



AHEAD OF WHAT'S POSSIBLE™

HIGH SPEED SIGNAL CHAIN SELECTION GUIDE

*Includes High
Speed ADCs, DACs,
Amplifiers, and
Clocking Solutions*

TABLE OF CONTENTS

HIGH SPEED DATA CONVERTERS

High Speed ADCs

Analog Devices' broad high speed analog-to-digital converter (ADC) portfolio delivers high performance and optimized power consumption necessary for today's demanding receiver/data acquisition applications. These products are employed in wired and wireless communications, instrumentation, radar, electronic warfare, and general data acquisition. This guide is designed to aid selection of the most relevant parts for your applications using a matrix across sample rate, channel count, and interface type. Recommended high speed amplifier and clocking solutions can be found in this guide, with additional design support via ADI field applications.

The extensive high speed ADC portfolio is supported with evaluation boards, data sheets, and evaluation/design tools, demonstrating best practices for achieving the highest performance design, accelerating time to market. Visit the relevant product page for these details.

Single Channel, Parallel Interface High Speed ADC Portfolio (<170 Msps).....4

- Widest family of pin-compatible parts for design flexibility and future proofing.
- Highest AC performance for demanding dynamic range receiver/data acquisition solutions.
- Features for reducing digital feedback and improving SFDR performance.
- Double-data-rate interfaces for reducing data lines to FPGA
- Lowest power consumption ADC portfolio in the industry to ease thermal management challenges.

Dual Channel, Parallel Interface High Speed ADC Portfolio (<170 Msps).....5

- Widest family of pin-compatible parts helping user with design flexibility and future proofing.
- Highest AC performance for demanding dynamic range receiver/data acquisition solutions.
- Features for reducing digital feedback and improving SFDR performance.
- Double-data-rate interfaces for reducing data lines to FPGA.
- Lowest power consumption ADC portfolio in the industry to ease thermal management challenge.

Serial LVDS Interface High Speed ADC Portfolio (>150 Msps).....6

- Multi-ADC core (2-16 channels) enabling higher density, multi-channel data acquisition applications.
- Optimized power/performance to meet dynamic range needs.
- Serial interface enables lower cost FPGA/processing.

170 Msps to 500 Msps, Parallel Interface High Speed ADC Portfolio7

- Enables bandwidth expansion, keeping legacy interface.
- High analog input bandwidth for undersampling applications

≥125 Msps to 3 Gsps, JESD204B Interface High Speed ADC Portfolio7

- Digitizing RF spectrum of interest—enabling software-defined receivers.
- Wide analog input bandwidths enable capture of fast time events.
- Integrated signal processing features—DDC, filters, and NCOs—enable faster time to market and reduced system cost.

High Speed DACs

ADI's high speed digital-to-analog converters (DACs) include wideband radio frequency, intermediate frequency signal processing, and general-purpose baseband classes. These products are employed in wired and wireless communications, instrumentation, radar, electronic warfare, and general waveform synthesis. This guide is designed to aid selection of the relevant parts for applications using a matrix across sample rate, channel count, and interface type, with additional design support via ADI field applications.

The extensive high speed DAC portfolio is supported with evaluation boards, data sheets, and evaluation/design tools, demonstrating best practices for achieving the highest performance design and help accelerate time to market. Visit relevant product page for these details.

Baseband High Speed DAC Portfolio (<1.2 Gsps).....8

- TxDAC+™ proprietary output allows synthesis beyond Nyquist, extending usable bandwidth.
- The devices include gain and offset compensation for direct conversion transmit applications.
- Low power dissipation for portable and space constrained applications.

Direct Digital Synthesis and Waveform Generation Portfolio8

- DDS synthesis products incorporate features such as NCOs, fast SPI writes, and phase accumulators; making them an ideal agile frequency synthesizer solution in systems for communications, test equipment, and radar.

IF and RF DAC Portfolio (>1.2 Gsps).....9

- Users can synthesize full spectrum RF signals for a variety of applications through programmable signal processing and wide output bandwidth.
- Highest AC performance for demanding dynamic range signal synthesis solutions.
- Integrated signal processing features—DUCs, channelizers, and NCOs—enable faster time to market and reduced system cost.
- Mix-mode: DAC operation that reconstructs RF carriers in the 2nd and 3rd Nyquist zones while still maintaining exceptional dynamic range.

Refer to analog.com to obtain part specific U.S. Export Control Classification Numbers (ECCNs) to assess whether or not U.S. export license or an export license issued by another national government is required prior to executing an export or re-export transaction.

