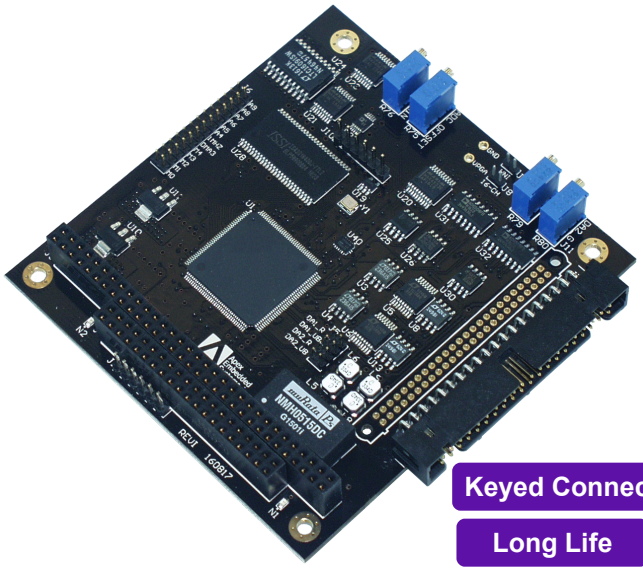
Apex Embedded Systems

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

STX104

June 10, 2018 **STX104-1MFIFO-DAQ**

The STX104 is a High-Reliability PC/104 16 channel 16-bit analog input and dual 16-bit analog output module that incorporates a large one million sample FIFO.



Keyed Connectors

Long Life

Analog Inputs

- **Huge One Million Sample FIFO** enables applications to run without data loss under long service latencies with or without interrupts.
- **Maximum Aggregate Sample Rate:** 200,000 samples per second. Timing adjustable to 25 nanosecond resolution.
- **Very Low Noise:** Less than 1.5-LSB RMS over all input ranges (1.1-LSB typical). Noise reduction to 0.6-LSB RMS can be achieved using the jumper or software selectable sixteen sample moving average filter.
- **Triggering Subsystem:** 14 start events, 15 stop events, 12 synchronization events, delay timer and three possible triggering sequences.
- **Channels:** 16-channel single-ended or 8-channel differential inputs.
- **Resolution:** 16-bits.
- **Ranges:** ±10V, ±5V, ±2.5V, ±1.25V, 0-10V, 0-5V, 0-2.5V, 0-1.25V

Analog Outputs

- **Resolution:** 16-bits.
- **Ranges:** ±10V, ±5V, 0-5V, 0-10V
- **Channels:** Two channel single-ended.

Digital Inputs/Outputs

- **Inputs:** Four channels with software configurable polarity and de-glitch filter.
- **Outputs:** Four channels with software configurable polarity.

General

- **Legacy compatibility:** CIO-DAS1602/16, DAS-1602/16-P5, DAS-16/16jr, PC104-DAS16JR/16, PC104-DAS16JR/12, DAC-02, Keithley DAS-16 Series. Superset register set functionality extending beyond legacy features.
- **Environmental:** Wide operating temperature from -40°C to +85°C.
- **Out-gassing and fire avoidance:** We do not use any tantalum or electrolytic capacitors in any products.
- **Reliability:** MTBF of 664,780 hours per MIL-HDBK-217F ground benign at 25°C.
- **Polarized Connectors** prevent incorrect cable installations.
- **LED Status:** An LED displays valid card activity which is useful for both product development and field status.
- **Flexible CPU Support:** The STX104 has a very flexible CPU interface support including ten or sixteen bit address decoding, and eight or sixteen bit data bus (i.e. without or with 40-pin PC/104 connector, respectively).
- **Single +5V Operation:** Power less than 1.5 Watts.
- **Interrupts** can be generated via a broad range of events including analog input sample count thresholds (from 1 to 1 million samples), external digital inputs and triggering events. All IRQ lines are supported.

Support

- **Long Term Commitment:** We are committed to delivering long product life and dedicated to ongoing product updates and improvements to enhance long product life.
- **Customer Service:** We are committed to serving our customers. We offer 24/7 online ordering with a variety of payment and shipping options for quick and hassle free ordering.
- **Production:** Designed and Manufactured in Wisconsin, USA, utilizing an ISO 9001 manufacturing facility.
- **Software Drivers:** Linux, Windows and DOS drivers are available as well as other third party software tools (legacy compatibility with many other cards).
- **Individual Customer Assistance:** We will do whatever we can to assist you in designing in our products.

Accessories

- Flat ribbon cable, 40-pin w/3M polarized IDC sockets and pull tab, 7.5-inches or 18-inches in length.
- 40-Pin Terminal Breakout Boards.
- **New:** High retention connector 2mm pin-to-wire option, contact factory.
- **New:** 4 Million sample FIFO option, contact factory.

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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: ±10ppm/°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 minimum, adjustable to 25 nS.
Analog Input Sampling Sources: 32-bit sample/frame timer, interrupt threshold counter, rising/falling edges of any digital input, and all legacy modes including 8254 counter, external source (DI0/TRIG) or software polled. Note: interrupt threshold counter can be used (independent of any interrupts) to pre-scale sampling source.
Data Transfer: From 1MEG sample FIFO via interrupt, 8- or 16-bit transfers, Single (one at a time), Burst or INSW() Instruction.

Triggering Subsection

Start Events: none, software, analog input sample/frame timer, 8254 counter outputs, any digital input falling or rising edge.
Stop Events: none, software, analog input sample/frame maximum count, analog input sample/frame timer, 8254 counter outputs, any digital input falling or rising edge.
Synchronization Events: none, software, analog input sample/frame timer, 8254 counter outputs, any digital input falling or rising edge. Example: 50/60Hz line synchronization.
Start Delay: 0 nanoseconds to 54 seconds.
Trigger Sequencing: (1) Start-->Sample,
(2) Start-->Delay-->Sample,
(3) Start-→Sync-→Delay-→Sample.

Analog Outputs

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.
Maximum Current: 5 milliamps per channel
Offset error: less than 24 LSB
Output Coupling: DC
Initial Output State: less than 20 millivolts independent of range.
Gain error: Adjustable to 0 by potentiometer
Settle Time: 10 microseconds
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: Input current due to 10K pull-up resistor to +5V. Logic 0: -0.5mA at 0.8V, and Logic 1: -260uA at 2.4V.
Input Filters: 200 nS (default) or 100 nS
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

General

Operating temperature range: -40°C to +85°C
Storage temperature range: -55°C to 125°C
Factory Calibration: Full NIST Traceable
Humidity: 0 to 95% non-condensing
Power Supply: 5VDC ± 5%; 1.5 Watts max.
Interface: PC/104 8-bit or 16-bit data, 10-bit address.
Weight: 0.2 lbs (91 grams), excluding spacers.

Ordering Information

Description: STX104 16-bit Analog I/O Module with 1M sample FIFO and dual 16-bit DACs.
SKU: STX104-1MFIFO-DAQ

Description: STX104 16-bit Analog I/O Module with 1M sample FIFO and without dual 16-bit DACs.
SKU: STX104-1MFIFO-DAQ-NODACS

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