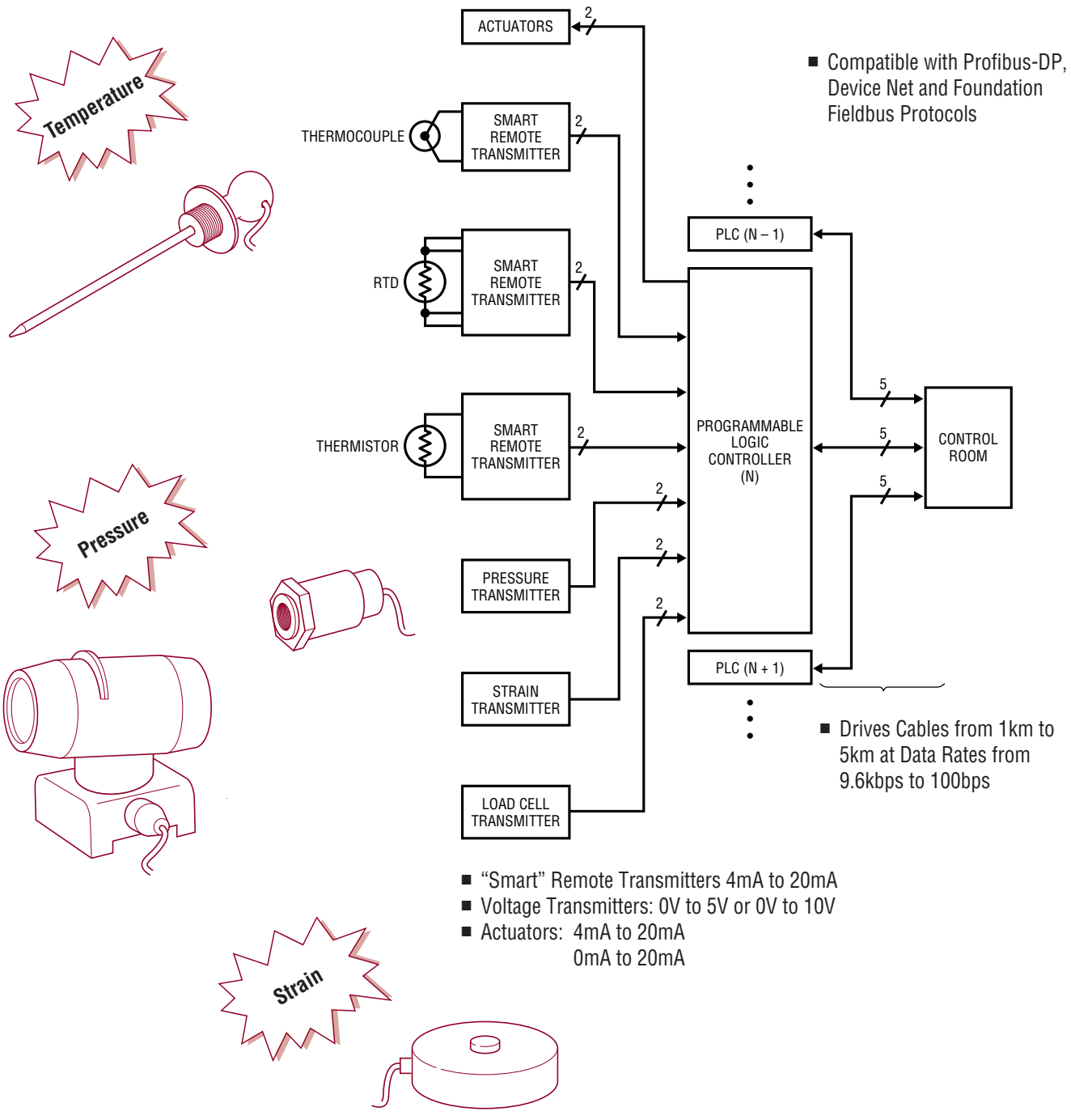