HIGH SPEED CLOCKING..... 10

Many high speed data converter applications require an external sample clock source to provide a lower jitter signal than the integrated data converter clock. ADI has a broad range of PLLVCO based clock sources whose implementation allows for ultralow jitter performance.

The introduction of JESD204B subclass 1 in 2011 created a new standard data converter clock interface to resolve the deterministic latency errors seen in JESD204A, now referred to as JESD204B subclass 0. The ADI clock portfolio offers a wide range of products that supports both JESD204B subclass 0 and subclass 1.

The current portfolio has varying degrees of JESD204B support – some products have full JESD204B subclass 1 support, while others support subclass 0 with optional phase adjustment.

JESD204B subclass 1

JESD204B subclass 1 products are available for sample clock frequencies from 1 Hz to 4.5 GHz. Several of these products can be used together to create a huge array of fully synchronized device clock and SYSREF signals for high channel count applications. Reference designs are available for clock networks with over 1000 clock signals.

JESD204B subclass 0

Above 4.5 GHz, integrated PLLVCO or discrete PLL and discrete VCO solutions can be used to generate very low jitter clock sources. A discrete PLL and discrete VCO solution will give the absolute best jitter performance while an integrated PLLVCO solution will save board space and design work. Both solutions have multiple product options with sample clock frequencies up to 12 GHz and higher. These products have $\lt; \mu\text{Hz}$ output phase control (programmable by SPI) which can be used to assist in a synchronization scheme.

ADI recommends carefully reviewing data sheets for performance needs for each use, the guide easily navigates the user to a variety of high performance options.

HIGH SPEED AMPLIFIERS

ADI's wide portfolio of best in class differential amplifier solutions allows the user to optimally match to an analog-to-digital converter across a wide variety of sampling speed grades. This differential amplifier selection guide is designed to assist you in selecting the most relevant parts for specific applications using a comparison matrix across gain, bandwidth & AC/DC coupling axis. While ADI recommends carefully reviewing data sheets for performance needs, the guide quickly navigates the user to a variety of high performance options.

DC Coupled External Gain Setting Differential Amplifiers..... 11

- DC coupled differential amplifiers offer adjustable output common mode voltages for a direct match with the input of the ADC for DC coupled single-ended to differential or differential-to-differential applications.
- The differential gain is flexible and easily realized with a simple external four-resistor feedback network that determines the closed-loop gain of the amplifier.
- Ideally suited for driving precision ADCs targeting sampling speed of $\lt; 100\text{ Msps}$.

Fixed or Pin-Strapped Differential Amplifiers..... 11

- AC coupled amplifiers (with provisions for DC coupled amplifiers) that have fixed or selectable gain settings to allow flexibility in a broad range of applications.
- Ideally suited for ADCs targeting sampling speeds from 100 Msps to multi Gsps which require exceptional performance at very wide bandwidths.

Differential Variable Gain Amplifiers..... 12

- Digital or Analog controlled variable gain amplifiers provide discrete or continuous levels of gain control.
- ADI's differential VGA's offer a balanced interface to high speed converters while improving the dynamic range of a circuit by allowing users to adjust the amplitude of a signal in real time.

Single Channel, Parallel Interface High Speed ADC Portfolio (<170 Msps)

