



KEITHLEY
A Tektronix Company

The 2015-P A/D converter module is a high-speed, high-precision, and high-resolution device. It is designed for use in a wide range of applications, including data acquisition, signal processing, and control systems. The module is shown in Figure 1.

Optimized for Production Testing

The 2015-P A/D converter module is optimized for production testing. It features a high-speed, high-precision, and high-resolution device. The module is designed for use in a wide range of applications, including data acquisition, signal processing, and control systems. The module is shown in Figure 1.

Figures 2, 3, and 4. 2015 a
2015-P a b a a
a a a a
Figure 2 a a a a

Dual Output Source

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Broad Measurement Flexibility

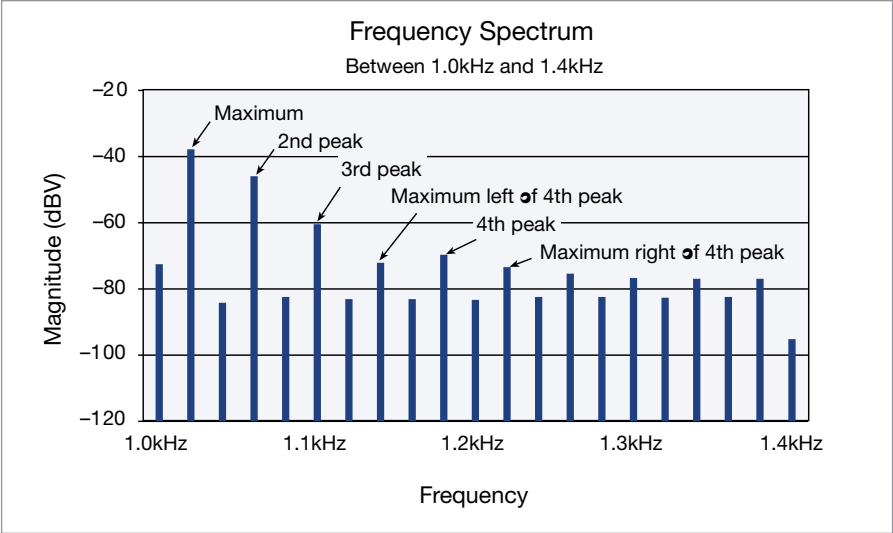
I a r THD, THD+N
SINAD, a a ar
a r ab
r a r a r -
DMM
DCV, ACV, DCI, ACI, 2W , 4W
ra r r B,
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Wide Band or Narrow Band Noise Measurements

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Spectrum Analysis

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(Figure 6). T 2015-P
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Specifications

Distortion Characteristics

Voltage Range	100 mV, 1 V, 10 V, 100 V, 750 V (auto range).
Input Impedance	1 M Ω or $<100 \Omega$.
Display Range	0.100% to 100.00% B.
Resolution	0.0001% or 0.00001% B.
Fundamental Frequency Range	20 Hz to 20 kHz.
Harmonic Frequency Range	40 Hz to 50 kHz.
Frequency Resolution	0.008 Hz.
Frequency Accuracy	0.01% or better.
Frequency Temperature Coefficient	100 ppm or less for 100 Hz to 1 kHz, 200 ppm or less for 1 kHz to 20 kHz.

Measurement Mode	Accuracy (1 Year, 23°C $\pm$ 5°C)	Residual Distortion ¹
THD and individual harmonic magnitudes	$\pm$ 0.8 dB 20 Hz to 20 kHz ²	0.004% or -87 dB 20 Hz to 20 kHz
THD + n	$\pm$ 1.5 dB 100 Hz to 20 kHz ²	0.056% or -65 dB 20 Hz to 20 kHz
SINAD	$\pm$ 1.5 dB 100 Hz to 20 kHz ²	$+65$ dB 20 Hz to 20 kHz
AC Level V rms	$\pm$ (0.15% of reading + 0.009% of range) 20 Hz to 20 kHz	

Distortion Measurement Audio Filters

None	C-Message
CCITT Weighting	CCIR/ARM
CCIR	"A" Weighting

Number of Harmonics Included in THD Calculation	2 to 64 (auto range).
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HI and LO Cutoff Filters (bus settable)	20 Hz to 50 kHz. Cutoff frequencies are programmable.
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Distortion Measurement Reading Rate ³		
Fundamental Frequency Acquisition Mode	Fundamental Frequency Range	Minimum Readings Per Second
Single acquisition or stored value	20 Hz to 100 Hz	14
	100 Hz to 1 kHz	24
	1 kHz to 20 kHz	28
Automatic	20 Hz to 30 Hz	5.5
	30 Hz to 400 Hz	6
	400 Hz to 20 kHz	6.6

Frequency Sweep Reading Rate	
Number of Frequencies	Time (seconds) ⁴
5	0.2
30	1.1
100	3.5
200	6.9

Notes

1. Input voltage must be >65 dB.
2. V_{IN} 20% range accuracy (>65 dB).
3. SINAD is measured with the input signal (RST), and the noise floor is 0.
4. THD is measured with the input signal (RST), and the noise floor is 0. TRIG DELAY = 0, DLY = OFF, A = OFF. Data rate is 100 Hz. THD is measured with the input signal (RST), and the noise floor is 0.

