

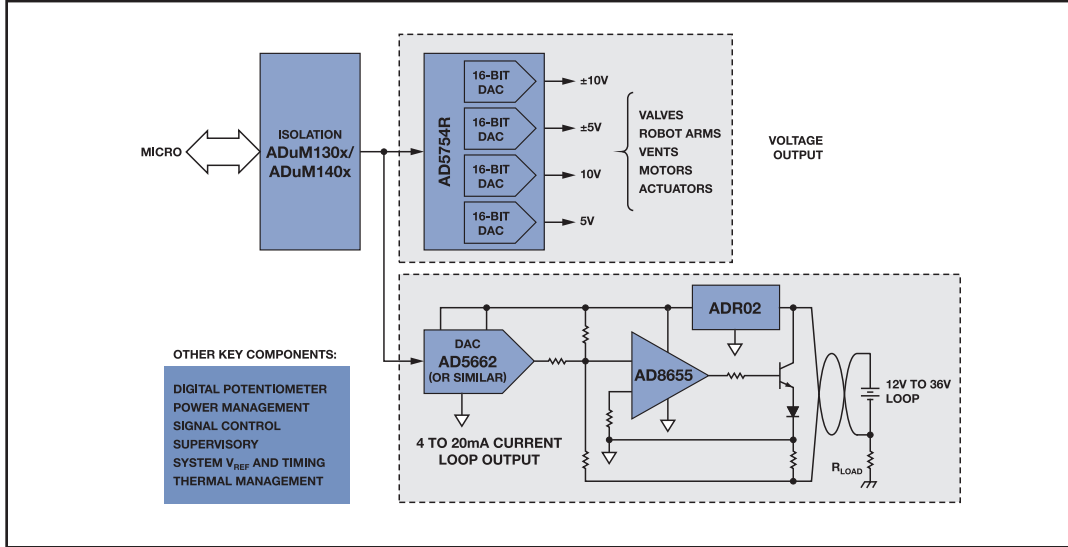


# Industrial Applications

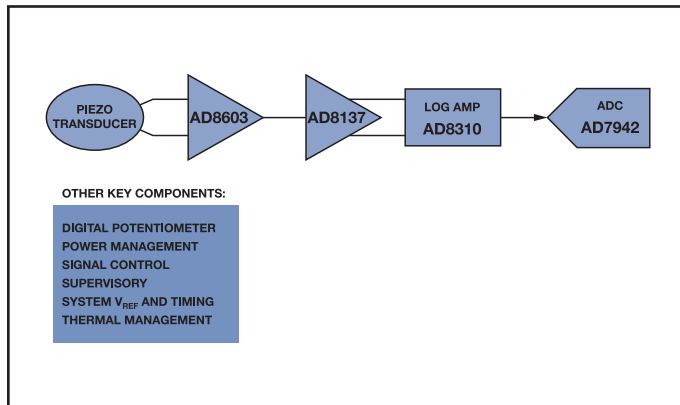


## Signal Chains

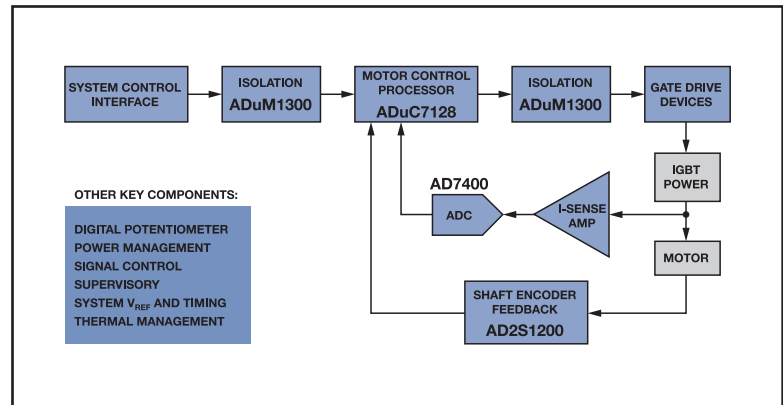
### PLC Outputs (AD5754R, ADR02, AD8655, ADuM1300)



### Non-Invasive Flow Monitor (AD8603, AD8137, AD8310, AD7942)



### Motor Control (AD2S1200, AD7400, ADuM1300, ADuC7128)





## Converters: ADCs

### AD7400 Isolated Sigma-Delta Modulator

#### Key Features

- 10 MHz data rate
- 2nd-order modulator
- $\pm 4$  LSB INL with 16-bit resolution
- Onboard digital isolator and reference
- $\pm 200$  mV  $A_m$  range
- Low power operation: 15 mA max
- $-40^\circ\text{C}$  to  $+105^\circ\text{C}$  operating temperature range

#### Benefits

- Highest performance isolated ADC
  - $\pm 2$  LSB INL typical with 16-bit resolution
  - $5\text{mV}/^\circ\text{C}$  offset drift
- 2nd order modulator
  - 10 MHz data rate - AD7400
  - 16 MHz data rate - AD7401