Supply Voltage & I/O		10 Msps	≥20 Msps	40 Msps	65 Msps	80 Msps	105 Msps	≥125 Msps	≥150 Msps
16-Bit	3.3V Parallel LVDS or CMOS				LTC 2215	LTC 2216	LTC 2217	LTC 2208	LTC 2209
	3.3V Parallel CMOS	LTC 2202	LTC 2203	LTC 2204	LTC 2205	LTC 2206	LTC 2207		
	1.8V Parallel CMOS or LVDS		LTC 2160 AD 9266-20 LTC 2269	LTC 2161 AD 9266-40	LTC 2162 AD 9266-65	LTC 2163 AD 9266-80 AD 9265-80	LTC 2164 AD 9265-105	LTC 2165 AD 9265-125	
14-Bit	3.3V Parallel LVDS or CMOS							LTC 2208-14	
	3.3V Parallel CMOS				LTC 2205-14	LTC 2206-14	LTC 2207-14		
	1.8V Parallel CMOS or LVDS		LTC 2256-14 AD 9649-20	LTC 2257-14 AD 9649-40	LTC 2258-14 AD 9649-65	LTC 2259-14 AD 9649-80 AD 9255-80	LTC 2260-14 AD 9255-105	LTC 2261-14 AD 9255-125	LTC 2262-14
	3V Parallel CMOS	LTC 2245	LTC 2246	LTC 2247	LTC 2248	LTC 2249	LTC 2254	LTC 2255	
	5V Parallel CMOS	AD 9240		AD 9244-40	AD 9244-65	AD 6645-80	AD 6645-105		
	1.8V Parallel CMOS or LVDS		LTC 2256-12 AD 9629-20	LTC 2257-12 AD 9629-40	LTC 2258-12 AD 9629-65	LTC 2259-12 AD 9629-80	LTC 2260-12	LTC 2261-12	LTC 2262-12
12-Bit	3V Parallel CMOS	LTC 2225	LTC 2226	LTC 2227	LTC 2228	LTC 2229	LTC 2252	LTC 2253	
	1.8V Parallel CMOS		AD 9609-20	AD 9609-40	AD 9609-65	AD 9609-80			
10-Bit	1.8V Parallel CMOS		AD 9609-20	AD 9609-40	AD 9609-65	AD 9609-80			
	3V Parallel CMOS		LTC 2236	LTC 2237	LTC 2238 AD 9215-65	LTC 2239 AD 9215-80	LTC 2250 AD 9215-105	LTC 2251	

 Higher Performance
  Lower Power
  Smaller Solution

Dual Channel, Parallel Interface High Speed ADC Portfolio (<170 Msp/s)

		Supply Voltage & I/O	≥20 Msp/s	40 Msp/s	65 Msp/s	80 Msp/s	105 Msp/s	125 Msp/s
Resolution	16-Bit	1.8V Parallel CMOS or LVDS	LTC 2180 AD 9650-25 LTC 2270	LTC 2181	LTC 2182 AD 9650-65	LTC 2183 AD 9650-80	LTC 2184 AD 9650-105	LTC 2185
	14-Bit	1.8V Parallel CMOS or LVDS	LTC 2140-14 AD 9251-20	LTC 2141-14 AD 9251-40	LTC 2142-14 AD 9251-65	LTC 2143-14 AD 9251-80 AD 9258-80	LTC 2144-14 AD 9648-105 AD 9258-105	LTC 2145-14 AD 9648-125 AD 9258-125
		3V Parallel CMOS	LTC 2296	LTC 2297	LTC 2298	LTC 2299	LTC 2284	LTC 2285
	12-Bit	1.8V Parallel CMOS or LVDS	LTC 2140-12	LTC 2141-12	LTC 2142-12	LTC 2143-12	LTC 2144-12 AD 9628-105	LTC 2145-12 AD 9628-125
		3V Parallel CMOS	LTC 2296	LTC 2297	LTC 2298	LTC 2299	LTC 2282	LTC 2283
	10-Bit	1.8V Parallel CMOS	AD 9204-20	AD 9204-40	AD 9204-65	AD 9204-80		
		1.8V Parallel CMOS or LVDS					AD 9608-105	AD 9608-125
		3V Parallel CMOS	LTC 2286	LTC 2287	LTC 2288 AD 9216-65	LTC 2289 AD 9216-80	LTC 2280 AD 9216-105	LTC 2281

Serial LVDS Interface High Speed ADC Portfolio (<150 Msps)

		Supply Voltage & I/O	Channels	≥20 Msps	40 Msps	65 Msps	80 Msps	105 Msps	125 Msps
Resolution	14-Bit	1.8V Serial LVDS	16			AD 9249			
	14-Bit	1.8V Serial LVDS	8	LTM 9006-14	LTM 9007-14 AD 9257-40	LTM 9008-14 AD 9257-65	LTM 9009-14	LTM 9010-14	LTM 9011-14 AD 9681
	12-Bit	1.8V Serial LVDS			AD 9637-40		AD 9637-80		
	10-Bit	1.8V Serial LVDS			AD 9212-40	AD 9212-65			
	16-Bit	1.8V Serial LVDS	4						AD 9653
	14-Bit	1.8V Serial LVDS		LTC 2170-14	LTC 2171-14	LTC 2172-14	LTC 2173-14 AD 9253-80	LTC 2174-14 AD 9253-105 HMCAD 1520	LTC 2175-14 AD 9253-125
	12-Bit	1.8V Serial LVDS		LTC 2170-12	LTC 2171-12	LTC 2172-12	LTC 2173-12 AD 9633-80	LTC 2174-12 AD 9633-105	LTC 2175-12 AD 9633-125
	10-Bit	1.8V Serial LVDS			AD 9219-40	AD 9219-65			
	16-Bit	1.8V Serial LVDS		LTC 2190 LTC 2271	LTC 2191	LTC 2192	LTC 2193	LTC 2194	LTC 2195 AD 9655-125
	14-Bit	1.8V Serial LVDS	2	LTC 2263-14	LTC 2264-14	LTC 2265-14	LTC 2266-14 AD 9645-80	LTC 2267-14	LTC 2268-14 AD 9645-125
	12-Bit	1.8V Serial LVDS		LTC 2263-12	LTC 2264-12	LTC 2265-12	LTC 2266-12 AD 9635-80	LTC 2267-12	LTC 2268-12 AD 9635-125

