

PCIe/PXIe-5500 Series

Family of Multi-functional Data Acquisition Boards



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Overview

The PCIe/PXIe-5500 Series is a family of multifunction data acquisition boards, which can run on PCIe, PXIe, TXI (Thunderbolt) and USB buses (coming soon). Depending on the model number, a 5500 series provide different AI channels, AO channels, sampling rate.

Main Features

- 32 single-ended or 16 differential 18-bit analog input channels
- 18 bits ADC
- 7 voltage ranges:
 $\pm 10V/\pm 5V/\pm 2V/\pm 1V/\pm 0.5V/\pm 0.2V/\pm 0.1V$
- 64M samples FIFO buffer for analog input
- 4 simultaneous 16-bit analog output channels
- 32M sample FIFO buffer for analog output
- 6 ports digital IO, 8 channels per port
- 4 general 32-bit timer/counter
- DMA for analog input and output
- Analog/Digital/Software Trigger

Hardware Specifications

Analog Input Specifications

Analog Input	5510	5511	5515	5516
Number of channels	32 SE / 16 DIFF		16 SE / 8 DIFF	
ADC resolution (Bits)	18			
Single channel maximum sample rate	2M Sample/s	1.25M Sample/s	2M Sample/s	1.25M Sample/s
Multichannel maximum sample rate (aggregate)	1M Sample/s	625K Sample/s	1M Sample/s	625K Sample/s
Clock	100 MHz			
Input range(V)	$\pm 10/\pm 5/\pm 2/\pm 1/\pm 0.5/\pm 0.2/\pm 0.1$			
Input mode	RSE / NRSE / Differential			
Input impedance	$>1\text{ G}\Omega 100\text{ pF}$			
Input coupling	DC			
Overvoltage protection	$\pm 25\text{ V}$			
CMRR	85 dB			
Crosstalk	Adjacent Channel : -80 dB Non-adjacent Channel : -95 dB Differential: -65 dB			
DNL	$<1\text{LSB}$			
INL	70 ppm of Range Typical			
Operating Temperature	$0^{\circ}\text{C} \sim 50^{\circ}\text{C}$			
Input FIFO	64M Samples			
Trigger type	Digital, Analog, Software			
Trigger mode	StartTrigger, ReferenceTrigger, ReTrigger			
Analog trigger voltage range	$\pm 10\text{V}$ Software Programmable			
Overvoltage Protection	Continuous : 20m A, $\pm 25\text{ V}$ Instantaneous : 40 mA, $\pm 25\text{ V}$			

AI Absolute Accuracy

Nominal Range Full Scale (V)	Absolute Accuracy at Full Scale(μV)
± 10	1253
± 5	792
± 2	363
± 1	189
± 0.5	95
± 0.2	51
± 0.1	21

Analog Output Specifications

Analog Output	5510	5511	5515	5516
Number of channels	4		2	
DAC resolution	16 bits			
Sampling rate(Sample/s)	2.86M	2.86M	2.86M	2.86M
Clock	100 MHz			
Clock accuracy	Jitter <20 ps			
Output range(V)	$\pm 10, \pm 5$			
Output mode	RSE			
Output impedance	2 ohm			
Output coupling	DC			
Output FIFO	32M Samples			
Trigger type	Digital, Software			
Trigger mode	StartTrigger			

AO Absolute Accuracy

Nominal Range Full Scale (V)	Absolute Accuracy at Full Scale(μ V)
± 10	1380
± 5	535

Digital IO Specifications

DIO	5510/5511	5515/5516
Number of channels	Port (0,1,2,3,4,5)	Port (0,1,2)
Ground reference	D GND	
Directional control	Independent control of each port	
Clock	10 MHz	
DI FIFO	16M Samples	
DO FIFO	16M Samples	
Initial state	Input	
Digital Input	Logic Low: V_{IL} Min : 0 / Max : 1.0 V Logic High: V_{IH} Min : 2V / Max : 5.3V)	
Digital Output	Logic Low : 0 V, I_{OL} Max: 24 mA Logic High : 2.6 V~5 V, I_{OH} : -24 mA~0 mA	
Overvoltage Protection	Continuous 30 mA, -3.9 V~8.9 V Instantaneous 200 mA, ± 25 V; Duty cycle of instantaneous current pulse does not exceed 15%	

