

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*

KUSB-3100 Series

USB-Based Data Acquisition Modules



- **USB 2.0 and USB 1.1, true plug-and-play compatibility**
- **Five different USB-based compact measurement systems**
- **12- and 16-bit resolution**
- **High and low programmable gains**
- **Input/output speeds up to 500kS/s**
- **Up to 96 digital lines for monitoring or control**
- **500V isolation barrier protects the computer and module from voltage spikes, ESD, and surges**
- **Runs under Windows® 2000 and XP platforms**

Now, adding data acquisition capabilities to your PC is as easy as plugging in a mouse or keyboard. Within minutes of connecting one of our compact data acquisition modules to your computer and your sensor directly to the module, you're ready to make measurements of voltage, temperature, pressure—whatever you need. And you have done this without opening your PC, without complicated programming, and without spending time configuring the module, power requirements, or connection schemes.

The Keithley KUSB-3100 Series brings true plug-and-play data acquisition to computers that contain Universal Serial Bus (USB) 2.0 and 1.1 ports. No more opening up your computer chassis to install boards—just plug in the module, install the included software, and you are ready to make measurements. It's easy and efficient.

Why USB?

Today, virtually all desktop and laptop PCs provide USB ports. In addition, USB ports can easily be added to existing PCI-bus machines. Equally important, these USB ports have full software support under the most popular computer operating systems, including Microsoft® Windows 2000 and XP.

Easy to Install, Easy to Share

USB devices are true "plug-and-play." There is no setting of address lines, interrupts, or configuration jumpers. The host PC automatically identifies a KUSB-3100 Series module when it is plugged in and searches for the software necessary to operate it. The first time a module is used, the user is prompted to install the drivers and application, a process that takes just a few minutes. Ease of installation means the KUSB-3100 Series modules can be shared between both laptop and desktop computers.

Hot-Swappable

The KUSB-3100 Series USB modules are hot-swappable, designed to be installed and removed while the computer is running. All you need to do is plug the module into a USB port when you need to use the module, and remove it when you are done.

Software

Every KUSB module includes the following software tools:

- A Quick DataAcq application provides a quick way to get the module up and running. It can collect A/D data and display data on the screen.
- DataAcq SDK is a Software Development Kit (SDK), allowing programmers to develop application programs for the KUSB-3100 Series using the Microsoft C compiler in Windows 2000 or Windows XP.
- ActiveX controls allow Microsoft Visual Basic® or Visual C++® programmers to access the capabilities of the KUSB-3100 Series modules.
- LabVIEW™ VIs allow LabVIEW programmers to access the capabilities of the KUSB-3100 Series modules.

Additional application software and examples are available at www.keithley.com.

Protecting Your Investment

The KUSB-3100 Series modules are external to the computer. This external location provides performance benefits for noise-sensitive devices like data acquisition systems. They can be placed away from the noisy environment of the PC and power supplies and can be positioned closer to the signals you need to measure.

1.888.KEITHLEY (U.S. only)

www.keithley.com

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

KUSB-3100 Series

Ordering Information

KUSB-3100
Economical Multifunction Data Acquisition USB Module

KUSB-3102
Low Gain Multifunction Data Acquisition USB Module

KUSB-3108
High Gain Multifunction Data Acquisition USB Module

KUSB-3116
High Performance Multifunction Data Acquisition USB Module

KUSB-3160
96-Channel Digital I/O USB Module

ACCESSORIES SUPPLIED

- USB cable
- CD-ROM containing a single user license, all user manuals, and the following software: KUSB device driver, Quick DataAcq application, DataAcq SDK, DTx-EZ, DT-LV Link.
- Power Supply with KUSB-3116 ONLY

TYPICAL APPLICATIONS

- Voltage, temperature, strain, and vibration measurements
- Analog stimulus/response testing
- Relay control
- Switch closure sensing
- System automation
- Security systems and monitoring
- Burn-in
- Position measurements
- Frequency/event counting
- In-vehicle automotive testing
- Life science research
- Educational teaching labs

1.888.KEITHLEY (U.S. only)
www.keithley.com

USB-Based Data Acquisition Modules

Because USB modules reside outside the computer, they can be susceptible to ground spikes, ESD, surges, and other damaging conditions. These spikes can cause system failure and may even cause permanent damage to your computer. The KUSB-3100 Series modules feature a 500V isolation barrier (except the KUSB-3100), which protects your computer and ensures a reliable stream of data.