Serial LVDS Interface High Speed ADC Portfolio (>150 Msps)

		Supply Voltage & I/O	Channels	160 Msps	250 Msps	320 Msps	500 Msps	640 Msps	1 Gsp
Resolution	12-Bit	1.8V Serial LVDS	4	HMCAD 1520					
			2			HMCAD 1520			
			1				HMCAD 1520		
	8-Bit	1.8V Serial LVDS	4		HMCAD 1511				
			2			HMCAD 1511			
			1					HMCAD 1511	

170 Msps to 500 Msps, Parallel Interface High Speed ADC Portfolio

		Supply Voltage & I/O	Channels	170 Msps	210 Msps	250 Msps	≥310 Msps	500 Msps
16-Bit	3.3V/1.8V Parallel LVDS	2					AD 9652-310	
		1		AD 9467-200	AD 9467-250			
	2.5V Parallel LVDS	1		LTC 2107				
14-Bit	1.25V/2.5V/3.3V Parallel LVDS	2						AD 9684-500
	1.8V Parallel LVDS	2	AD 9643-170	AD 9643-210	AD 9643-250			
		1	AD 9642-170	AD 9642-210	AD 9642-250			
12-Bit	1.8V Parallel LVDS	2	AD 9613-170	AD 9613-210	AD 9613-250			
		1	AD 9634-170	AD 9634-210	AD 9634-250	AD 9434-370	AD 9434-500	
10-Bit	1.8V Parallel LVDS	1		AD 9211-200	AD 9211-250	AD 9211-300		
8-Bit	1.8V Parallel LVDS	1					AD 9286-500 AD 9484-500	

≥125 Msps to 3 Gsps, JESD204B Interface High Speed ADC Portfolio

		I/O	Channels	≥125 Msps	≥500 Msps	1 Gsps	≥1.25 Gsps	≥2 Gsps	≥3 Gsps
16-Bit	JESD204B		4	AD 9656-125					
14-Bit	JESD204B	4			AD 9694-500				
		2	AD 9250-170 AD 9250-250	AD 9680-500 AD 9680-820 AD 9695-625	AD 9680-1000	AD 9680-1250 AD 9691-1250 AD 9695-1300	AD 9689-2000 AD 9689-2600	AD 9208-3000	
		1	AD 9683-170 AD 9683-250	AD 9690-500	AD 9690-1000	AD 9697-1300			
12-Bit	JESD204B	2			AD 9234-500	AD 9234-1000			
		1					AD 9625-2000 AD 9625-2500		

Baseband High Speed DAC Portfolio (<1.2 Gsps)

		Interface	Channels	Low Power	≤175 Msps	≤600 Msps	≤1 Gsps
Resolution	16-Bit	Parallel CMOS	1	LTC 1668			
			2			AD 9747	AD 9788
	14-Bit		1	LTC 1667	AD 9707	AD 9744	
			2	AS 9717	AD 9117	AD 9746	AD 9787
	12-Bit		1	LTC 1666	AD 9706	AD 9742	
			2	AD 9716	AD 9116	AD 9745	AD 9785
	10-Bit		1		AD 9705	AD 9740	
			2	AD 9715	AD 9115	AD 9743	
	8-Bit		1		AD 9704	AD 9748	
			2	AD 9714	AD 9114		
16-Bit	Parallel LVDS	2			AD 9783		
		2			AD 9781		
		2			AD 9780		

Direct Digital Synthesis and Waveform Generation Portfolio

		Interface	Channels	400 Msps to 500 Msps	≤1 Gsps	≤2.5 Gsps	≤12 Gsps
Resolution	16-Bit	JESD204B	1				AD 9164
	14-Bit	Serial I/O	1	AD 9951-6	AD 9102	AD 9912	
			1	AD 9106		AD 9915	AD 9914
	10-Bit	Serial I/O	1	AD 9911	AD 9858		
		Serial I/O	2	AD 9958			
		Serial I/O	4	AD 9959			