#### Key Applications

- AC motor control
- Data acquisition systems
- A/D and opto-isolator replacements

#### Cost

\$4.00 per unit in 1k quantity

#### Package Options

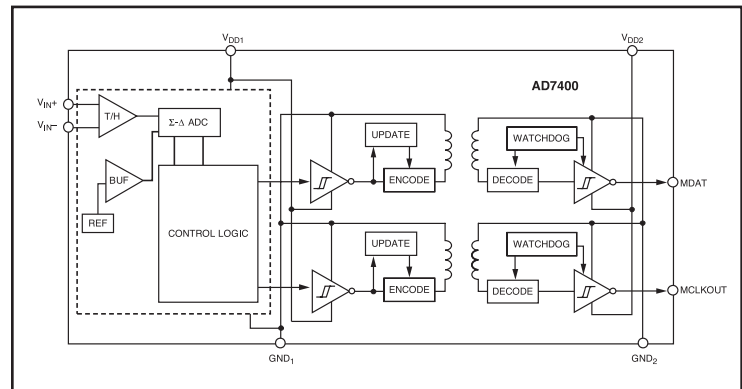
- 16-lead SOIC

#### Recommended Complementary Products

- ADA4851-1: low cost, high-speed rail-to-rail output operational amplifier
- AD8051: low cost, high speed, single, rail-to-rail amplifier
- AD5543: 16-bit DAC in  $\mu\text{SOIC-8}$  package
- AD5545: precision dual 16-bit and 14-bit DACs in compact TSSOP packages

#### Product Link

[www.analog.com/AD7400](http://www.analog.com/AD7400)



## Converters: DACs

### AD5754R Complete, Quad, 16-Bit, Serial Input, Unipolar/Bipolar Voltage Output DAC

#### Key Features

- Complete quad 16-bit D/A converter
- Operates from single/dual supplies
  - +4.5 V to  $\pm 16.5$  V
- Software-programmable output range:
  - +5 V, +10 V, +10.8 V,  $\pm 5$  V,  $\pm 10$  V, over-range
- $\pm 8$  LSB max INL error,  $\pm 1$  LSB max DNL error
- Total unadjusted error (TUE) 0.1% FSR max
- Settling time: 10  $\mu$ s max
- Integrated reference, 5 ppm/ $^{\circ}$ C
- Integrated reference buffers
- Output control during power-up/brownout
- Simultaneous updating via LDAC
- Asynchronous CLR to zero-/mid-scale
- DSP/microcontroller compatible serial interface
- Operating temperature range:  $-40^{\circ}$ C to  $+85^{\circ}$ C
- iCMOS™ process technology

#### Benefits

- The combination of small package, programmable voltage output ranges and operation over a wide range of dual and single supplies make the AD5754R and family ideal for analog output requirements for PLC modules, DAQ cards and DC set point control in space-constrained industrial and instrumentation applications

#### Key Applications

- Programmable logic controllers
- Closed-loop servo control, process control
- Automatic test equipment
- DC set-point control

#### Cost

\$10.05 per unit in 1k quantity

#### Package Options

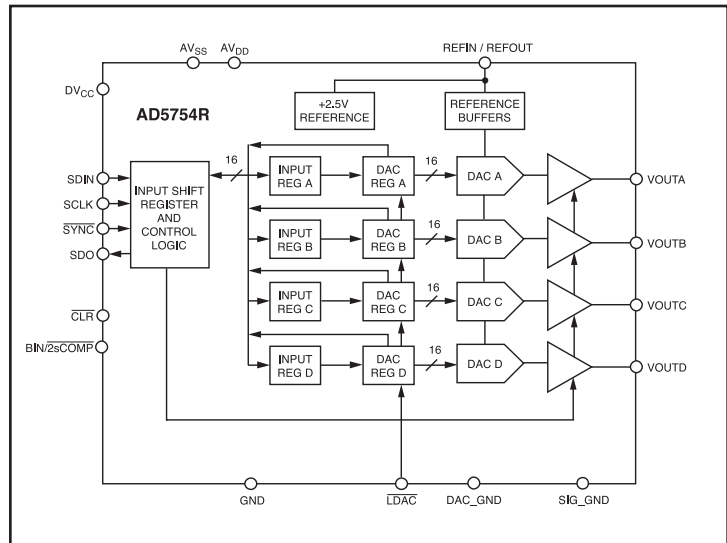
- 24-lead TSSOP

#### Related Devices

Product	Resolution (bits)	Channel Count	Supply Voltage (V)
AD5752	16	2	+4.5 to $\pm 16.5$
AD5734	14	4	+4.5 to $\pm 16.5$
AD5724	12	4	+4.5 to $\pm 16.5$
AD5664	16	4	+2.7 to +5.5