Solutions for Demanding Applications

Keithley offers a variety of KUSB solutions to meet your demanding measurement needs.

	KUSB-3100	KUSB-3102	KUSB-3108	KUSB-3116	KUSB-3160
Description	Low cost, multifunction	Low gain, multifunction	High gain, multifunction	High performance, multifunction	96-channel digital I/O
Resolution	12-bit	12-bit	16-bit	16-bit	
Throughput	50 kS/s	100kS/s	50kS/s	500kS/s	
Analog Input Channels	8 SE	16 SE/8 DI	16 SE/8 DI (1 CJC)	16 SE/8 DI	
Analog Output Channels	2	2	2	4 waveform quality	
Digital I/O Channels	16	17	17	33	96
Counter/Timers	1	2	2	5	
Gain	1, 2, 4, 8	1, 2, 4, 8	1, 10, 100, 500	1, 2, 4, 8	
Connectivity	Built-in screw terminals	Built-in/Removable screw terminals	Built-in/Removable screw terminals	BNC and 37-pin D-type connectors	Mass termination connector; Optional external cable and screw terminal panel

KUSB-3100

The KUSB-3100 module, our economical solution, provides eight single-ended inputs with 12-bit resolution, up to 50 kS/s throughput, two 12-bit ±10V analog outputs, 16 digital I/O lines, and 1 counter/timer.



KUSB-3100

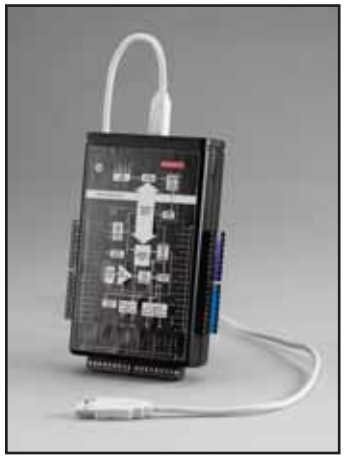
KUSB-3102

The KUSB-3102 module offers 16 single-ended or eight differential inputs with 12-bit resolution, up to 100kS/s throughput, two 12-bit analog outputs, 17 digital I/O lines, and two counter/timers. The 500V isolation barrier protects your computer and ensures a reliable stream of data.

KUSB-3108

The KUSB-3108 module features a variety of analog input channels, including a Cold Junction Compensation (CJC) channel, as well as single-ended/differential analog input channels. The CJC channel provides 10mV/ºC with an accuracy of 1ºC. The differential analog input channels can be used for B, E, J, K, N, R, S, or T type thermocouples. To measure other low-level analog input signals, such as pressure and flow sensors, you can use these channels to connect up to 16 single-ended/eight differential analog inputs. Thermocouple break detection is also provided to set the value to full-scale if an open circuit is detected at the input.

In addition, the KUSB-3108 provides two analog output channels for high resolution, single-value output operations, 17 digital I/O lines, and two counter/timer channels. The 500V isolation barrier protects your computer and ensures a reliable stream of data.



KUSB-3102, KUSB-3108

KUSB-3116

The KUSB-3116 module combines the functionality of multiple boards in a single USB 2.0 module to provide simultaneous analog input, analog output, digital I/O, and counter/timer operations. The

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

KUSB-3100 Series

USB-Based Data Acquisition Modules



KUSB-3116

KUSB-3116 provides maximum flexibility: 16-bit resolution, 16 single-ended inputs, four 16-bit waveform quality analog outputs at sampling rates up to 500 kSamples/s, 16 digital input lines, 16 digital output lines, and five 32-bit counter/timer channels. This module is enclosed in a metal box with standard BNC and D-sub connectors for analog I/O and digital I/O, and for connecting external clocks and triggers. The metal box makes this module perfect for industrial applications and environments that require enclosures that protect the instrumentation. The 500V isolation barrier protects your computer and ensures a reliable stream of data.