Counter/Timer Specifications

C/CO	5510	5511	5515	5516
Number of channels	4		2	
Resolution	32			
CI	edge count, period measurement, frequency measurement, pulse width measurement, two-edge interval measurement, orthogonal coding, etc.			
CO	Single, finite and continuous pulse			
Clock	200 MHz			
FIFO	4M Samples			
Input	Gate, Source, Aux			
Output	OUT			

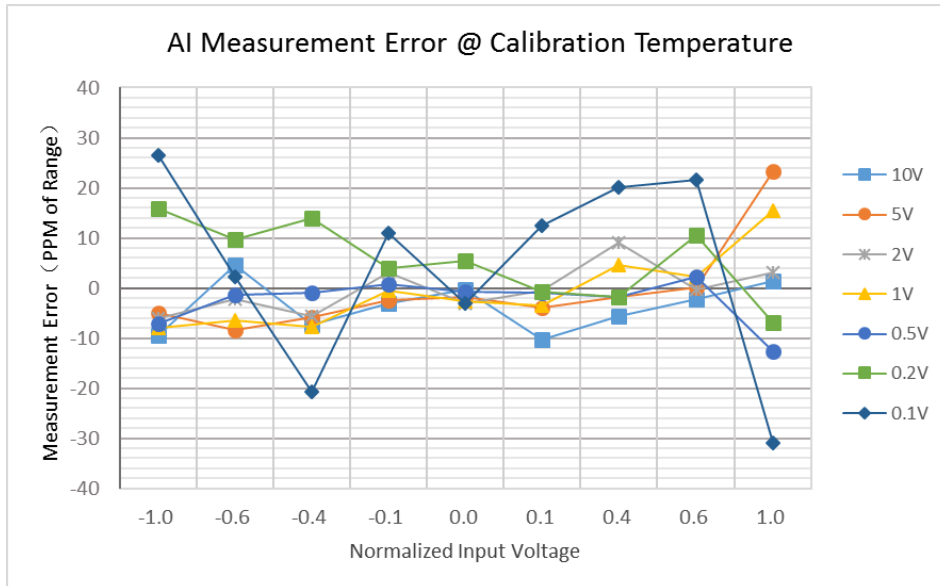
PFI Specifications

PFI	5510	5511	5515	5516
Number of channels	16			
External digital trigger interface	Trigger voltage 3.3 V TTL; trigger edge: Rising/Falling			
Initial state	Input			