#### Product Link

[www.analog.com/AD5754R](http://www.analog.com/AD5754R)



## Converters: DACs

### AD7942 14-Bit, 250 kSPS PuLSAR® ADC

#### Key Features

- 14-bit resolution, no missing codes
- 250 kSPS sampling rate
- INL 1 LSB MAX
- SINAD 85 dB @ 20k
- 10-lead MSOP
- 1.15 mW @ 100k
- Power dissipation:
  - 1.15 mW @ 2.5V/100 kSPS
  - 1.15  $\mu$ W @ 2.5 V/100 SPS
- Pseudo-differential analog input range:  
0 V to  $V_{REF}$  with  $V_{REF}$  up to  $V_{DD}$
- Single supply operation 2.3 V to 5.5 V with  
1.8 V to 5 V logic interface
- No pipeline delay
- Multiple ADCs daisy chain, busy indicator
- Serial interface SPI®/QSPI™/DSP-compatible
- Pin-to-pin compatible with the 16-bit AD7685

#### Benefits

- Small package
- Low power
- Ideal 14-bit accuracy
- Daisy-chaining

#### Key Applications

- Data acquisition
- Industrial
- Medical
- Battery-powered applications
- Process control

#### Cost

\$4.75 per unit in 1k quantity

#### Package Options

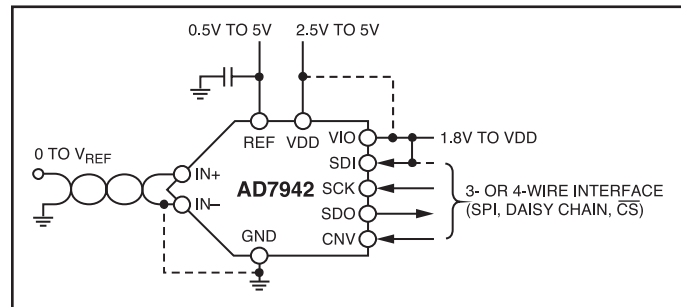
- 10-lead MSOP

#### Related Devices

Type	100 kSPS	250 kSPS	500 kSPS
16-Bit True Differential	AD7684	AD7687	AD7688
16-Bit Pseudo Differential/Unipolar	AD7683	AD7685 AD7694	AD7686
16-Bit Unipolar	AD7680		
14-Bit Pseudo Differential/Unipolar		AD7942	AD7946
14-Bit Unipolar	AD7940		

#### Product Link

[www.analog.com/AD7942](http://www.analog.com/AD7942)





## Processors: Precision Analog Microcontroller

### ADuC7128 Precision Analog Microcontroller ARM7TDMI® MCU with 12-Bit ADC and DDS DAC

#### Key Features

##### Common Architectural Features

##### Analog I/O multi-channel, 12-bit, 1MSPS ADC

- 10 ADC channels-32-bit 21 MHz DDS
- Current-to-voltage (I/V) conversion
- Integrated 2nd order LPF
- DDS input to DAC
- 100 Ohm line driver, on-chip voltage reference, on-chip temperature sensor ( $\pm 3^{\circ}\text{C}$ )
- Uncommitted voltage comparator

##### Microcontroller

- ARM7TDMI core, 16-/32-bit RISC architecture, JTAG port supports code download and debug, external watch crystal/clock source
- 41.78 MHz PLL with 8 way programmable divider
- Optional trimmed on-chip oscillator

##### Memory

- 126k bytes flash/EE memory, 8k bytes SRAM in-circuit download, JTAG-based debug software triggered in-circuit re-programmability

##### On-Chip Peripherals

- 2 x UART, 2 x I<sup>2</sup>C® and SPI serial I/O 28-pin GPIO port, 5x general purpose timers wake-up and watchdog timers, power supply monitor 16-bit PWM generator, quadrature encoder PLA - programmable logic

#### Benefits

- The peripherals include 6-channel pulse-width modulation (PWM) with H-bridge mode, an on-chip quadrature encoder that deliver the speed, position and direction control required by dc motor controls, and an integrated direct digital synthesizer (DDS) and low-pass filter that generates a raw sine wave at up to 1 MHz to act as a stimulus for smart sensing applications.
- In addition to the 6-channel PWM and quadrature encoder, the ADuC7128 provides I/V control, making it applicable to a variety of motor control applications. The PWMs can also be used as general purpose 16-bit PWMs to provide additional DAC outputs, high frequency clocks or set point control