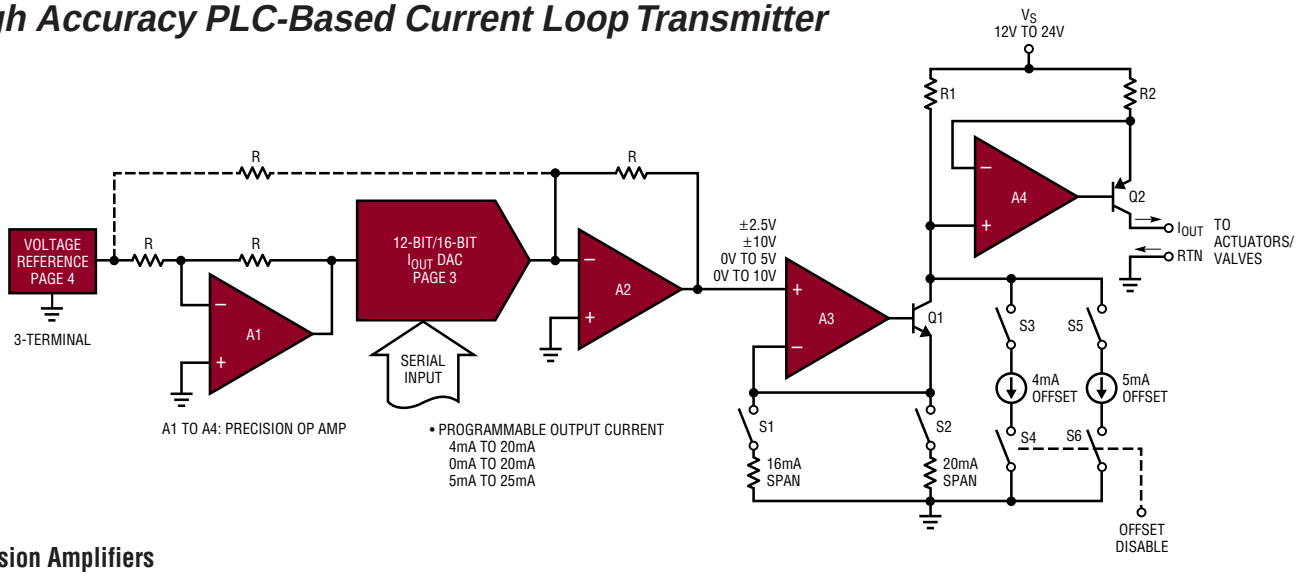
Sense and Control...