Performance and Tests

AI Accuracy

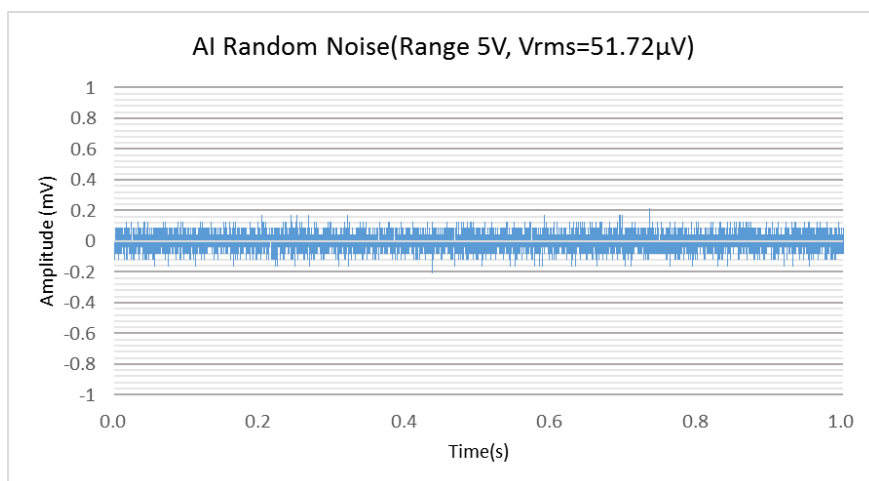
Typical Tested 5500 AI Accuracy							
	Nominal Range						
Nominal Range Positive Full Scale (V)	10.0	5.0	2.0	1.0	0.5	0.2	0.1
Temperature Change From Calibration (°C)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Gain Temperature Coefficient (PPM of Reading per °C)	6.1	5.6	5.5	5.2	5.0	5.7	7.0
Residual Gain Error Coefficient (PPM of Reading)	0.9	2.7	1.1	3.1	7.8	6.8	17.0
Total Gain Error Coefficient (PPM of Reading)	31.4	30.7	28.6	29.1	32.8	35.3	52.0
Total Gain Error (µV)	314.0	153.5	57.2	29.1	16.4	7.1	5.2
Offset Temperature Coefficient (PPM of Range per °C)	1.2	1.3	1.5	2.0	3.2	7.4	15.2
Residual Offset Error Coefficient (PPM of Range)	2.3	2.4	0.7	4.0	3.0	7.2	16.6
INL Error (PPM of Range)	7.1	10.1	4.2	9.2	19.2	40.1	58.9
Total Offset Error Coefficient (PPM of Range)	15.4	19.0	12.4	23.2	38.2	84.3	151.5
Total Offset Error (µV)	154.0	95.0	24.8	23.2	19.1	16.9	15.2
Random Noise, σ (µVrms)	93.4	51.7	26.4	16.4	14.9	14.1	13.9
Noise Uncertainty (µV)	2.8	1.6	0.8	0.5	0.4	0.4	0.4
Absolute Accuracy at Full Scale (µV)	470.8	250.1	82.8	52.8	35.9	24.3	20.8



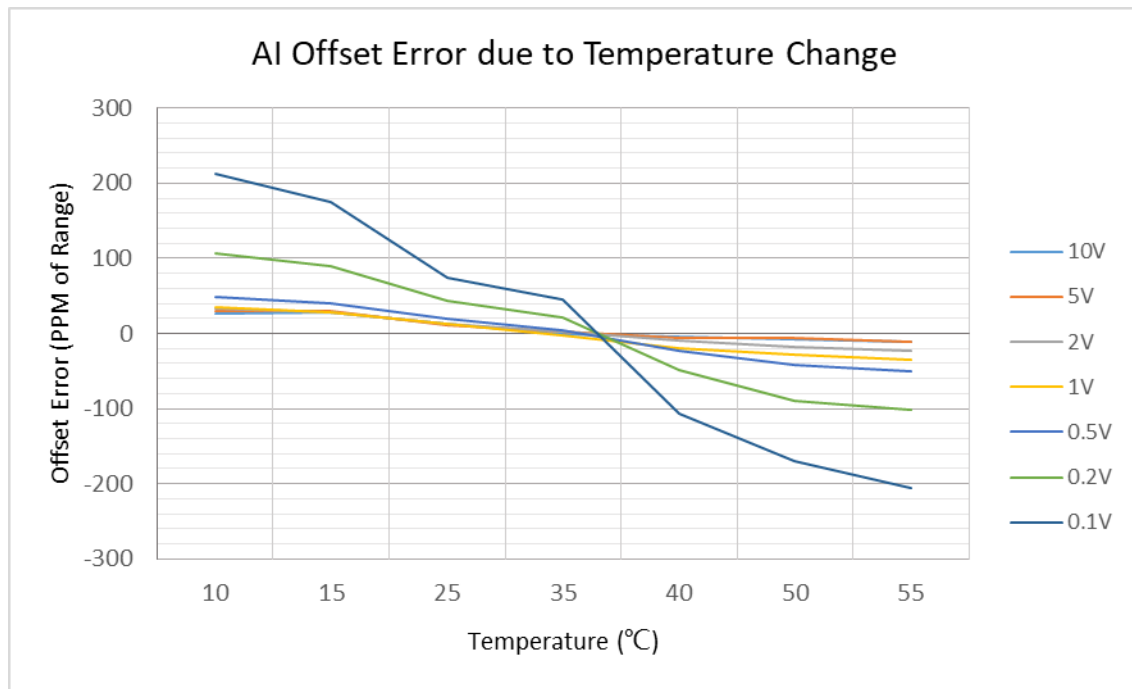
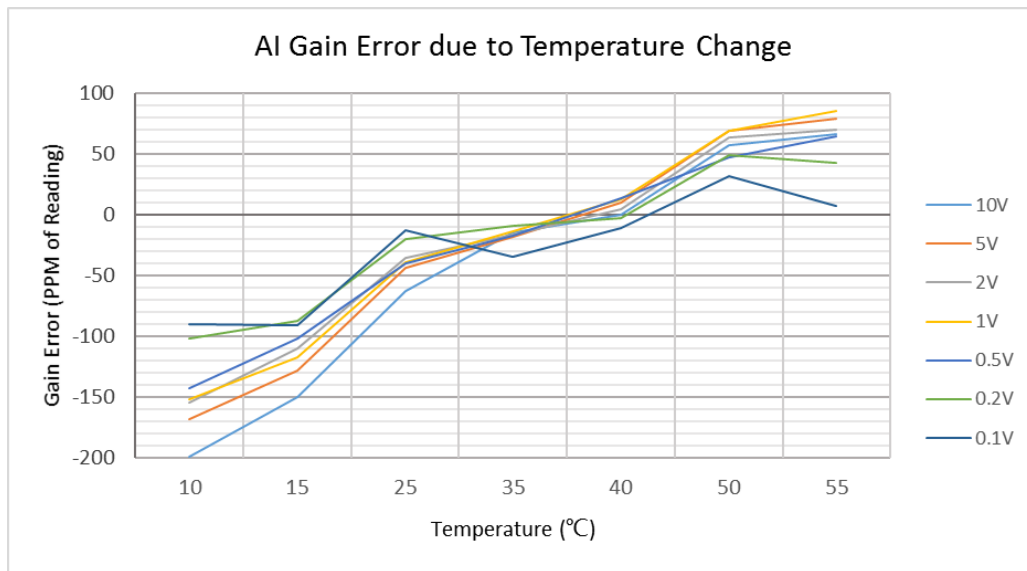
AI Bandwidth

Analog Input Bandwidth	
Nominal Range Full Scale (V)	-3dB Bandwidth (MHz)
±10	2.06
±5	2.14
±2	1.72
±1	1.21
±0.5	1.21
±0.2	1.21
±0.1	1.21

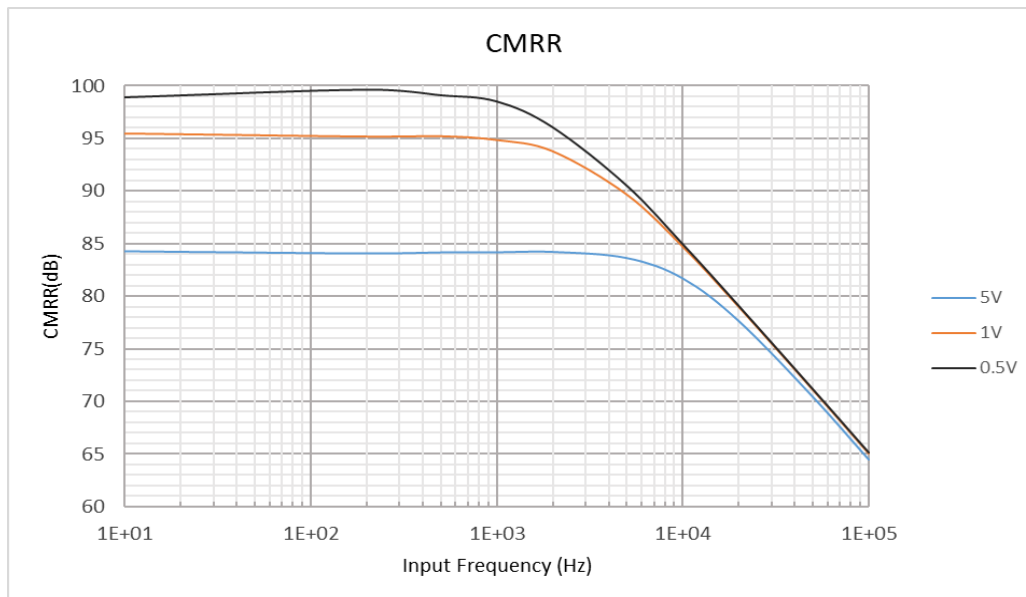
System Noise



Temperature Drift



CMRR



AO Accuracy

Typical Tested 5500 AO Accuracy		
Nominal Range Positive Full Scale (V)	10	5
Gain Temperature Coefficient (PPM of Reading per °C)	10	7
Residual Gain Error Coefficient (PPM of Reading)	10	8
Offset Temperature Coefficient (PPM of Range per °C)	2	2
Residual Offset Error Coefficient (PPM of Range)	8	4
INL Error (PPM of Range)	60	50
Temperature Change (C)	2	2
Gain Error	30	22
Offset Error	72	58
Absolute Accuracy at Full Scale (µV)	1020	400

Order Information

- PXIe-5510 (PN: JY2005510-01)
32-ch AI (18-Bit, 2 MS/s), 4-ch AO (16-Bit, 2.86MS/s), 32 DIO, PXIe Multifunction I/O Card
- PXIe-5511 (PN: JY2005511-01)
32-ch AI (18-Bit, 1.25 MS/s), 4-ch AO (16-Bit, 2.86 MS/s), 32 DIO, PXIe Multifunction I/O Card
- PXIe-5515 (PN: JY2005515-01)
16-ch AI (18-Bit, 2 MS/s), 2-ch AO (16-Bit, 2.86MS/s), 24 DIO, PXIe Multifunction I/O Card
- PXIe-5516 (PN: JY2005516-01)
16-ch AI (18-Bit, 1.25 MS/s), 2-ch AO (16-Bit, 2.86 MS/s), 24 DIO, PXIe Multifunction I/O Card

- PCIe-5510 (PN: JY2105510-01)
32-ch AI (18-Bit, 2 MS/s), 4-ch AO (16-Bit, 2.86MS/s), 32 DIO, PCIe Multifunction I/O Card
- PCIe-5511 (PN: JY2105511-01)
32-ch AI (18-Bit, 1.25 MS/s), 4-ch AO (16- Bit, 2.86 MS/s), 32 DIO, PCIe Multifunction I/O Card
- PCIe-5515 (PN: JY2105515-01)
16-ch AI (18-Bit, 2 MS/s), 2-ch AO (16-Bit, 2.86MS/s), 24 DIO, PCIe Multifunction I/O Card
- PCIe-5516 (PN: JY2105516-01)
16-ch AI (18-Bit, 1.25 MS/s), 2-ch AO (16-Bit, 2.86 MS/s), 24 DIO, PCIe Multifunction I/O Card

Accessories

- TB-68 (PN: JY2000068-03)
68-Pin SCSI Shielded I/O Connector Block
- TB-68CI (PN: JY2010068-02)
68-Pin SCSI Shielded I/O Connector Block with 8ch current converter
- TB-68CI-16 (PN: JY2010068-03)
68-Pin SCSI Shielded I/O Connector Block with 16ch current converter
- DIN-68S-01 (PN: JA9114029-01)
SCSI 68-pin Terminal board w/o cable
- ACL-2006868-1 (PN: JY2006868-01)
1M 68pin VHDCI68M-SCSI68M cable
- ACL-2006868-2 (PN: JY2006868-02)
2M 68pin VHDCI68M-SCSI68M cable

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