#### Key Applications

- Motor control
- Smart sensing applications

#### Cost

\$6.95 per unit in 1k quantity

#### Package Options

- 64-lead LFCSP (9mm x 9mm) package

#### Recommended Complementary Products

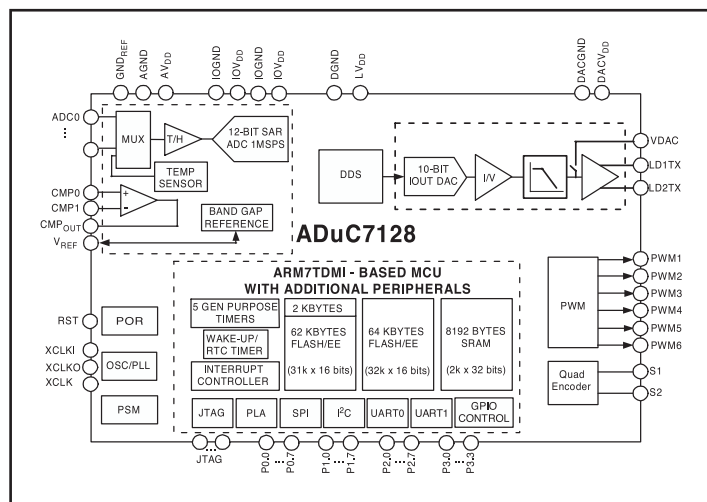
- AD8354: 1 MHz - 2.7 GHz RF gain blocks, silicon bipolar amplifier

#### Product Link

[www.analog.com/ADuC7128](http://www.analog.com/ADuC7128)

For other members of analog microcontrollers please visit:

[www.analog.com/microcontroller](http://www.analog.com/microcontroller)





## Converters: Synchro/Resolver to Digital Converters

### AD2S1200 12-Bit R/D Converter with Reference Oscillator

#### Key Features

- Complete monolithic R/D converter
- Parallel and serial 12-bit data ports
- System fault detection
- Absolute position and velocity outputs
- Differential inputs
- $\pm 11$  arc minutes of accuracy
- 1,000 rps maximum tracking rate, 12-bit resolution
- Incremental encoder emulation: 1,024 pulses/rev
- Programmable sinusoidal oscillator on-board
- Compatible with DSP and SPI® interface standards
- 204.8 kHz square wave output
- Single-supply operation:  $5.00\text{ V} \pm 5\%$

#### Benefits

- Complete resolver to digital solution
- Wide choice of data format
  - parallel, serial and encoder emulation
- Angular position and angular velocity available
- Programmable excitation frequency
- System fault detection
- High accuracy

#### Key Applications

- Hybrid electric vehicles
- Electric power steering
- Integrated starter generator/alternator
- Encoder emulation
- Automotive motion sensing and control

#### Cost

\$12.00 per unit in 1k quantity

#### Package Options

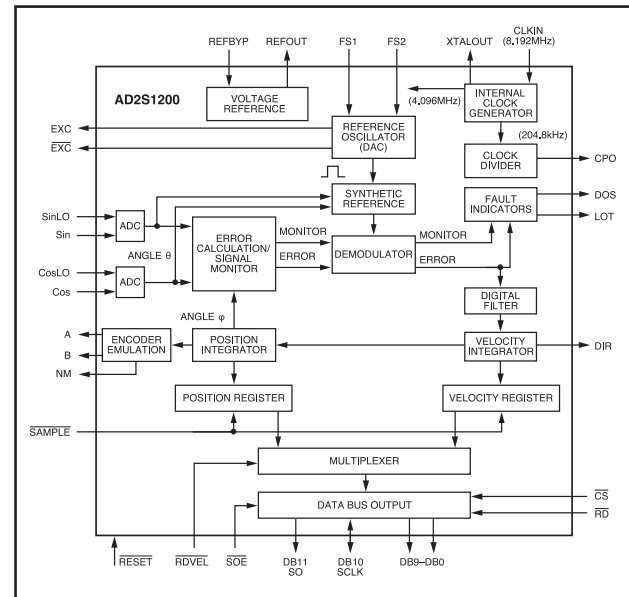
- 44-lead LQFP

#### Related Devices

Device No	Resolution (Bits)	Max track rate ( $\pm$ rps)	Accuracy (arcmin)	Ref Freq (Hz)	Encoder Emulation
AD2S1205	12	1250	11	10k-20k	Yes
AD2S1210	10/12/14/16	2500/1000/500/125	5 + 1 lsb	2k-20k	Yes
AD2S80A	10/12/14/16	1040/260/65/16.25	8/4/2 + 1 lsb	50-20k	No
AD2S90	12	500	10.6 + 1 lsb	3k-20k	Yes

#### Product Link

[www.analog.com/AD2S1200](http://www.analog.com/AD2S1200)





## iCoupler® Digital Isolators

### ADuM130x Triple-Channel Digital Isolator

#### Key Features

- 3 isolated channels in one package
- < 20mW power at < 2 Mbps data rates
- Up to 90 Mbps data rate
- 105°C operation
- UL, VDE, CSA and TUV safety approvals
- Multidirectional channels available
- < 2nS channel-to-channel matching
- > 25kV/μs transient immunity
- Digital interface
- Default high output (default low output available as ADuM131x)

#### Benefits

- Lowest system cost
- Most compact solution
- Highest reliability at high operating temperatures
- Easiest isolation to implement for fastest time-to-market