The KUSB-3116 is fully compliant with USB 2.0. USB 2.0 extends the speed of connection to up to 480 Mbps. For optimal performance, it is recommended that you use the KUSB-3116 with a USB 2.0 port. The KUSB-3116 can be used with a USB 1.1 port, but at USB 1.1 performance.

KUSB-3160



KUSB-3160

The KUSB-3160 module provides 96 digital lines, 64 I/O and 32 input, grouped into twelve 8-bit ports. Eight ports are either input or output with four ports dedicated as inputs. Digital outputs are capable of driving external solid-state relays (12mA sink). The KUSB-3160 can generate an interrupt when any of the eight digital I/O lines corresponding to ports 1 or 2 changes state. This feature is useful when you want to monitor critical signals or when you want to signal the host computer to transfer data to or from the board. You can enable the interrupts on a bit-by-bit basis on this port. All signals are brought out to a dedicated, standard 100-pin connector on the backplate of the KUSB-3160 module. The KUSB-STP100 screw terminal panel and KUSB-CABDIO are available to simplify connections. The 500V isolation barrier protects your computer and ensures a reliable stream of data.

Analog Inputs

All KUSB-3100 Series modules (except KUSB-3160) feature up to 16 single-ended or eight differential inputs. In addition, an Amp Low connection (KUSB-3102 and KUSB-3108 only) allows single-ended inputs to be referenced to a common point other than ground to provide up to 16 pseudo-differential inputs. Software-selectable gain settings on the KUSB-3100, -3102, and -3116 are 1, 2, 4, and 8, which provide input ranges of ±1.25V, ±2.5V, ±5V, and ±10V.

The KUSB-3108 provides four programmable gains (1, 10, 100, and 500) to support input signal ranges of ±10V, ±1V, ±0.10V, and ±0.020V. For thermocouple inputs, which are typically in the range of 20mV, the KUSB-3108 module provides a dynamic range of 100,000:1 (100dB) to ensure that the input signals are amplified to the full ±10V range of the A/D converter and digitized to 16 bits for maximum accuracy.

The KUSB-3108 module also supports auto-ranging, where the software can determine the appropriate gain based on the input range you specify (in single value mode). The maximum sampling rate depends on the gain that is used: 50 kSamples/s when the gain is 1 or 10, 10 kSamples/s when the gain is 100, and 2 kSamples/s when the gain is 500. The minimum sampling rate is 0.75Hz.

Analog Input Acquisition Modes

The analog inputs allow you to acquire a single value from any channel or a number of samples from multiple channels. To acquire data from multiple channels, two scan modes are provided: continuously paced and triggered. With the continuously paced mode, the module scans the channel-gain list continuously and acquires data until you stop the operation or until a specific number of samples are acquired. With triggered scan mode, the module scans the channel-gain list at high speeds with a programmed interval between scans, emulating a simultaneous sample-and-hold operation. You can pace either scan mode using an internal or external clock.

For added flexibility, a multi-location channel-gain list allows you to sample non-sequential channels and channels with different gains. The A/D resolution and maximum sampling rate vary depending on the module type.

Analog Trigger Modes

Internal Triggers: Software Trigger, Triggered Scan Counter
External Trigger: External TTL Trigger Input

The external A/D sample clock and the digital trigger input signals are accessible through the user connector.

Analog Outputs

Each KUSB-3100 Series module provides a different selection of analog output specifications. The KUSB-3100 module features two ±10V analog outputs at 12-bit resolution with a 50kHz throughput. The KUSB-3102 module features two 12-bit analog output channels. These analog outputs offer output ranges of ±5V, ±10V, 0–5V, and 0–10V. The KUSB-3108 and KUSB-3116 modules feature 16-bit analog outputs with a range of ±10V. The KUSB-3108 offers two analog output channels, while the KUSB-3116 provides four deglitched waveform quality analog outputs with sampling rates up to 500kS/s. The KUSB-3116 analog outputs offer a continuous output mode and a waveform mode where the waveform can contain up to 128 kSamples for a single channel or a set of waveforms for all analog output channels with waveforms containing 24 kSamples.

Digital I/O

All KUSB-3100 Series modules feature a wide range of digital I/O lines. These lines are divided into sets of input and output ports. You can read the status of input ports at rates as high as the maximum speed of the A/D. A dynamic digital input feature allows you to "time stamp" the digital inputs in relation to the analog inputs.