Generator Characteristics

Frequency Range	10 20 H .
Frequency Resolution	0.007 H .
Frequency Accuracy	(0.015% r a + 0.007 H) ¹ .
Frequency Temperature Coefficient	<100 W r a A02.9/Spa3/Field.3 3 (2.3245)31.225.2 (z93 (f r705.4 (e4-28.4%1 Tf0 /)2 1 (.)80)11.1 (C)3
Amplitude Resolution	R2.8 (ti)1.4 T0.77-0.022 Tcf0.022 Tw 6.533 0 ((0ITextFEFpanA J/13.3 (d 6)-19.9aITextFE-15.1 3FEt.6 (08o)-14.7 (

Source Output

Waveform	S a .
Amplitude Range	2 V W (50 a 600) r 4 V W (HI Z).
Amplitude Resolution	0.5 V W (50 a 600) r 1 V W (HI Z).

DC Characteristics

Conditions MED (1 PLC)¹ r SLOW (10 PLC) r MED (1 PLC)  10.

Function	Range	Resolution	Test Current or Burden Voltage (±5%)	Input Resistance	Accuracy ±(ppm of reading + ppm of range) (ppm = parts per million) (e.g., 10 ppm = 0.001%)			Temperature Coefficient 0°–18°C & 28°–50°C
					24 Hour ¹⁴ 23°C ± 1°	90 Day 23°C ± 5°	1 Year 23°C ± 5°	
Voltage	100.0000 mV ¹⁷	0.1 µV		> 10 GΩ	30 + 30	40 + 35	50 + 35	2 + 6
	1.000000 V	1.0 µV		> 10 GΩ	15 + 6	25 + 7	30 + 7	2 + 1
	10.00000 V	10 µV		> 10 GΩ	15 + 4	20 + 5	30 + 5	2 + 1
	100.0000 V	100 µV		10 MΩ ±1%	15 + 6	30 + 6	45 + 6	5 + 1
	1000.000 V ⁹	1 mV		10 MΩ ±1%	20 + 6	35 + 6	45 + 6	5 + 1
Resistance ¹⁵	100.0000 Ω	100 µΩ	1 mA		30 + 30	80 + 40	100 + 40	8 + 6
	1.000000 kΩ	1 mΩ	1 mA		20 + 6	80 + 10	100 + 10	8 + 1
	10.00000 kΩ	10 mΩ	100 µA		20 + 6	80 + 10	100 + 10	8 + 1
	100.0000 kΩ	100 mΩ	10 µA		20 + 6	80 + 10	100 + 10	8 + 1
	1.000000 MΩ ¹⁶	1 Ω	10 µA		20 + 6	80 + 10	100 + 10	8 + 1
	10.00000 MΩ ^{11, 16}	10 Ω	700 nA // 10MΩ		300 + 6	450 + 10	600 + 10	95 + 1
	100.0000 MΩ ^{11, 16}	100 Ω	700 nA // 10MΩ		1600 + 30	2000 + 30	2200 + 30	900 + 1
Current	10.00000 mA	10 nA	< 0.15 V		60 + 30	300 + 80	500 + 80	50 + 5
	100.0000 mA	100 nA	< 0.03 V		100 + 300	300 + 800	500 + 800	50 + 50
	1.000000 A	1 µA	< 0.3 V		200 + 30	500 + 80	800 + 80	50 + 5
	3.00000 A	10 µA	< 1 V		1000 + 15	1200 + 40	1200 + 40	50 + 5
Continuity 2W	1 kΩ	100 mΩ	1 mA		40 + 100	100 + 100	120 + 100	8 + 1
Diode Test	3.00000 V	10 µV	1 mA		20 + 6	30 + 7	40 + 7	8 + 1
	10.00000 V	10 µV	100 µA		20 + 6	30 + 7	40 + 7	8 + 1
	10.00000 V	10 µV	10 µA		20 + 6	30 + 7	40 + 7	8 + 1

DC Operating Characteristics²

Function	Digits	Readings/s	PLCs ⁸
DCV (all ranges), DCI (all ranges), 2W Ohms (<10 M ranges)	6.5 ^{3, 4}	5	10
	6.5 ^{3, 7}	30	1
	6.5 ^{3, 5}	50	1
	5.5 ^{3, 5}	270	0.1
	5.5 ⁵	500	0.1
	5.5 ⁵	1000	0.04
	4.5 ⁵	2000	0.01

DC System Speeds^{2, 6}

Range Change ³	50/ .
Function Change ³	45/ .
Autorange Time ^{3, 10}	<30  .
ASCII readings to RS-232 (19.2k baud)	55/ .
Max. Internal Trigger Rate	2000/ .
Max. External Trigger Rate	400/ .