#### Key Applications

- Motor drives
- SPI interfaces
- Industrial field buses

#### Cost

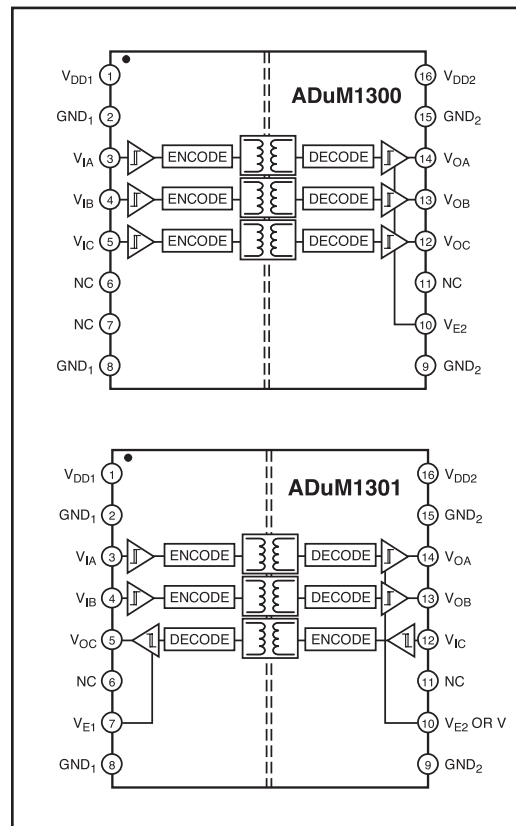
\$1.61 per unit in 1k quantity

#### Package Options

- 16-lead wide body SOIC

#### Product Link

[www.analog.com/ADuM130x](http://www.analog.com/ADuM130x)





## Amplifiers: Logarithmic Amplifier

### AD8310 Fast, Voltage-Out DC -440 MHz, 95 dB Logarithmic Amplifier

#### Key Features

- DC -440 MHz operation,  $\pm 0.4$  dB linearity
- Voltage output, rise time  $< 15$  ns
- High current capacity: 25 mA into grounded RL
- 95 dB dynamic range: -91 dBV to +4 dBV
- Single supply of 2.7 V min at 8 mA typ
- Slope of +24 mV/dB, intercept of -108 dBV
- 100 ns power-up time, 1 mA sleep current

#### Benefits

- Low cost and small package size
- Fast response time of  $< 15$  ns
- Fully differential dc-coupled signal path
- Highly stable scaling over temperature

#### Key Applications

- Conversion of signal level to decibel form
- Signal-level determination down to 20 Hz
- Transmitter antenna power measurement
- Receiver signal strength indication (RSSI)
- Low cost radar and sonar signal processing
- Network and spectrum analyzers
- True-decibel ac mode for multimeters

#### Cost

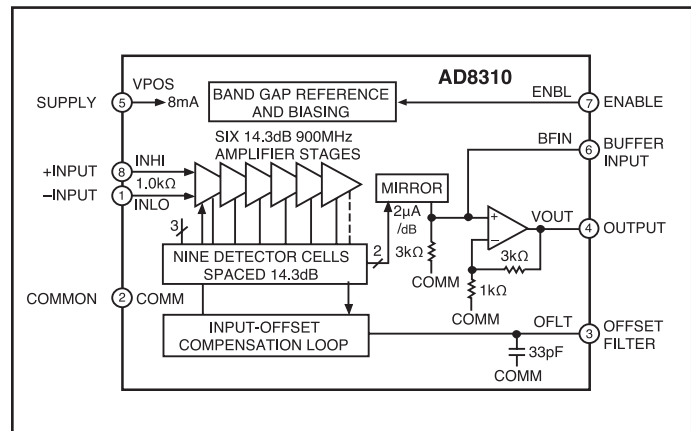
\$3.95 per unit in 1k quantity

#### Package Options

- 8-lead MSOP

#### Product Link

[www.analog.com/AD8310](http://www.analog.com/AD8310)



## Amplifiers: Precision Operational Amplifiers

### AD8655 Low Noise, Precision CMOS Amplifier

#### Key Features

- Low noise: 2.7 nV/√Hz @ f = 10 kHz
- Low distortion: 0.0008%
- Low offset voltage: 250 μV max
- Bandwidth: 28 MHz
- Rail-to-rail input/output
- 2.7 V to 5.5 V operation
- -40°C to +125°C operation

#### Benefits

- Rail-to-rail at the input and output enables designers to buffer ADCs and other wide output swing devices in single-supply systems
- ADI's patented DigiTrim® technology to achieve high DC accuracy
- Suitable for industrial instrumentation applications where noise and DC performance are critical

#### Key Applications

- Industrial controls
- Precision filters
- Digital scales
- Strain gauges
- Audio