Counter/Timers

Dedicated counter/timers are available on the KUSB-3100 Series (except KUSB-3160) for counting events, creating a one-shot or frequency output, or measuring a frequency input. If applicable, you can cascade two counters internally through software or cascade more than two counters exter-

KUSB-3100 Series

USB-Based Data Acquisition Modules

RECOMMENDED ACCESSORIES

KUSB-CABDIO	100-pin Cable for KUSB-STP100 and KUSB-3160
KUSB-STP100	Screw Terminal Panel for KUSB-3160

OPTIONAL ACCESSORIES

4801	48˝ Low Noise Coax BNC to BNC Cable. For KUSB-3116
7051-2	2´ General Purpose BNC to BNC Cable. For KUSB-3116
7051-5	5´ General Purpose BNC to BNC Cable. For KUSB-3116
7051-10	10´ General Purpose BNC to BNC Cable. For KUSB-3116
7401	Type K thermocouple Wire Kit, 100 ft. For KUSB-3108
C1800	18˝ Ribbon Cable with one 37-Pin D-type female connector and one 37-Pin D-type male connector. For KUSB-3116
C-1800/M	18˝ Ribbon Cable with two 37-Pin D-type female connectors. For KUSB-3116
KUSB-BNC-DIN-KIT	DIN Rail Kit for KUSB-3116
KUSB-DIN-MOUNT-KIT	DIN Rail Mount Kit for KUSB-3102, -3108, -3160
KUSB-ST	Extra Screw Terminal Blocks for KUSB-3102 and KUSB-3108
S1803	Shielded 4.5´ Cable with 37-Pin D-type female connectors. For KUSB-3116
S1805	Shielded 6.5´ Cable with 37-Pin D-type female connectors. For KUSB-3116
STA-U	Universal Screw Terminal Accessory for KUSB-3116

SYSTEM REQUIREMENTS:

PC with Pentium 233MHz processor minimum
256MB RAM or higher recommended
Windows 2000/XP operating system
USB ports – One or more (version 2.0 or 1.1)
Super VGA (800 × 600) or higher resolution monitor
CD-ROM drives – one or more

nally on the user connections. You can also set the duty cycle, frequency, and output polarity of the output pulse from the user counter/timers.

User Connections

A single USB cable, shipped with each KUSB-3100, -3102, -3108, and -3160 module, provides both power and signal connections from your PC. No external power supply or battery is required. The KUSB-3116 includes a USB cable and +5V 2A power supply and power cable.

Signal connections are made directly to each module using either screw terminals, BNC connectors, or 37-pin D-type connectors located on the module itself. The KUSB-3102 and -3108 provide removable screw terminal blocks. Pin assignments are clearly marked on the module labels for quick setup.