IF and RF DAC Portfolio (>1.2 Gsps)

		Interface	Channels	≤1.2 Gsps	≤2 Gsps	≤3 Gsps	≤6 Gsps	≤12 Gsps
Resolution	16-Bit	Parallel CMOS	2					
	14-Bit		2					
	12-Bit		2					
	16-Bit	Parallel LVDS	1					
			2					
			4					
			1					
			2					
			4					
			1					
			1					
	10-Bit	1						
	16-Bit	JESD204B	1					
			2					
			4					
1								
2								

Higher Performance Supports Mix-Mode Operation

High Speed Data Converter External Clock Selection Guide

	Part Number	Sample Clock Frequency Range	Jitter ($f_{s_{rms}}$)*		JESD204B Support**	Comments	
			12kHz to 20 MHz	ADC SNR Method			
Clock Generation and Distribution Sample Clock Frequency	<2.7 GHz	LTC6951-X	LF to 2.7 GHz	90	115	Subclass 0 and Subclass 1	<ul style="list-style-type: none"> Integrated PLL and VCO Noise floor: -165 dBc/Hz @ 250 MHz 5 Outputs with Timing Control Multichip Synchronization
		AD9545	1 Hz to 500 MHz	220	300		<ul style="list-style-type: none"> Quad Input Dual Digital PLL 5 Outputs with Timing & Power Control GPS and IEEE1588 support Multichip Synchronization
		AD9523-1	1 MHz to 1 GHz	150	220		<ul style="list-style-type: none"> Dual Loop PLL 14 Outputs with Timing and Power Control Internal EEPROM
	<4.5 GHz	AD9528	25 MHz to 1.25 GHz	160	230	Subclass 0 and Subclass 1 with SYSREF Modes	<ul style="list-style-type: none"> Dual Loop PLL 14 Outputs with Timing & Power Control PLL Bypass – (Full JESD204B Buffer)
		HMC7043	LF to 3.2 GHz	7	80		<ul style="list-style-type: none"> HMC7044 without PLLs/VCOs 14 Outputs with Timing and Power Control Multichip Synchronization
		HMC7044	LF to 3.2 GHz	44	89		<ul style="list-style-type: none"> Dual Loop PLL 14 Outputs with Timing and Power Control Multichip Synchronization
		LTC6952†	LF to 4.5 GHz	14	70		<ul style="list-style-type: none"> Internal PLL, External VCO Noise Floor: -154 dBc/Hz @ 4.5 GHz 11 Outputs with Timing Control Multichip Synchronization
LTC6953†	LF to 4.5 GHz	5	65	<ul style="list-style-type: none"> LTC6952 without PLL Noise Floor: -154 dBc/Hz @ 4.5 GHz 11 Outputs with Timing Control Multichip Synchronization 			
Low Jitter PLL and VCOs Sample Clock Frequency	≤32 GHz	ADF4356	0.05 GHz to 6.8 GHz PLLVCO	93	130	Subclass 0	<ul style="list-style-type: none"> -138 dBc/Hz @ 1 MHz from 3.4 GHz Dual Output
		LTC6946	LF to 6.4 GHz PLLVCO	115	125		<ul style="list-style-type: none"> 1/f: -134 dBc/Hz; FOM: -226 dBc/Hz -155 dBc/Hz Noise Floor @ 6 GHz
	Discrete PLL and VCO†	Several Options Available	<40		<ul style="list-style-type: none"> Large Selection of Suitable PLLs and VCOs Available. Contact Factory. Example: $f_s = 5.6$ Gsps: ADF41513† (Low Noise PLL) and HMC513 (Low Noise VCO; Family of Frequencies) Example: $f_s = 18$ Gsps: ADF41513† (Low Noise PLL) and HMC8362 (Low Noise VCO) 		
	ADF5356	LF to 14 GHz Wideband Synth	97 (12 GHz)	130	<ul style="list-style-type: none"> ADF4356 with Output doubler Subharmonic Filtering May Be Needed > 6.8 GHz 		
	ADF5610†	LF to 15 GHz Wideband Synth	45	58	<ul style="list-style-type: none"> -116 dBc/Hz @ 100 kHz (7 GHz) VCO Current (90 mA); PLL (50 mA) Subharmonic Filtering May Be Needed > 7.5 GHz 		
	ADF437X†	LF to 32 GHz Ultra Wideband PLLVCO	40	60	<ul style="list-style-type: none"> Int-N FOM: -234 dBc/Hz PFD Spurs: -100 dBc Integrated LDOs Subharmonic Filtering May Be Needed > 8 GHz 		

* Integrated jitter numbers assume a high quality, ultralow phase noise reference input. ADC SNR method jitter numbers are integrated from 1 kHz to F_{CLK} . LTC6952 jitter numbers assume low phase noise external VCO.