High Accuracy PLC-Based Current Loop Transmitter

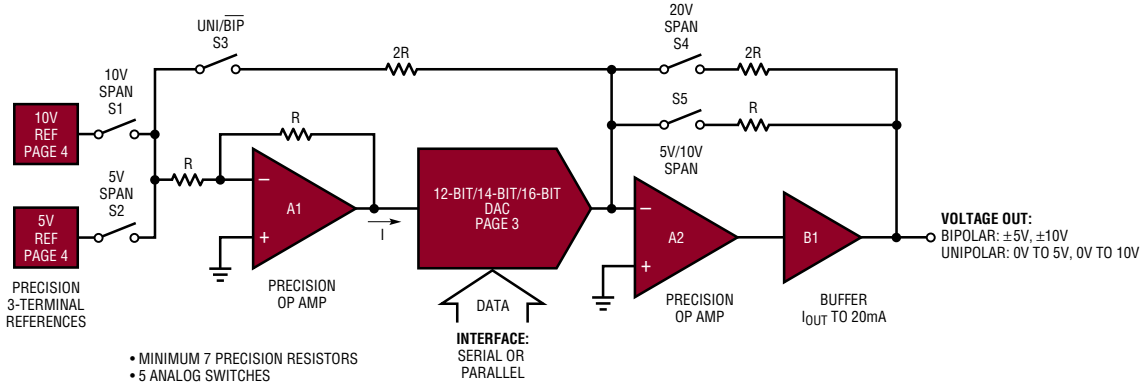


Precision Amplifiers

Part Number	Max Offset Voltage (µV)	Max TC (µV/°C)	Max I_{BIAS} (nA)	Typ Slew Rate (V/µs)	Typ GBW (MHz)	Typ V_{NOISE} (nV/√Hz$^{1/2}$)	Max I_Q (mA)	Max Supply (V)	Comments
LTC1051/53	5	0.05	50	4	2.5	1.5µV_{P-P}[1]	1.5	4.75 to 16.5	D/Q chopper op amp, internal capacitors, rail-to-rail O/P
LT1112/LT1114	60	0.5	0.25	0.3	0.75	14	0.4	±1 to ±20	D/Q, precision Picoamp input
LT1492/LT1493	180	3	100	3	5	16.5	0.55	2.5 to ±18	D/Q, single supply
LT1498/LT1499	475	2.5	650	6	10.5	12	2.2	2.2 to ±18	D/Q, rail-to-rail input and output swing
LT1677	60	2	20	2.5	7.2	3.2	3.5	3 to ±15	S, rail-to-rail input and output voltage swing
LT1881/LT1882	50	0.8	0.2	0.4	1.1	14	0.85	2.7 to ±20	D/Q, rail-to-rail O/P swing, improved C-Load™ vs LT1112/LT1114
LT1884/LT1885	50	0.8	0.4	1	2.2	9.5	0.85	2.7 to ±20	D/Q, rail-to-rail O/P swing, higher speed than LT1112/LT1114
LTC2050/51/52	3	0.03	50	2	3	1.5µV_{P-P}[1]	1	2.7 to ±5	S/D/Q, autozero op amp, internal capacitors
LT2178/LT2179	70	1.8	5	0.04	0.085	49	18	2.2 to ±20	D/Q, micropower, single supply

[1]Peak-to-peak noise from 0Hz to 10Hz S = single, D = dual, Q = quad C-Load is a trademark of Linear Technology Corporation

High Precision General Purpose Analog Output Module



Buffers

Part Number	Slew Rate (V/µs)	GBW (MHz)	I_Q (mA)	Supply (V)	Output (mA)
LT1010	75	20	5	4.5 to 40	150
LT1206	900	60	30	±5 to ±15	250
LT1357	300	25	2.5	±2.5, ±5, ±15	30

12-BIT/14-BIT/16-BIT I_{OUT} DAC

- ±0.5LSB INL and DNL Available on 12-Bit DACs
- ±1.0LSB INL and DNL Available on 14-Bit and 16-Bit DACs
- Low Glitch: 1nV•s
- On-Chip Precision Resistors for 4-Quadrant Multiplication (LTC1591, LTC1597, LTC1599)

Current Output Digital-to-Analog Converters

Part Number	Bits	I/O	Output Range	V_{CC}	Package	Comments
LTC1599	16	Parallel	0V to 10V/0V to –10V or ±10V	5V	SSOP-24	Byte wide input, on-chip resistors 4-quadrant multiplication
LTC1597	16	Parallel	0V to 10V/0V to –10V or ±10V	5V	SSOP-28, PDIP	On-chip resistors, LTC1597-1 resets to midscale
LTC1596	16	Serial	0V to V_{REF} or $\pm V_{REF}$	5V	PDIP, SW-16	Pin compatible with LTC8143, LTC1596-1 resets to midscale
LTC1595	16	Serial	0V to V_{REF} or $\pm V_{REF}$	5V	PDIP, SO-8	Pin compatible with LTC8043, multiplying
LTC1591	14	Parallel	0V to 10V/0V to –10V or ±10V	5V	SSOP-28, PDIP	On-chip resistors, LTC1591-1 resets to midscale, LTC1597 pinout
LTC7541A	12	Parallel	0V to V_{REF} or $\pm V_{REF}$	5V	PDIP, SW-18	Multiplying
LTC7543	12	Serial	0V to V_{REF} or $\pm V_{REF}$	5V	PDIP, SW-16	Multiplying
LTC7545A	12	Parallel	0V to V_{REF} or $\pm V_{REF}$	5V	PDIP, SW-20	Microprocessor compatible I/O, multiplying
LTC8043	12	Serial	0V to V_{REF} or $\pm V_{REF}$	5V	PDIP, SO-8	Upgrade to 16-bit with LTC1595
LTC8143	12	Serial	0V to V_{REF} or $\pm V_{REF}$	5V	PDIP, SW-16	Upgrade to 16-bit with LTC1596
LTC1590	12	Serial	0V to V_{REF} or $\pm V_{REF}$	5V	PDIP, S-16	Dual DAC, multiplying, 0.5LSB over temp

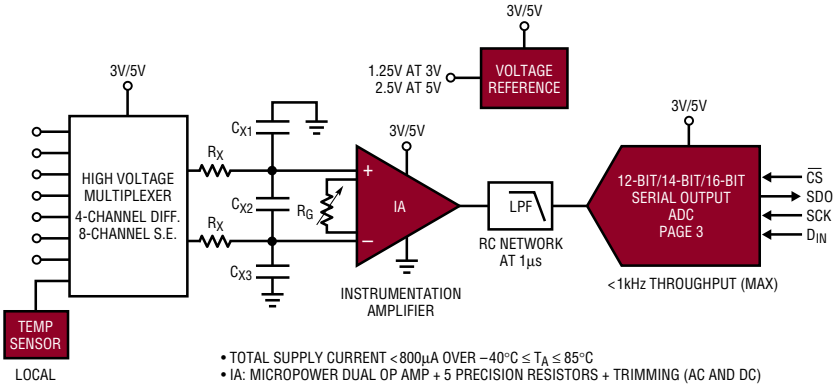
12-BIT/14-BIT/16-BIT SERIAL OUTPUT

- LTC1609 Configurable Input Ranges:
  – Unipolar: 0V to 10V, 0V to 5V, 0V to 4V
  – Bipolar: ±10V, ±5V, ±3.33V
- Small Packages
- Low Power, Automatic Shutdown Between Conversions Available

Analog-to-Digital Converters

Part Number	Resolution	MUX	Speed	I/O	Power	Supply	Int. Ref	Input Span	Package
LTC1609	16-Bits		200ksps	Serial	65mW	5V	LT	Configurable to ±10V	PDIP, SW-20, SSOP-28
LTC1417	14-Bits		400ksps	Serial	20mW	5V, ±5V	LT	0V to 4.096V/±2.048V	SSOP-16
LTC1418	14-Bits		200ksps	Ser/Par	15mW	5V, ±5V	LT	0V to 4.096V/±2.048V	PDIP, SSOP-28
LTC1402	12-Bits		2.2Msps	Serial	90mW	5V, ±5V	LT	0V to 4.096V/±2.048V	SSOP-16
LTC1404	12-Bits		600ksps	Serial	75mW	5V, ±5V	LT	0V to 4.096V/±2.048V	SO-8
LTC1400	12-Bits		400ksps	Serial	75mW	5V, ±5V	LT	0V to 4.096V/±2.048V	SO-8
LTC1401	12-Bits		200ksps	Serial	15mW	3V	LT	0V to 2.048V	SO-8
LTC1286	12-Bits		12.5ksps	Serial	1.25mW	5V		0V to V_{REF}	PDIP, SO-8
LTC1285	12-Bits		7.5ksps	Serial	0.48mW	3V		0V to V_{REF}	PDIP, SO-8
LTC1290	12-Bits	8	50ksps	Serial	30mW	5V, ±5V		0V to 5V/±5V	PDIP, SW-20
LTC1294	12-Bits	8	46ksps	Serial	30mW	5V, ±5V		0V to 5V/±5V	PDIP, SW-20
LTC1296	12-Bits	8	46ksps	Serial	30mW	5V, ±5V		0V to 5V/±5V	PDIP, SW-20
LTC1289	12-Bits	8	25ksps	Serial	4.5mW	3V, ±3V		0V to 3V/±3V	PDIP, SW-20
LTC1598	12-Bits	8	16.8ksps	Serial	1.6mW	5V		0V to 5V	SSOP-28
LTC1598L	12-Bits	8	10.5ksps	Serial	0.48mW	3V		0V to 3V	SSOP-28
LTC1293	12-Bits	6	46ksps	Serial	30mW	5V, ±5V		0V to 5V/±5V	PDIP, SW-16
LTC1594	12-Bits	4	16.8ksps	Serial	1.6mW	5V		0V to 5V	SO-20
LTC1594L	12-Bits	4	10.5ksps	Serial	0.48mW	3V		0V to 3V	SO-20
LTC1291	12-Bits	2	54ksps	Serial	30mW	5V		0V to 5V	PDIP-8
LTC1298	12-Bits	2	11.1ksps	Serial	1.7mW	5V		0V to 5V	PDIP, SO-8
LTC1288	12-Bits	2	6.6ksps	Serial	0.63mW	3V		0V to 3V	PDIP, SO-8

High End Data Acquisition Front End



Instrumentation Amplifiers

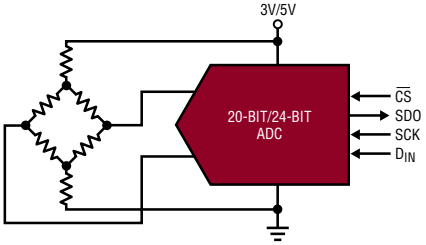
Part Number	Max Offset Voltage (µV)	Max TC (µV/°C)	I_{BIAS} (nA)	Slew Rate (V/µs)	GBW (kHz)	V_{NOISE} (nV/√Hz)	I_Q (mA)	Supply (V)	Gain	Comments
LT1167	60	0.3	0.35	1.2	800	2	1.3	±2.3 to ±18	1 to 10k	Gain programmable, precision
LT1168	60	0.3	10.25	0.5	400	15	0.53	±2.3 to ±18	1 to 10k	Gain programmable, precision
LTC1100	10	0.1	0.065	1.5	18	1.9	3.3	5 to 16, ±2.5 to ±8	100	Zero offset, drift, gain of 100
LT1101	160	2	8	0.06	22	0.9	0.13	1.8 to 44, ±2.5 to ±22	100/10	Micropower, gain of 100/10
LT1102	600	8	40	21	2000	2.8	5	±15	100/10	High speed, JFET input

Voltage References

Part Number	Output Voltages	Voltage Accuracy	Voltage Drift	I_Q	Comments
LT1019	2.5V, 4.5V, 5V, 10V	0.50%	5ppm/°C	0.65mA	Precision, series, temp pin
LT1236	5V, 10V	0.05%	5ppm/°C	0.8mA	Precision, low noise, series
LT1258/LT1798	2.5V, 3V, 4.096V, 5V, Adj	0.50%	40ppm/°C	4µA	Micropower, low dropout, series
LT1634	1.2V, 2.5V	0.05%	10ppm/°C	10µA	Micropower, precision, shunt
LT1460	2.5V, 5V, 10V	0.075%	10ppm/°C	100µA	Micropower, precision, series
LT1461	2.5V, 3V, 3.3V, 4.096V, 5V	0.04%	3ppm/°C	45µA	Micropower, low dropout, precision, series, shutdown
LT1790	2.5V	0.05%	10ppm/°C	35µA	Micropower, LDO, precision, SOT-23, series

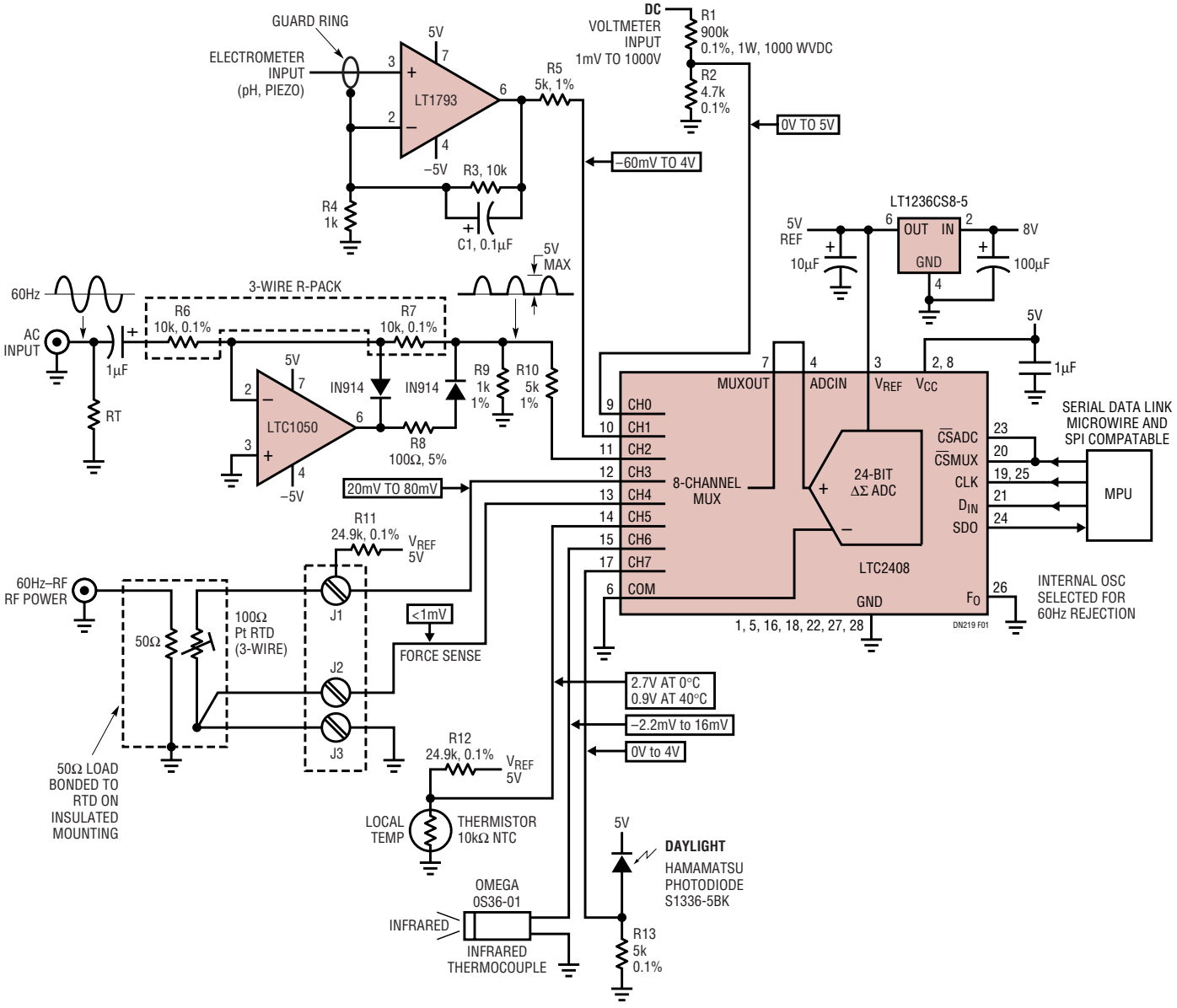
No Latency ΔΣ™ Analog-to-Digital Converters

- Single Conversion Settling Time
- Internal Oscillator—No External Components Required
- High Accuracy—No PGA Required
- Extended Input Conversion Range and –12.5% V_{REF} to 112.5% V_{REF}



Part Number	Bits	MUX	RMS Noise	I_{CC}	Supply	V_{REF}	Input Span	Package	Comments
LTC2400	24		1.2µV	200µA	2.7V to 5.5V	0.1V to V_{CC}	0V to V_{REF} ±12%	SO-8	High accuracy
LTC2401	24		3µV	200µA	2.7V to 5.5V	0.1V to V_{CC}	0V to V_{REF} ±12%	MS10	Small size
LTC2402	24	2	3µV	200µA	2.7V to 5.5V	0.1V to V_{CC}	0V to V_{REF} ±12%	MS10	Automatic channel selection
LTC2404	24	4	1.2µV	200µA	2.7V to 5.5V	0.1V to V_{CC}	0V to V_{REF} ±12%	SSOP-28	High accuracy
LTC2408	24	8	1.2µV	200µA	2.7V to 5.5V	0.1V to V_{CC}	0V to V_{REF} ±12%	SSOP-28	High accuracy
LTC2410	24		800nV	200µA	2.7V to 5.5V	0.1V to V_{CC}	$-V_{REF/2}$ to $V_{REF/2}$	SSOP-16	Differential input
LTC2411	24		1.45µV	200µA	2.7V to 5.5V	0.1V to V_{CC}	$-V_{REF/2}$ to $V_{REF/2}$	MS10	Differential input
LTC2420	20		6µV	200µA	2.7V to 5.5V	0.1V to V_{CC}	0V to V_{REF} ±12%	SO-8	Fast mode 100sps
LTC2424	20	4	6µV	200µA	2.7V to 5.5V	0.1V to V_{CC}	0V to V_{REF} ±12%	SSOP-28	Fast mode 100sps
LTC2428	20	8	6µV	200µA	2.7V to 5.5V	0.1V to V_{CC}	0V to V_{REF} ±12%	SSOP-28	Fast mode 100sps

Measuring DC to Daylight with the LTC2408

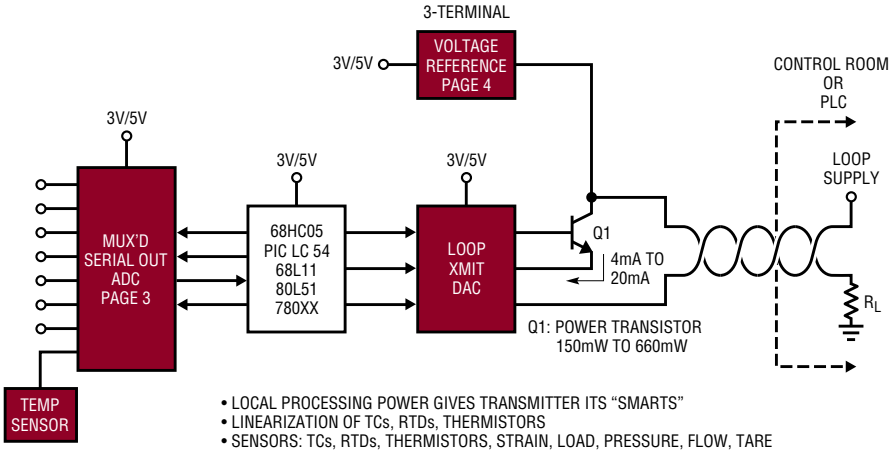


Measure Inputs From:

- CH0 DC Voltage
- CH1 Electrometer
- CH2 AC Voltage
- CH3/CH4 AC/Audio/RF Power
- CH5 Temperature (Thermistor)
- CH6 Thermocouple
- CH7 Daylight (Photodiode)

With a Single A/D Converter. No Latency Between Measurements, No Calibraton and No PGA Required

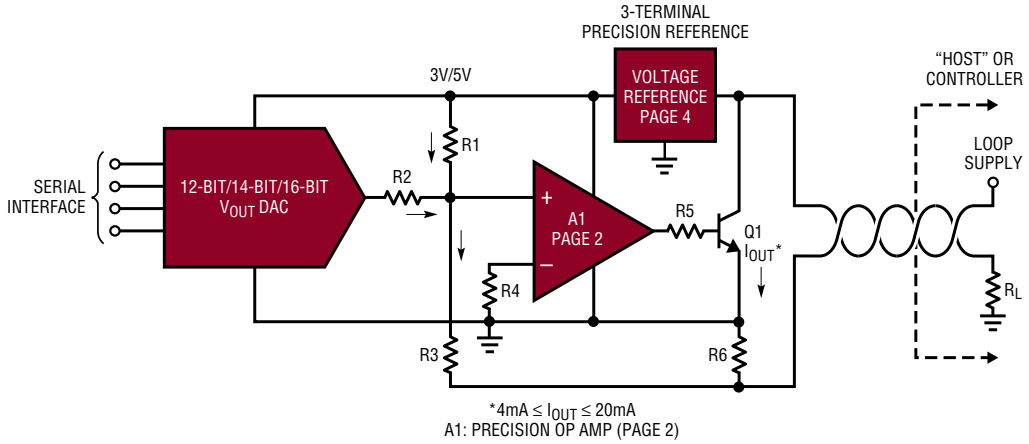
Smart Remote Transmitter



LT1025 Thermocouple Cold Junction Compensator

- Compatible with Standard Thermocouples (E, J, K, R, S, T)
- 0.5°C Initial Accuracy

4mA to 20mA Current Loop Transmitter



Voltage Output Digital-to-Analog Converters

Part Number	Bits	I/O	Int Ref	Output Range	V_{CC}	Package	Comments
LTC1650	16	Serial SPI	Ext	±5V	±5V	PDIP, S-16	16-bit monotonic, low glitch impulse
LTC1655	16	Serial SPI	2.048V	0V to 4.096V	4.5V to 5.5V	PDIP, SO-8	Smallest 16-bit DAC
LTC1655L	16	Serial SPI	1.25V	0V to 2.5V	2.7V to 5.5V	PDIP, SO-8	Smallest 3V 16-bit DAC
LTC1658	14	Serial SPI	Ext	0V to V_{REF}	2.7V to 5.5V	MS8, SO-8	V_{REF} can be tied to V_{CC}
LTC1257	12	Serial SPI	2.048V	0V to 2.048V	4.5V to 15V	SO-8, PDIP	350µA I_{CC}, high V_{CC} range
LTC1451	12	Serial SPI	2.048V	0V to 4.096V	4.5V to 5.5V	SO-8, PDIP	0.5LSB DNL
LTC1452	12	Serial SPI	Ext	0V to 2(V_{REF})	2.7V to 5.5V	PDIP, SO-8	225µA I_{CC}
LTC1453	12	Serial SPI	1.22V	0V to 2.5V	2.7V to 3.5V	PDIP, SO-8	250µA I_{CC} includes Ref
LTC1456	12	Serial SPI	2.048V	0V to 4.096V	4.5V to 5.5V	PDIP, SO-8	Clear input
LTC1659	12	Serial SPI	Ext	0V to V_{REF}	2.7V to 5.5V	MS8, SO-8	V_{REF} can be tied to V_{CC}