KUSB-3100 Series Specifications

ANALOG INPUT SPECIFICATIONS

	KUSB-3100	KUSB-3102	KUSB-3108	KUSB-3116
Number of Analog Input Channels	8 SE	16 SE/pseudo-DI, 8 DI	16 SE/pseudo-DI, 8 DI (7 T/C, 1 CJC)	16 SE/8 DI
Resolution	12-bit	12-bit	16-bit	16-bit
Channel-Gain List	16 locations	32 locations	32 locations	1024 locations
Input FIFO Size	2000[3] samples	512 samples	2048 samples	2048 samples
Gains	1, 2, 4, 8	1, 2, 4, 8	1, 10, 100, 500	1, 2, 4, 8
Input Range				
Bipolar	±10, 5, 2.5, 1.25 V	±10, 5, 2.5, 1.25 V	±10, 1, 0.1, 0.02 V	±10, 5, 2.5, 1.25 V
Unipolar		0–10, 5, 2.5, 1.25 V		
System Accuracy to % of FSR (averaged over 50 readings)	0.04% @ Gain = 1 0.06% @ Gain = 2 0.08% @ Gain = 4 0.15% @ Gain = 8	0.03% @ Gain = 1 0.04% @ Gain = 2 0.05% @ Gain = 4 0.05% @ Gain = 8	0.01% @ Gain = 1 0.02% @ Gain = 10 0.03% @ Gain = 100 0.04% @ Gain = 500	See note 2
Nonlinearity	0.05%	±1 LSB	±4 LSB	<0.5 LSB
Differential Nonlinearity	±0.5 LSB	±0.5 LSB (no missing codes)	±1.2 LSB (no missing codes)	0.5 LSB
Drift				
Zero	±100 µV	±30 µV + (20 µV · Gain)/°C	±25 µV + (5 µV · Gain)/°C[4]	±10 µV/°C
Gain	±100 ppm	±30 ppm/°C	±20 ppm/°C	±30 ppm/°C
Differential Linearity	Monotonic			±2 ppm/°C
Input Impedance[1]				
Off Channel	10 MΩ, 10 pF	100 MΩ, 10 pF	100 MΩ, 10 pF	100 MΩ, 10 pF
On Channel	10 MΩ, 100 pF	100 MΩ, 100pF	100 MΩ, 100 pF	100 MΩ, 100 pF
Input Bias Current	±10 nA	±20 nA	±10 nA	±20 nA
Maximum Input Voltage (without damage)				
Power On	±35 V	±40 V	±40 V	±35 V
Power Off	±20 V	±20 V	±20 V	±20 V
Common Mode Voltage	±11 V max. (operational)	±11 V max. (operational)	±11 V max. (operational)	±11 V max. (operational)
Common Mode Rejection	N/A	>74 dB	>74 dB	80 dB (gain = 1 @ 1 kΩ)
A/D Conversion Time	8 µs	6.6 µs	8 µs	2 µs
A/D Converter Noise	0.6 LSB rms	0.3 LSB rms	0.4 LSB rms	0.4 LSB rms
Channel Acquisition Time	20 µs (±0.5 LSB)	3 µs	6 µs (gain = 1) 250 µs (gain = 500)	1 µs (±0.5 LSB) typical
Channel-to-Channel Offset	0.1mV	±40 µV	±40 µV	±40 µV
Throughput	50 kS/s	100 kS/s	50 kS/s	500 kS/s (single channel), 500 kS/s + 0.05% (multiple channel)
CJC Voltage @ 25°C			0.25 V	
CJC Accuracy			1° from 5° to 45°C	
CJC Warm-up Time			10 to 20 minutes	

1.888.KEITHLEY (U.S. only)
www.keithley.com

KEITHLEY
A GREATER MEASURE OF CONFIDENCE

KUSB-3100 Series Specifications (continued)

ANALOG INPUT SPECIFICATIONS (continued)

	KUSB-3100	KUSB-3102	KUSB-3108	KUSB-3116
Thermocouple Break Detection Current			50 nA (high-side differential) outputs full-scale for gains greater than 1, or 2.5 V for gains of 1	
Effective Number of Bits (ENOB)	10.5 bts typical	11.5 bits	14.1 bits	14.6 bits
Total Harmonic Distortion (THD)	<-70 dB typical	–80 dB typical	–90 dB typical	–90 dB typical
Channel Crosstalk	–74 dB @ 1 kHz	–80 dB @ 1 kHz	–80 dB @ 1 kHz	–80 dB @ 1 kHz
Maximum A/D Pacer Clock				
Single Analog Input Throughput	50 kHz	100 kS/s @ 0.03% accuracy	50 kS/s @ 0.01% accuracy at gain of 1–10	50 kS/s
Multiple Analog Input Throughput	50 kHz	100 kS/s @ 0.03% accuracy	50 kS/s @ 0.01% accuracy at gain of 1–10 10 kS/s @ 0.03% accuracy at gain of 100 2 kS/s @ 0.04% accuracy at gain of 500	50 kS/s @ ±0.05%
Minimum A/D Pacer Clock Throughput	0.75 S/s	0.75 S/s	0.75 S/s	0.00419 S/s
External A/D Sample Clock				
Minimum Pulse Width	200 ns (high) 200 ns (low)	600 ns (high) 600 ns (low)	600 ns (high) 600 ns (low)	25 ns (high) 25 ns (low)
Maximum Frequency (Analog Inputs)	50 kHz	100 kHz	50 kHz	500 kHz
Maximum Frequency (Digital Inputs Only)	N/A	Maximum A/D rate	Maximum A/D rate	Maximum A/D rate
External Digital (TTL) Trigger				
High Input Voltage	2.4 V min.	2.4 V min.	2.4 V min.	3.3 V min.
Low Input Voltage	0.8 V max.	0.8 V max.	0.8 V max.	0.8 V max.
Minimum Pulse Width	200 ns (high) 200 ns (low)	600 ns (high) 600 ns (low)	600 ns (high) 600 ns (low)	25 ns (high) 25 ns (low)

[1] Very high input impedance minimizes any source error.