** Above 4.5 GHz, JESD204B subclass 1 must be handled externally to the PLLVCO; however, the PLLVCO μHz phase adjustment can assist.

† Part in development.

DC Coupled External Gain Setting Differential Amplifiers

		3 dB Bandwidth					
		≤100 MHz	>100 MHz to 300 MHz	>300 MHz to 500 MHz	>500 MHz to 1 GHz	>1 GHz to 2 GHz	>2 GHz to 4 GHz
Spurious Free Dynamic Range (SFDR) in dB	>70 to 80	ADA 4941-1				ADA 4939-1 ADA 4939-2	ADA 4937-1 ADA 4937-2
	>80 to 90			AD 8132 AD 8139	ADA 4938-1 ADA 4938-2		ADA 4927-1 ADA 4927-2
	>90 to 100	AD 8137	ADA 4940-1 ADA 4940-2	AD 8138 AD 8131			
	>100 to 120	ADA 4922-1	AD 8475		ADA 4932-1 ADA 4932-2	ADA 4950-1 ADA 4950-2	ADA 4930-1 ADA 4930-2

Fixed or Pin-Strapped Differential Amplifiers

		Coupling	3 dB Bandwidth					
			≤100 MHz	>100 MHz to 300 MHz	>500 MHz to 1 GHz	>1 GHz to 2 GHz	>2 GHz to 4 GHz	>4 GHz to 6 GHz
Max Gain (dB)	1 to 10	DC		LT 6402-6	LTC 6404-1 LT 1993-2 LT 6411	LTC 6417 LTC 6416 LTC 6410-6	LTC 6400-8 LTC 6401-8	
	>10 to 20	AC				LTC 6430-15 LTC 6432-15	ADL 5561* ADL 5562*	ADA 4960-1 ADL 5567* ADL 5566*
		DC	LT 1994	LT 6402-12 LT 6402-20	LTC 6404-1/-2 LTC 1993-4/-10	LTC 6400-14/-20 LTC 6401-14/-20 LTC 6421-20 LTC 6420-20		
	>20 to 40	AC					LTC 6430-20 AD 8351	
		DC		LTC 6403-1	LTC 6405 LTC 6406	LTC 6401-26 LTC 6400-26		
	>40 to 60	DC			LTC 6409 LTC 6419			

* Can be DC coupled using negative supply on the ground plane.



Differential Variable Gain Amplifiers

	Gain Control	3 dB Bandwidth						
		≤100MHz	>100MHz to 300MHz	>300MHz to 500MHz	>500MHz to 1GHz	>1GHz to 2GHz	>2GHz to 4GHz	
Gain CNTRL Range (dB)	>10 to 20							
	>20 to 40	Analog						
		Digital						
	>40 to 60	Analog						
		Digital						

One Channel Two Channels

**Analog Devices, Inc.
Worldwide Headquarters**

Analog Devices, Inc.
One Technology Way
P.O. Box 9106
Norwood, MA 02062-9106
U.S.A.
Tel: 781.329.4700
(800.262.5643, U.S.A. only)
Fax: 781.461.3113

**Analog Devices, Inc.
Europe Headquarters**

Analog Devices GmbH
Ott-Aicher-Str. 60-64
80807 München
Germany
Tel: 49.89.76903.0
Fax: 49.89.76903.157

**Analog Devices, Inc.
Japan Headquarters**

Analog Devices, KK
New Pier Takeshiba
South Tower Building
1-16-1 Kaigan, Minato-ku,
Tokyo, 105-6891
Japan
Tel: 813.5402.8200
Fax: 813.5402.1064

**Analog Devices, Inc.
Asia Pacific Headquarters**

Analog Devices
5F, Sandhill Plaza
2290 Zuchongzhi Road
Zhangjiang Hi-Tech Park
Pudong New District
Shanghai, China 201203
Tel: 86.21.2320.8000
Fax: 86.21.2320.8222

©2017 Analog Devices, Inc. All rights reserved. Trademarks and registered trademarks are the property of their respective owners. Ahead of What's Possible is a trademark of Analog Devices.

Visit analog.com and linear.com