Triggering and Memory

Reading Hold Sensitivity	0.01%, 0.1%, 1%, 10%
Trigger Delay	0 - 99 (1 μs)
External Trigger Latency	200 + <300 ns
Memory	1024

Math Functions

Math Functions	R, M, Ma, A, a, S, D, B, L, T, %, a, X+b
dBm Reference Resistances	1, 9999, 1

Standard Programming Languages

SCPI (Standard Command Programming Interface)

Remote Interface

Remote Interface	GPIO (IEEE-488.1, IEEE-488.2) and RS-232C.
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Frequency and Period Characteristics 1, 2

ACV Range	Frequency				

GPIB Interfaces

KPCI-488LPA	IEEE-488 I  C 
KUSB-488B	IEEE-488 USB-  

Power Cord Options

A0	N  P  (120 V, 60 H)
A1	U  P  (220 V, 50 H)
A2	U   240 V, 50 H)
A3	A  P  (240 V, 50 H)
A4	C  (220 V, 50 H)
A5	S  P  (220 V, 50 H)
A6	Ja a P  (100 V, 50/60 H)
A7	D  P 
A8	I  P 
A9	Ar  P 
A10	C a P  (50 H)
A11	I  P  (50 H)
A12	Bra P  (60 H)
A99	N 

Documentation

I  Ma a (a a ab a  /  -a  a  -2015-  -a  -a a  
2015/2015-P THD M  U  Ma a
2015, 2015-P THD M  Q   G 

Available Services

Extended Warrantes		
2015-EW	1-Year KEITHLEYCARE E	Warra
2015-3Y-EW	3-Year KEITHLEYCARE E	Warra
2015-5YR-EW	5-Year KEITHLEYCARE E	Warra
2015-P-EW	1-Year KEITHLEYCARE E	Warra
2015-P-3Y-EW	3-Year KEITHLEYCARE E	Warra
2015-P-5YR-EW	5-Year KEITHLEYCARE E	Warra

Calibration Confac		
C/2015-3Y-STD	KEITHLEYCARE 3-Year S a a Ca bra	Pa
C/2015-3Y-DATA	KEITHLEYCARE 3-Year Ca bra	Da a Pa
C/2015-3Y-17025	KEITHLEYCARE 3-Year ISO 17025 Ca bra	Pa
C/2015-5Y-STD	KEITHLEYCARE 5-Year S a a Ca bra	Pa
C/2015-5Y-DATA	KEITHLEYCARE 5-Year Ca bra	Da a Pa
C/2015-5Y-17025	KEITHLEYCARE 5-Year ISO 17025 Ca bra	Pa

Calibration Data		
C/NEW DATA	Ca bra	Da a r N 2015 r 2015-P
C/NEW DATA ISO	ISO-17025 Ca bra	Da a r N 2015 r 2015-P
C/TRACE CHART	Ca bra	Traceab C ar

Contact Information:

Australia* 1 800 709 465
Austria 00800 2255 4835
Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777
Belgium* 00800 2255 4835
Brazil +55 (11) 3759 7627
Canada 1 800 833 9200
Central East Europe / Baltics +41 52 675 3777
Central Europe / Greece +41 52 675 3777
Denmark +45 80 88 1401
Finland +41 52 675 3777
France* 00800 2255 4835
Germany* 00800 2255 4835
Hong Kong 400 820 5835
India 000 800 650 1835
Indonesia 007 803 601 5249
Italy 00800 2255 4835
Japan 81 (3) 6714 3010
Luxembourg +41 52 675 3777
Malaysia 1 800 22 55835
Mexico, Central/South America and Caribbean 52 (55) 56 04 50 90
Middle East, Asia, and North Africa +41 52 675 3777
The Netherlands* 00800 2255 4835
New Zealand 0800 800 238
Norway 800 16098
People's Republic of China 400 820 5835
Philippines 1 800 1601 0077
Poland +41 52 675 3777
Portugal 80 08 12370
Republic of Korea +82 2 565 1455
Russia / CIS +7 (495) 6647564
Singapore 800 6011 473
South Africa +41 52 675 3777
Spain* 00800 2255 4835
Sweden* 00800 2255 4835
Switzerland* 00800 2255 4835
Taiwan 886 (2) 2656 6688
Thailand 1 800 011 931
United Kingdom / Ireland* 00800 2255 4835
USA 1 800 833 9200
Vietnam 12060128

* European toll-free number. If not accessible, call: +41 52 675 3777



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