[2] System accuracy (% of FSR) of KUSB-3116

	500kHz	400kHz	250kHz
Gain = 1	±0.05%	±0.03%	±0.01%
Gain = 2	±0.06%	±0.04%	±0.02%
Gain = 4	±0.07%	±0.05%	±0.02%
Gain = 8	±0.09%	±0.07%	±0.03%

[3] Total FIFO size used for both A/D and D/A on the module is 2k.

[4] This value is referenced to voltage entering the A/D converter. To reference this value to the original voltage signal, use {[±25µV + (5µV · Gain)]/Gain}/°C.

KUSB-3100 Series

USB-Based Data Acquisition Modules

ANALOG OUTPUT SPECIFICATIONS

	KUSB-3100	KUSB-3102	KUSB-3108	KUSB-3116
Number of Analog Output Channels	2	2	2	4
Resolution	12-bit	12-bit	16-bit	16-bit
Output Range	±10 V	±5, ±10, 0–5, 0–10 V	±10 V	±10 V
Nonlinearity	0.05%	±1 LSB	±4 LSB	±1 LSB
Differential Nonlinearity	±1 LSB	±1 LSB	±1 LSB	±1 LSB
Differential Linearity	±1 LSB (monotonic)	±0.5 LSB (monotonic)	±1.0 LSB (monotonic)	±1 LSB (monotonic)
Error				
Gain	±0.2%	±2 LSB + reference	±6 LSB	Adjustable to 0
Zero	±4 mV	Software adjustable to 0	Software adjustable to 0	Adjustable to 0
Drift				
Zero (bipolar)	±100 µV/°C	±10 ppm of FSR/°C	±10 ppm of FSR/°C	±10 ppm of FSR/°C
Gain	±100 ppm	±30 ppm of FSR/°C	±30 ppm of FSR/°C	±30 ppm of FSR/°C
Throughput				
Single Value		50 Hz	System dependent	
Waveform Generation Mode	50 kHz			500 kS/s
Continuously Paced Analog Output Mode	50 kHz			500 kS/s
Current Output	+2 mA max. load	+5 mA max. load	+5 mA max. load	+5 mA max. load
Output Impedance	<0.2 Ω	0.3 Ω typical	0.3 Ω typical	0.1 Ω
Capacitive Drive Capability	1000 pF min.	0.001 µF (no oscillators)	0.001 µF (no oscillators)	0.004 µF
Protection	Short to ground	Short to analog common	Short to analog common	Short to analog common
Power-on Voltage	0V ±10 mV	0V ±10 mV	0V ±10 mV	0V ±10 mV
Setting Time to 0.01% of FSR	20 µs	50 µs, 20 V step; 10.0 µs, 100 mV step	50 µs, 20 V step; 10.0 µs, 100 mV step	5 µs, 10 V step; 4 µs, 100 mV step
Slew Rate	2 V/µs	2 V/µs	2 V/µs	10 V/µs

