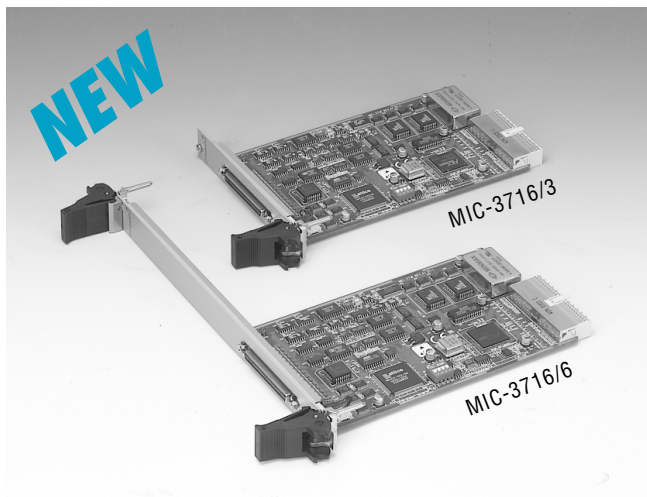


MIC-3716

250 KS/s, 16-bit, 16-ch
High-resolution Multifunction Card



Introduction

The MIC-3716 is a powerful high-resolution multifunction card for PCI bus. It features a 250 KS/s 16-bit A/D converter, an on-board 1K sample FIFO buffer for A/D. The MIC-3716 provides a total of up to sixteen single-ended or eight differential A/D input channels or a mixed combination, two 16-bit D/A output channels, 16 digital input/output channels, and one 10 MHz 16-bit counter channel. MIC-3716 provides specific functions for different user requirements:

MIC-3716 16-bit High-Resolution Multifunction Card

PCI-Bus Mastering Data Transfer

The MIC-3716 supports PCI-Bus mastering DMA for high-speed data transfer and gap-free analog input and analog output. By setting aside a block of memory in the PC, the MIC-3716 performs bus-mastering data transfers without CPU intervention, setting the CPU free to perform other more urgent tasks such as data analysis and graphic manipulation. The function allows users to run all I/O functions simultaneously at full speed without losing data.

Auto-calibration Function

The MIC-3716 provides an auto-calibration function by using a calibration utility. The built-in calibration circuitry of the MIC-3716 corrects gain and offset errors in analog input and analog output channels thereby eliminating the need for external equipment and user adjustments.

Board ID

The MIC-3716 has a built-in DIP switch that helps define each card's ID when multiple MIC-3716 cards have been installed on the same PC chassis. The board ID setting function is very useful when users build their system with multiple MIC-3716 cards. With the correct Board ID settings, the user can easily identify and access each card during hardware configuration and software programming.

Plug-and-Play Function

The MIC-3716 is a Plug-and-Play device, which fully complies with PCI Specification Rev 2.2. During card installation, there is no need to set jumpers or DIP switches. Instead, all bus-related configurations such as base I/O address and interrupt are automatically done by the Plug-and-Play function.

Features

- 16-bit high resolution
- 250 KS/s sampling rate
- Auto calibration function
- PCI-bus mastering for data transfer
- 16 analog input channels with 1K FIFO
- 16 S.E. or 8 Diff. AI, or a combination
- Unipolar/Bipolar input range
- 2 analog output channels (PCI-1716 only)
- 16 digital input channels
- 16 digital output channels
- One 10 MHz 16-bit resolution counter
- Board ID

Automatic Channel/Gain/SD*/BU* Scanning

The MIC-3716 features an automatic channel/gain/SD/BU scanning circuit. This circuit controls multiplexer switching during sampling in a way that is more efficient than software implementation. An on-board SRAM stores different gain, SD and BU values for each channel. This combination lets users perform multi-channel high-speed sampling with different gain, SD and BU values for each channel.

SD: Single-Ended/Differential; BU: Bipolar/Unipolar

On-board FIFO Memory

The MIC-3716 provides 1K sample on-board FIFO (First In First Out) memory buffer for AD. This is an important feature for faster data transfer and more predictable performance under the Windows system.

On Board Programmable Timer/Counter

The MIC-3716 provides a programmable timer counter for generating a pacer trigger for the A/D conversion. The timer/counter chip is 82C54, which includes three 16-bit counter 10 MHz clocks. One counter is used as an event counter for counting events coming from the input channel. The other two are cascaded together to make a 32-bit timer for pacer trigger time base.

Ordering Information

- **MIC-3716/3:** 3U, 250 KS/s, 16-bit, 16-ch High-Resolution Multifunction Card, user's manual and driver CD-ROM. (cable not included)
- **MIC-3716/6:** 6U, 250 KS/s, 16-bit, 16-ch High-Resolution Multifunction Card, user's manual and driver CD-ROM. (cable not included)
- **PCLD-8710:** Industrial Wiring Terminal Board with CJC circuit for DIN-rail Mounting. (cable not included)
- **PCL-10168:** 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 and 2 m
- **ADAM-3968:** 68-pin SCSI-II Wiring Terminal Board for DIN-rail Mounting

250 KS/s, 16-bit, 16-ch High-resolution Multifunction Card

Specifications

Analog Input

Channels	16 single-ended or 8 differential or combination					
Resolution	16-bit					
FIFO Size	1K samples					
Sampling Rate*	250 KS/s max.					
Conversion Time	2.5 μ s					
Input range and Gain List	Gain	0.5	1	2	4	8
	Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
	Bipolar	± 10	± 5	± 2.5	± 1.25	± 0.625
Small Signal Bandwidth for PGA Gain	Gain	0.5	1	2	4	8
	Bandwidth	4.0 MHz	4.0 MHz	2.0 MHz	1.5 MHz	0.65 MHz
Common mode voltage	± 11 V max. (operational)					
Max. Input voltage	± 20 V					
Input Protect	30 Vp-p					
Input Impedance	100 M Ω /10pF (Off); 100 M Ω /100pF (On)					
Trigger Mode	Software, on-board programmable pacer or external					
Accuracy	DC	DNLE: ± 1 LSB				
		INLE: ± 1 LSB				
		Zero (Offset) error: Adjustable to ± 1 LSB				
	Gain	0.5	1	2	4	8
	Gain error (% FSR)	0.15	0.03	0.03	0.05	0.1
	AC	SNR: 82 dB				
Clocking and Trigger Inputs	Trigger Mode	Software, on-board programmable pacer or external				
	A/D pacer clock	250 KHz (max.); 58 μ Hz (min.)				
	External A/D trigger clock	Min. pulse width: 2 μ s (high); 2 μ s (low) Max. frequency: 250 KHz				

Analog Output

Channels	2		
Resolution	16-bit		
Operation mode	Single output		
Throughput*	200 KS/s max. per channel (FSR)		
Output Range (Internal & External Reference)	Using Internal Reference	0 ~ +5 V, 0 ~ +10 V, -5 ~ +5 V, -10 ~ +10 V	
	Using External Reference	0 ~ +x V @ +x V (-10 \leq x \leq 10) -x ~ +x V @ +x V (-10 \leq x \leq 10)	
Accuracy	DC	DNLE: ± 1 LSB (monotonic)	
		INLE: ± 1 LSB	
		Zero (Offset) error: Adjustable to ± 1 LSB	
		Gain (Full-scale) error: Adjustable to ± 1 LSB	
Dynamic Performance	Settling Time	5 μ s (to 4 LSB of FSR)	
	Slew Rate	20 V/ μ s	
Drift	10 ppm/ $^{\circ}$ C		
Driving Capability	± 20 mA		
Output Impedance	0.1 Ω max.		

Digital Input/Output

Input Channels	16	
Input Voltage	Low	0.4V max.
	High	2.4 V min.
Input Load	Low	0.4 V max. @ -0.2 mA
	High	2.7 V min. @ 20 μ A
Output Channels	16	
Output Voltage	Low	0.4 V max. @ +8.0 mA (sink)
	High	2.4 V min. @ -0.4 mA (source)

Counter/Timer

Channels	3 channels, 2 channels are permanently configured as programmable pacers; 1 channel is free for user application	
Resolution	16-bit	
Compatibility	TTL level	
Base Clock	Channel 2: Takes input from output of channel 1 Channel 1: 10 MHz Channel 0: Internal 1 MHz or external clock (10 MHz) max Selected by software	
Max. Input Frequency	1 MHz	
Clock Input	Low	0.8 V max.
	High	2.0 V min.
Gate Input	Low	0.8 V max.
	High	2.0 V min.
Counter Output	Low	0.5 V max. @ +24 mA
	High	2.4 V min. @ -15 mA

General

I/O Connector Type	68-pin SCSI-II female	
Dimensions	175 mm x 100 mm (6.9" x 3.9")	
Power Consumption	Typical	+5 V @ 850 mA +12 V @ 600 mA
	Max.	+5 V @ 1 A +12 V @ 700 mA
Temperature	Operation	0 ~ +60 $^{\circ}$ C (32 ~ 158 $^{\circ}$ F) (refer to IEC 68-1, -2, -3)
	Storage	-20 ~ +85 $^{\circ}$ C (-4 ~ 158 $^{\circ}$ F)
Relative Humidity	Operation	5 ~ 85%RH non-condensing (refer to IEC 68-1, -2, -3)
	Storage	5 ~ 95%RH non-condensing (refer to IEC 68-1, -2, -3)
Certification	CE certified	

The sampling rate and throughput depends on the computer hardware architecture and software environment. The rates may vary due to programming language, code efficiency, CPU utilization and other factors.

Pin Assignment

A10	68	34	A11
A12	67	33	A13
A14	66	32	A15
A16	65	31	A17
A18	64	30	A19
A110	63	29	A111
A112	62	28	A113
A114	61	27	A115
A116	60	26	A116
A0L_REF	59	25	A0L_REF
A0L_OUT	58	24	A0L_OUT
A0GND	57	23	A0GND
D10	56	22	D11
D12	55	21	D13
D14	54	20	D15
D16	53	19	D17
D18	52	18	D19
D110	51	17	D111
D112	50	16	D113
D114	49	15	D115
D116	48	14	D116
D00	47	13	D01
D02	46	12	D03
D04	45	11	D05
D06	44	10	D07
D08	43	9	D09
D010	42	8	D011
D012	41	7	D013
D014	40	6	D015
D016	39	5	D016
CNT0_CLK	38	4	PACER_OUT
CNT0_OUT	37	3	TRQ_GATE
CNT0_GATE	36	2	EXT_TRG
+12V	35	1	+5V