#### Cost

\$0.70 per unit in 1k quantity

#### Package Options

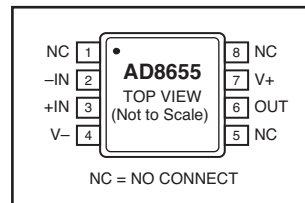
- 8-lead MSOP and SOIC

#### Related Devices

Part #	V <sub>SY</sub>	V <sub>OS</sub> max	GBP	Slew Rate	I <sub>SY</sub> max	en @ 1 kHz
<b>Singles</b>						
AD8651	2.7 to 5.5 V	350 μV	50 MHz	41 V/μs	14 mA	8 nV/sqrt(Hz)
AD8691	2.7 to 6 V	2 mV	10 MHz	5 V/μs	1.05 mA	12 nV/sqrt(Hz)
AD8628	2.7 to 6 V	5 μV	2.5 MHz	1 V/μs	1.1 mA	22 nV/sqrt(Hz)
AD8603	1.8 to 6 V	50 μV	0.4 MHz	0.1 V/μs	50 μA	25 nV/sqrt(Hz)
<b>Duals</b>						
AD8672	8 to 36 V	75 μV	10 MHz	4 V/μs	3.5 mA	3.8 nV/sqrt(Hz)
AD8662	5 to 16 V	100 μV	4 MHz	3.5 V/μs	2 mA	12 nV/sqrt(Hz)

#### Product Link

[www.analog.com/AD8655](http://www.analog.com/AD8655)





## Amplifiers: Precision Operational Amplifiers

### AD8603 Precision Micropower Low Noise CMOS Operational Amplifier

#### Key Features

- Low offset voltage: 50  $\mu\text{V}$  max
- Low input bias current: 1 pA max
- Single-supply operation: 1.8 V to 5 V
- Low noise: 22 nV/Hz
- Micropower: 50  $\mu\text{A}$  max

#### Benefits

- Tiny packaging for small form factor applications
- Low power DC accuracy and low noise combination excellent for portable medical and instrumentation applications
- Rail-to-rail input and output to operate close to 1.8 V and 6 V for wide dynamic range beneficial for shunt sense, voltage monitoring, ADC driving, low power microcontroller analog input

#### Key Applications

- Battery-powered instrumentation
- Filters
- Sensors gain stages: thermocouple, pressure
- Low power ASIC or microcontroller and ADC drivers

#### Cost

\$0.67 per unit in 1k quantity

#### Package Options

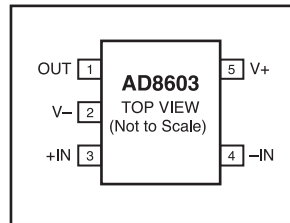
- 5-lead TSOT-23

#### Related Devices

Part #	V <sub>SY</sub>	V <sub>OS</sub> max	GBP	Slew Rate	I <sub>SY</sub> max	en @ 1 kHz
<b>Singles</b>						
AD8615	2.7 to 6 V	300 $\mu\text{V}$	24 MHz	12 V/ $\mu\text{s}$	2 mA	8 nV/sqrt(Hz)
OP196	3 to 12 V	300 $\mu\text{V}$	0.45 MHz	0.3 V/ $\mu\text{s}$	60 $\mu\text{A}$	26 nV/sqrt(Hz)
AD8502	1.8 to 5.5 V	3 mV	7 kHz	0.004 V/ $\mu\text{s}$	1 $\mu\text{A}$	190 nV/sqrt(Hz)
AD8613	1.8 to 5.5 V	2.2 mV	0.4 MHz	0.1 V/ $\mu\text{s}$	41 $\mu\text{A}$	25 nV/sqrt(Hz)
<b>Duals</b>						
AD8607	1.8 to 6 V	50 $\mu\text{V}$	0.4 MHz	0.1 V/ $\mu\text{s}$	50 $\mu\text{A}$	25 nV/sqrt(Hz)
AD8667	5 to 16 V	100 $\mu\text{V}$	550 kHz	0.2 V/ $\mu\text{s}$	250 $\mu\text{A}$	35 nV/sqrt(Hz)

#### Product Link

[www.analog.com/AD8603](http://www.analog.com/AD8603)





## Differential ADC Driver

### AD8137 Low Cost, Low Power 12-Bit Differential ADC Driver

#### Key Features

- Extremely low power
  - 2.6 mA @ 5 V
  - 450  $\mu$ A in power-down mode @ 5 V
- High speed
  - 110 MHz, -3 dB bandwidth (G = +1)
  - 450 V/ $\mu$ s slew rate
- 12-bit distortion @ 500 kHz
- Fast settling time: 100 ns to 0.02%
- Low voltage offset:  $\pm$  2.6 mV max
- Rail-to-rail output
- Fully differential
  - Single-ended-to-differential operation
  - Differential-to-differential operation
- Adjustable output common mode voltage
- Externally adjustable gain
- Wide supply voltage range
  - 2.7 V to 12 V

#### Benefits

- The AD8137 is a low power, low cost, high-speed differential amplifier for 12-bit data acquisition systems and other systems that are sensitive to power and cost.
- Adjustable output common mode voltage allows the user to easily level shift signals.

#### Key Applications

- Battery-powered applications
- Portable instrumentation
- Single-ended-to-differential converters
- Differential active filters
- Level shifter

#### Cost

\$1.09 per unit in 1k quantity

#### Package Options

- 8-lead SOIC
- 8-lead 3mm x 3mm LFCSP

#### Recommended Complementary Products

- Precision ADCs
- Precision DACs

#### Related Devices

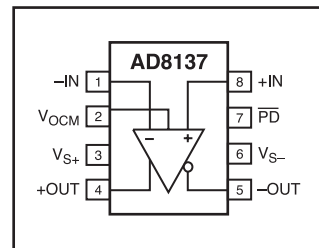
AD8132: low cost, high speed differential amplifier

AD8138: low distortion differential ADC driver

AD8139: ultra low noise fully differential ADC driver

#### Product Link

[www.analog.com/AD8137](http://www.analog.com/AD8137)





## References: Precision Series References

### ADR02 Ultra Compact Precision 5 V Reference

#### Key Features

- 5 V output
- Ultra compact SC70-5 and TSOT-5 packages
- Initial accuracy  $\pm .1\%$
- Low noise 10  $\mu\text{V}$  p-p (0.1 Hz to 10 Hz)
- Wide operating range 7.0-40 V
- High output current 10 mA

#### Benefits

- High initial accuracy and low drift makes this device ideally suited for precision measurement systems
- Excellent long term drift and hysteresis characteristics minimize the number of calibration cycles required, reducing maintenance and service costs
- No external capacitors required thus precious PCB space is preserved
- Low noise characteristics improve system accuracy

#### Key Applications

- Precision data acquisition systems
- High resolution converters
- Industrial process controls
- Precision instruments
- Automotive

#### Cost

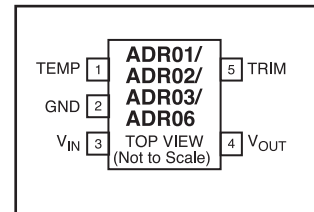
\$1.10 per unit in 1k quantity

#### Package Options

- 8-lead SOIC
- 5-lead TSOT
- 5-lead SC70

#### Product Link

[www.analog.com/ADR02](http://www.analog.com/ADR02)





## Industrial Applications Product Selection Table

Amplifiers				
Product	Bandwidth	Supply	Package	Features
AD8603	400 kHz	1.8 V to 6 V	TSOT	low bias current (0.2 pA), rail-to-rail input/output op amp
AD8655	28 MHz	2.7 V to 5.5 V	SOIC, MSOP	low noise (4nV/√Hz), rail-to-rail input/output op amp
AD8310	DC to 440 MHz	2.7 V to 5.5 V	SOIC	log amplifier with 100 dB dynamic range and 15 nS response time
AD8137	110 MHz	2.7 V to ±6 V	SOIC	low power, 12-bit differential ADC driver with rail-to-rail output

Data Converters						
Product	Type	Resolution	Interface	Supply	Package	Features
AD7942	ADC	14 bits	SPI	2.5 V to 5 V	CSP, SOP	250 kSPS ADC with no pipeline delay
AD2S1200	Resolver to Digital	12 bits	Parallel, Serial	5 V	LQFP	11 arc minutes of accuracy
AD5754R	DAC	16 bits	SPI	4.5 V to ±16 V	TSSOP	quad DAC with programmable output ranges
AD7400	Iso. ΣΔ Modulator	16 bits	Serial	Multi +3 and +5	SOIC	2nd order ΣΔ modulator

Additional Devices in this Promotion			
Product	Function	Supply	Features
ADuM1300	Digital Isolator	3 V to 5 V	2500 V isolation rating, low power, 3 channels, up to 90 Mbps in 16-lead SOIC
ADR02	Voltage Reference	7 V to 40 V	5.0 V reference with 0.06% initial accuracy and 3 ppm/°C tempco, small package and low power.
ADuC7128	Analog Microcontroller	3 V	ARM7 architecture microcontroller with 12-bit ADCs, 10-bit DAC, and PWM generator

Ask your distributor sales representative to provide information on these complementary “analog is everywhere” promotions:

### Medical Applications

- AD5259: nonvolatile, I<sup>2</sup>C-compatible 256-position digital potentiometer
- AD7266: differential input, dual 2 MSPS, 12-bit, 3-channel SAR ADC
- AD7142: programmable capacitance-to-digital converter with environmental compensation
- AD7685: 250 kSPS 16-bit PulSAR<sup>®</sup> ADC
- ADuC7026: precision analog microcontroller
- AD8666: 16 V, 4 MHz rail-to-rail output amplifier
- AD8333: DC to 50 MHz, dual I/Q demodulator and phase shifter
- AD8334: quad VGA with ultralow noise preamplifier and programmable R<sub>in</sub>
- AD8220: rail-to-rail output JFET input instrumentation amplifier
- SSM2211: low distortion, 1.5 W audio power amplifier
- ADSP-21375: high-performance 32-bit floating-point SHARC processor

### Security and Surveillance Applications

- AD5233: nonvolatile, quad, 64-position digital potentiometer
- AD8668: 16 V, 4 MHz rail-to-rail output amplifier
- AD7276: 3 MSPS, 12-bit ADC
- ADR125: precision micropower LDO voltage reference
- ADG721: CMOS Low Voltage 4 Ω Dual SPST Switch
- ADA4851-1: low cost, high-speed rail-to-rail output operational amplifier
- AD8131: low cost, high speed differential driver
- AD8130: low cost 270 MHz differential receiver amplifier
- AD8113: audio/video 60 MHz 16 x 16 crosspoint switch
- ADV212: JPEG 2000 video codec
- ADSP-BF548: high performance convergent Blackfin<sup>®</sup> processor



## Analog Devices Line Card

### Amplifiers and Comparators

Audio Amplifiers  
Buffer Amplifiers  
Comparators  
Current Sense Amplifiers  
Differential Amplifiers  
Gain Blocks  
Instrumentation Amplifiers  
Isolation Amplifiers  
Log Amps/Detectors  
Operational Amplifiers (Op Amps)  
Variable Gain Amplifiers

### Analog-to-Digital Converters

A/D Converters  
Audio A/D Converters  
Capacitance-to-Digital Converters  
Energy Measurement  
Isolated A/D Converters  
Synchro/Resolver-to-Digital Converters  
Temperature-to-Digital Converters  
Touchscreen Controllers  
Video Decoders  
Voltage-to-Frequency Converters

### Digital-to-Analog Converters

D/A Converters  
Audio D/A Converters  
Digital Potentiometers  
Video Encoders

### Embedded Processing and DSP

Blackfin® Processors  
TigerSHARC® Processors  
SHARC® Processors  
ADSP-21xx Processors  
Development Tools

### MEMS and Sensors

MEMS® Accelerometers  
MEMS Gyroscopes  
Analog/Digital Temperature Sensors

### RF/IF Components

Direct Digital Synthesis (DDS)  
Gain Blocks  
Log Amps/Detectors  
Mixers/Multipliers  
Modulators/Demodulators  
PLL Synthesizers/VCOs  
RF/IF Transceivers  
RF Switches  
RMS Detectors  
Rx/Tx Subsystems  
Short Range Transceivers  
DDS Modulators  
Digital Up-/Downconverters

### Switches/Multiplexers

Analog Crosspoint Switches  
Analog Switches  
Digital Crosspoint Switches  
Digital Switches  
Multiplexers (Muxes)  
RF Switches

### Analog Microcontrollers

#### Interface

Isolators  
Level Translators  
RS-232  
RS-485  
Transceivers

### Power and Thermal Management

Analog/Digital Temperature Sensors  
Battery Chargers  
Charge Pumps  
Fan Controllers  
Hot Swap Controllers  
LED Drivers  
Linear Regulators  
MOSFET Drivers  
Multifunctional Power ICs  
Power Supply Controllers  
Power Supply Sequencers  
Supervisory  
Switching Controllers  
Switching Regulators  
System Monitoring Products  
Temperature Setpoint Controllers

### References

Voltage References

### Clock and Timing

Clock Generation and Distribution  
PLL Synthesizers/VCOs  
Clock and Data Recovery/Retiming

### Wireless Products

Baseband Processing  
Cellular Terminal Chipsets  
DDS Modulators  
Digital Up-/Downconverters

### Other Linear

Analog Multipliers/Dividers  
Hall Effect Sensors  
LVDT Sensor Amplifiers  
Matched Transistors  
RMS-to-DC Converters  
Sample/Track-and-Hold Amplifiers

### Audio/Video Products

Audio A/D Converters  
Audio Amplifiers  
Audio Codecs  
Audio D/A Converters  
Audio Signal Processors  
Camera/Camcorder Analog Front Ends  
Display Interfaces  
Display Driver Electronics  
Lens Driver Components  
Sample Rate Converters  
Video Codecs  
Video Compression  
Video Encoders  
Video Decoders  
Video Filters

### Broadband Products

Broadband Amplifiers  
Broadband Codecs  
DSL/ADSL Chipsets  
CATV Amps/Splitters  
Clock and Data Recovery/Retiming  
Digital Crosspoint Switches

### Fiber/Optic

Clock and Data Recovery/Retiming  
Laser Drivers  
Log/Limiting Amplifiers  
Transimpedance Amplifiers

### Other

Automatic Test Equipment  
IOS Subsystems  
Military/Aerospace  
Modems  
Multichip



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