DIGITAL I/O SPECIFICATIONS

	KUSB-3100	KUSB-3102	KUSB-3108	KUSB-3116	KUSB-3160[2]
Number of Digital I/O Lines	8 in, 8 out	8 in (Port A), 8 out (Port B)	8 in (Port A), 8 out (Port B), 1 dynamic digital output	16 in, 16 out, 1 dynamic digital output	8 bidirectional per port (Ports 0–7), 8 inputs per port (Ports 8–11)
Logic Family	TTL	TTL	TTL	LVTTL	TTL
Logic Sense	Positive true	Positive true	Positive true	Positive true	Positive true
Inputs					
Input Type	Level sensitive	Level sensitive	Level sensitive	Level sensitive	Level sensitive
Input Logic Load	1 TTL load	1 TTL load	1 TTL load	1 LVTTL load	1 TTL load
High Input Voltage	2.4 V min.	2.0 V min.	2.0 V min.	2.0 V min.	2.0 V min.
Low Input Voltage	0.8 V max.	0.8 V max.	0.8 V max.	0.8 V max.	0.8 V max.
Low Input Current	–0.4 mA max.	–3 µA	–3 µA	–0.4 mA max.	
High Input Current		3 µA	3 µA		
Pulse Width (min.)					66 ns high and low[1]
Internal Pacer Clock Rate (max.) (single digital channel)	N/A	Max. A/D rate	Max. A/D rate (Port A and dynamic digital output)	Max. A/D rate	N/A
Outputs					
Fan Out	12 mA	12 mA	12 mA	12 mA	12 mA
High Voltage Output	2.8 V min.	74 HCT 244 (TTL) 2.4 V min.	2.4 V min.	2.0 V min.	2.4 V min.
Low Voltage Output	0.6 V max.	0.5 V max.	0.5 V max.	0.8 V max.	0.5 V max.
High Output Current (Source)	2 mA	1 mA	–1 mA Port B 1 mA DDO	–12 mA	–15 mA
Low Output Current (Sink)	10 mA	12 mA	12 mA (Port B) or 2 mA (dynamic digital output)	12 mA	12 mA
Interrupt on Change	No	No	No	Yes	Yes
Clocked with Sample Clock	Yes	Yes	Yes	Yes	No

1 The minimum pulse width applies only to interrupt-on-change detection for Ports 1 and 2. Pulses less than the minimum may not be detected as a change. All diodes back EMF protected for inductive loads.

2 The mass termination connector is a 100-pin D, Robinson Nugent part #P50E-100P1-SR1-TG. The mating connector is a 100-pin Robinson Nugent part #P50E-100S-TG.

COUNTER/TIMER SPECIFICATIONS

	KUSB-3100	KUSB-3102	KUSB-3108	KUSB-3116
Number of Counter/Timers	1	2	2	5[1]
Resolution	32-bit	16-bit	16-bit	32-bit
Minimum Pulse Width (minimum amount of time for a C/T to recognize an input pulse)	200 ns	600 ns (high); 600 ns (low)	600 ns (high); 600 ns (low)	55.5 ns
Logic Family	TTL	TTL	TTL	LVTTL
Inputs	Level sensitive	Level sensitive	Level sensitive	Edge sensitive
Input Logic Load	1 TTL load	1 TTL load	1 TTL load	1 LVTTL load
High Input Voltage	2.4 V min.	2.4 V min.	2.4 V min.	2.0 V max.
Low Input Voltage	0.8 V max.	0.8 V max.	0.8 V max.	0.8 V max.
Low Input Current	–0.4 mA max.	0.4 mA max.	0.4 mA max.	–0.4 mA max.
Clock Inputs				
High Input Voltage	2.4 V min.	2.4 V min.	2.4 V min.	2.0 V
Low Input Voltage	0.8 V max.	0.8 V max.	0.8 V max.	0.8 V
Min. Pulse Width	200 ns	600 ns (high) 600 ns (low)	600ns (high) 600ns (low)	25 ns
Max. Frequency	6 MHz	750 kHz	750 kHz	9 MHz
Gate Inputs				
High Input Voltage	2.4 V min.	2.4 V min.	2.4 V min.	2.4 V min.
Low Input Voltage	0.8 V max.	0.8 V max.	0.8 V max.	0.8 V max.
Outputs				
Fan Out	12 mA	12 mA	12 mA	12 mA
High Voltage Output	2.8 V min.	3.0 V min.	3.0 V min.	2.0 V min.
Low Voltage Output	0.6 V max.	0.4 V max.	0.4 V max.	0.8 V max.
High Output Current (Source)	2 mA	1 mA	1 mA	–12 mA max.
Low Output Current (Sink)	12 mA	2 mA	2 mA	12 mA max.

1 Has same logic high and low voltage and current specifications as the digital I/O lines.

POWER, PHYSICAL, AND ENVIRONMENTAL SPECIFICATIONS

	KUSB-3100	KUSB-3102	KUSB-3108	KUSB-3116	KUSB-3160
Power	<100 mA			±5%, @2 A max.	
+5V Enumeration Operation	<250 mA	100 mA max.	100 mA max.		100 mA max.
+5V Standby		0.5 mA max.	0.5 µA max.		0.5 mA max.
+5V Power On		500 mA max.	500 mA max.		500 mA max.
+5V Isolated Power Out (TB 27)		10 mA max.	10 mA max.		
Physical					
Dimensions	100mm (L) × 100mm (W) × 25mm (H)	6.5 in (L) × 4.5 in (W) × 1.4 in (H)	6.5 in (L) × 4.5 in (W) × 1.4 in (H)	190mm × 100mm	150mm × 100mm
Weight	4.8 oz. (136 g)	9 oz. (255 g)	9 oz. (255 g)	2 lbs. (906 g)	9 oz. (255 g)
Environmental					
Operating Temperature	0° to 70°C	0° to 55°C	0° to 55°C	0° to 55°C	0° to 50°C
Storage Temperature	–40° to 125°C	–25° to 85°C	–25° to 85°C	–25° to 85°C	–25° to 85°C
Relative Humidity	To 95% non-condensing	To 95% non-condensing	To 95% non-condensing	To 95% non-condensing	To 95% non-condensing
Certification and Compliance	FCC Part 15 Class B verified; will not compromise FCC compliance of host computer CE	FCC Part 15 Class B verified; will not compromise FCC compliance of host computer CE	FCC Part 15 Class B verified; will not compromise FCC compliance of host computer CE	FCC Part 15 Class B verified; will not compromise FCC compliance of host computer CE	FCC Part 15 Class B verified; will not compromise FCC compliance of host computer CE

KUSB-3100 Series

USB-Based Data Acquisition Modules

Specifications are subject to change without notice.
All Keithley trademarks and trade names are the property of Keithley Instruments, Inc.
All other trademarks and trade names are the property of their respective companies.

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

KEITHLEY INSTRUMENTS, INC. ■ 28775 AURORA ROAD ■ CLEVELAND, OHIO 44139-1891 ■ 440-248-0400 ■ Fax: 440-248-6168 ■ 1-888-KEITHLEY ■ www.keithley.com

BELGIUM
Sint-Pieters-Leeuw
Ph: 32-2363-0040
Fax: 32-2363-0064
www.keithley.nl

CHINA
Beijing
Ph: 8610-82255010
Fax: 8610-82255018
www.keithley.com.cn

FINLAND
Espoo
Ph: 358 9 88171661
Fax: 358 9 88171662
www.keithley.com

FRANCE
Saint-Aubin
Ph: 33-1-6453-2020
Fax: 33-1-60-1-77-26
www.keithley.fr

GERMANY
Germering
Ph: 49-89-84-93-070
Fax: 49-89-84-93-0734
www.keithley.de

UNITED KINGDOM
Theale
Ph: 44-118-929-7500
Fax: 44-118-929-7519
www.keithley.co.uk

NDIA
Bangalore
Ph: 91-80-2212-8027
Fax: 91-80-2212-8005
www.keithley.com

ITALY
Milano
Ph: 39-02-55 38 421
Fax: 39-02-55 38 42 28
www.keithley.it

JAPAN
Tokyo
Ph: 81-3-5733-7555
Fax: 81-3-5733-7556
www.keithley.jp

KOREA
Seoul
Ph: 82-2-574-7778
Fax: 82-2-574-7838
www.keithley.co.kr

MALAYSIA
Kuala Lumpur
Ph: 60-3-4041-0899
Fax: 60-3-4042-0899
www.keithley.com

NETHERLANDS
Gorinchem
Ph: 31-1-836-35333
Fax: 31-1-836-30821
www.keithley.nl

SINGAPORE
Singapore
Ph: 65-6747-9077
Fax: 65-6747-2991
www.keithley.com.sg

SWEDEN
Solna
Ph: 46-8-509-04-600
Fax: 46-8-655-26-10
www.keithley.com

TAIWAN
Hsinchu
Ph: 886-3-572-9077
Fax: 886-3-572-9031
www.keithley.com.tw

© Copyright 2006 Keithley Instruments, Inc.

Printed in the U.S.A. No. 2607 Rev. 0706

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP