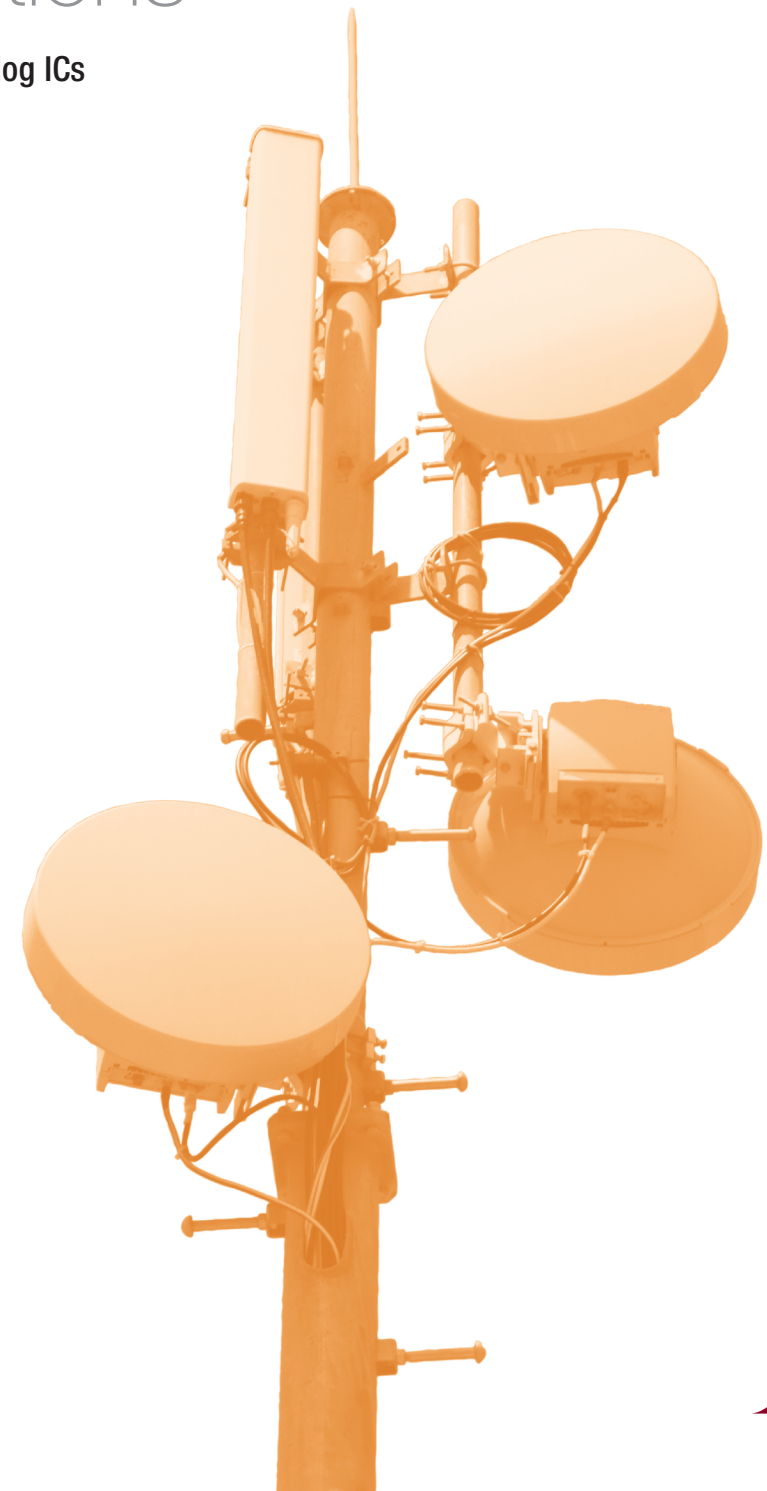
Wireless & RF Solutions

High Performance Analog ICs



LINEAR TECHNOLOGY

Linear Technology offers some of the highest performance RF and signal chain solutions for wireless and cellular infrastructure. These products support worldwide standards including, LTE, WiMAX, GSM, W-CDMA, TD-SCDMA, CDMA, and CDMA2000. Other wireless systems include broadband microwave data links, secure communications, satellite receivers, broadband wireless access, wireless broadcast systems, RFID readers and cable infrastructure.

Product Offerings

- High Linearity Active Mixers
- Direct Conversion I/Q Modulators
- High Dynamic Range Direct Conversion I/Q Demodulators
- Low Distortion IF Amplifiers/ADC Drivers
- Variable Gain Amplifiers
- Complete, Integrated RF-to-Digital Receivers
- Frequency Synthesizer/VCO
- High Speed A/D Converters up to 16-Bit Resolution
- High Sampling Rate A/D Converters up to 250Msps
- Serial High Speed A/D Converters
- High Accuracy RMS RF Detectors
- High Dynamic Range Log Detectors
- High Frequency Schottky Peak Detectors
- Active Filters

This guide is organized by application and specific radio architecture to facilitate ease of finding the right product for the job. Most products are available with a demo board to facilitate quick and easy evaluation. Data sheets and additional product information is available at www.linear.com.

Linear Technology Stands Behind

- Product Reliability
- Highest Quality (0.1 FIT Rate)
- Superior Performance and Value
- Reliable Delivery
- Unparalleled Service

We are committed to innovation, enhanced performance and features that bring outstanding value to your end products.

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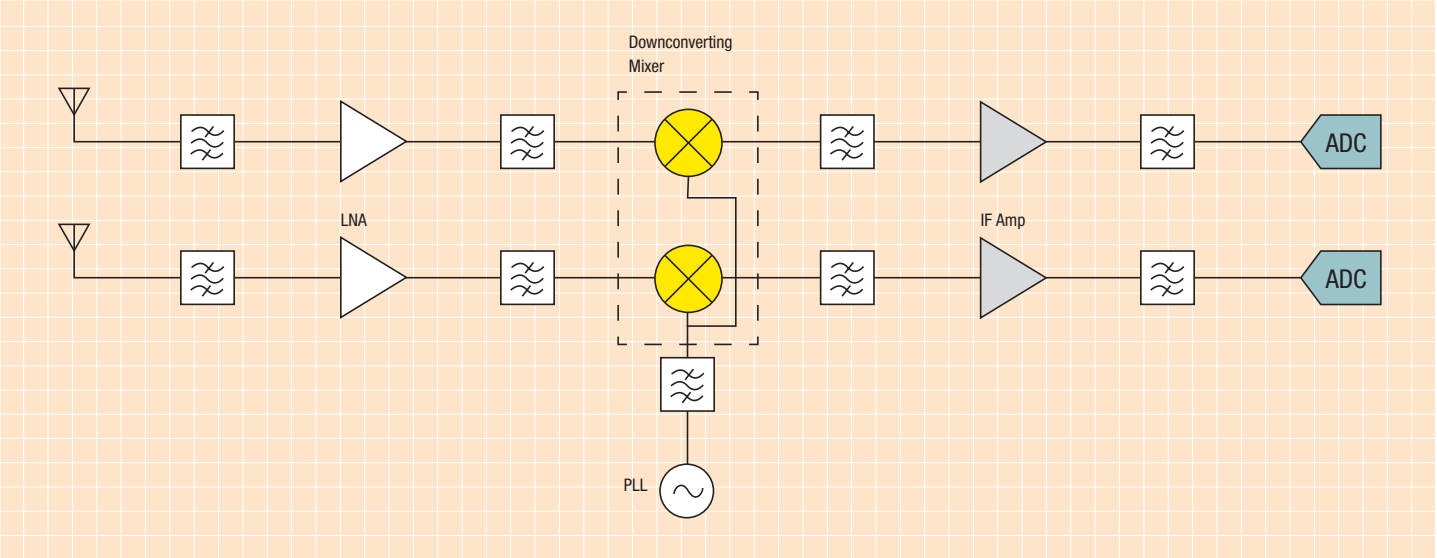
MIMO Multicarrier High IF Sampling Receiver



Downconverting Mixer

Part No.	Features	Op Freq.	IIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LTC®5569	Dual Wideband	0.3–4.0GHz	26.7dBm	11.7dB	2.0dB	0dBm	-50dBm	3.0V–3.5V	180mA
LTC5591	Dual High Gain	1.3–2.3GHz	26.2dBm	9.9dB	8.5dB	0dBm	-30dBm	3.1V–3.5V	380mA
LTC5540	High Gain	0.6–1.3GHz	25.9dBm	9.9dB	7.9dB	0dBm	-30dBm	3.1V–3.5V	193mA
LTC5541	High Gain	1.3–2.3GHz	26.4dBm	9.6dB	7.8dB	0dBm	-32dBm	3.1V–3.5V	192mA
LTC5542	High Gain	1.6–2.7GHz	26.8dBm	9.9dB	8.0dB	0dBm	-32dBm	3.1V–3.5V	199mA
LTC5543	High Gain	2.3–4.0GHz	24.5dBm	10.2dB	8.4dB	0dBm	-28dBm	3.1V–3.5V	201mA
LT®5557	Low Power, Wideband	0.4–3.8GHz	24.7dBm	11.7dB	2.9dB	-3dBm	-45dBm	2.9V–3.9V	81.6mA
LT5527	Integrated Xformer	0.4–3.7GHz	23.5dBm	12.5dB	2.3dB	-3dBm	-44dBm	4.5V–5.25V	78mA

IF Amp

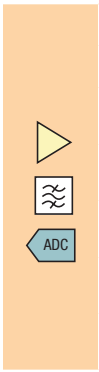
Part No.	Gain	90dB SFDR @	84dB SFDR @	72dB SFDR @	NF	Supply Voltage	Supply Current	Features
LTC6400	8, 14, 20, 26dB	60MHz	120MHz	180MHz	6.2dB	2.85V–3.5V	85mA	Fixed Gain
LTC6420-20	20dB	45MHz	75MHz	140MHz	6.2dB	2.85V–3.5V	160mA	Dual Matched
LT5554	2 to 18dB	–	50MHz	7200MHz	10dB	5V	110mA	Digital VGA 0.125dB Steps
LTC6412	-14 to 17dB	–	–	280MHz	10dB	3.3V	110mA	Analog VGA

ADC

Part No.	# Channels	Resolution	Sample Rate	Full Power Bandwidth	SNR	SFDR	V_{CC}	Power	Package
LTC2209	1	16-Bit	160Msps	700MHz	77.1dB	100dB	3.3V	1450mW	9x9 QFN
LTC2185	2	16-Bit	125Msps	550MHz	76.8dB	90dB	1.8V	370mW	9x9 QFN
LTC2157-14	2	14-Bit	250Msps	1250MHz	70.0dB	90dB	1.8V	650mW	9x9 QFN
LTC2145-14	2	14-Bit	125Msps	750MHz	73.1dB	90dB	1.8V	189mW	9x9 QFN

µModule® Receiver Subsystems

µModule Receiver Subsystems



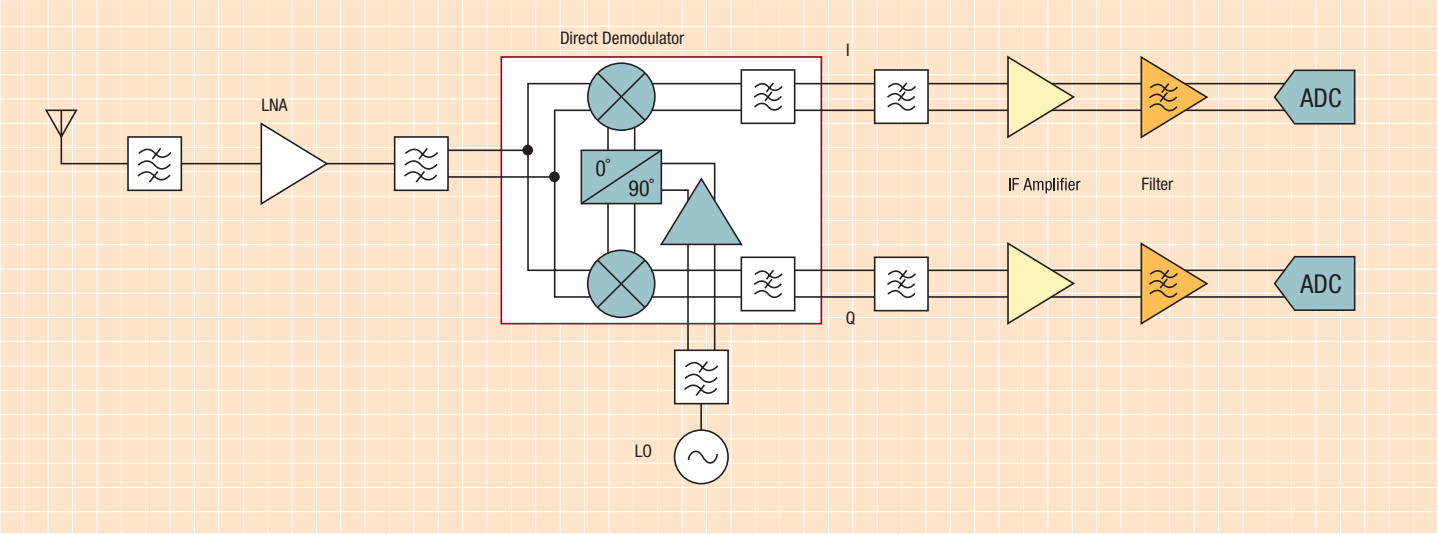
Part No.	Description	Integrated Components			RF Range (GHz)	Intermediate Frequency (MHz)	Signal Bandwidth (MHz)	Gain (dB)	Supply Voltage (V)	Power (Typ) (W)	Package
		ADC	ADC Driver	RF Mixer							
LTM®9001-AA	16-Bit IF/ Baseband Receiver	16-Bit, 130Msps	Single	–	–	162.5	50 (BPF)	20	3.3	1.65	11.25×11.25 LGA
LTM9001-AD	16-Bit IF/ Baseband Receiver	16-Bit 130Msps	Single	–	–	70	25 (BPF)	14	3.3	1.65	11.25×11.25 LGA
LTM9002-AA	Dual 14-Bit IF/ Baseband Receiver	Dual 14-Bit 125Msps	Dual	–	–	170	170 (LPF)	26	3.0	1.3	15×11.25 LGA
LTM9005-AA	14-Bit IF Sampling Receiver	14-Bit 125Msps	Single	Down-converter	0.4 to 3.8	140	16	20 Variable	3.3	1.32	22×15 LGA
LTM9005-AB	16-Bit IF Sampling Receiver	14-Bit 125Msps	Single	Down-converter	0.4 to 3.8	140	20	20 Variable	3.3	1.65	22×15 LGA

Table Title

Part No.	Features	Freq. Range	Closed-Loop Phase Noise				Spurious Products	V_{CC}	I_{CC}
			10kHz	1MHz	10MHz	40MHz			
LTC6946-1	Integer-N, PLL + VCO	0.373-3.740GHz	–100dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-2	Integer-N, PLL + VCO	0.513-4.910GHz	–100dBc	–132dBc	–152dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-3	Integer-N, PLL + VCO	0.640-5.790GHz	–94dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA

GSM / EDGE / CDMA / CDMA2000 / W-CDMA / TD-SCDMA / SDR / LTE / WiMAX BASE STATIONS

Direct Conversion Receiver



Direct Demodulator

Part No.	Op Freq.	BB Freq.	IIP3	NF	P1dB	Ampl. Match	Phase Match	V_{CC}	I_{CC}
LT5575	0.8–2.7GHz	DC - 490MHz	28dBm	12.8dB	13.2dBm	0.03dB	0.5°	4.5V–5.25V	132mA
LT5517	40–900MHz	DC - 130MHz	23.5dBm	9dB	10dBm	0.03dB	0.7°	4.5V–5.25V	90mA

IF Amplifier

Part No.	Gain	90dB SFDR @	84dB SFDR @	72dB SFDR @	Noise	Supply Voltage	Supply Current	Features
LTC6421-20	20dB	–	–	110MHz	6.2dB	2.85V–3.5V	40mA	Matched Dual
LTC6420-20	20dB	40MHz	80MHz	140MHz	6.2dB	2.85V–3.5V	80mA	Matched Dual
LTC6401	8, 14, 20, 26dB	40MHz	90MHz	135MHz	6.1dB	2.85V–3.5V	45mA	Fixed Gain
LTC6409	Resistor Set	100MHz	105MHz	120MHz	6.9dB	2.70V–5.25V	52mA	DC Coupled

Filter

Part No.	Function	Order	Cutoff Freq.	SNR	HD2	HD3	Noise	V_{CC}	I_{CC}
LT6604-2.5 / 5/10/15	Dual Lowpass	4th	2.5, 5, 10, 15MHz	82dB	-93dBc	-96dBc	4.5μV_{RMS}	3V, 5V, ±5V	68mA
LTC6605-7 / 10/14	Dual Lowpass	2nd	7, 10, 14MHz	83dB	-90dBc	-106dBc	4.0μV_{RMS}	2.7V, 5.25V	66mA

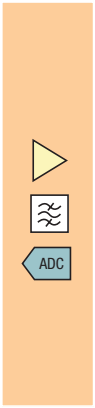
ADC

Part No.	# Channels	Resolution	Sample Rate	Full Power Bandwidth	SNR	SFDR	V_{CC}	Power	Package
LTC2145-14	2	14-Bit	125Msps	750MHz	73.1dB	90dB	1.8V	189mW	9x9 QFN
LTC2268-14[1]	2	14-Bit	125Msps	800MHz	73.1dB	88dB	1.8V	299mW	6x6 QFN

Note 1: Serial LVDS Outputs

µModule Receiver Subsystems

µModule Receiver Subsystems



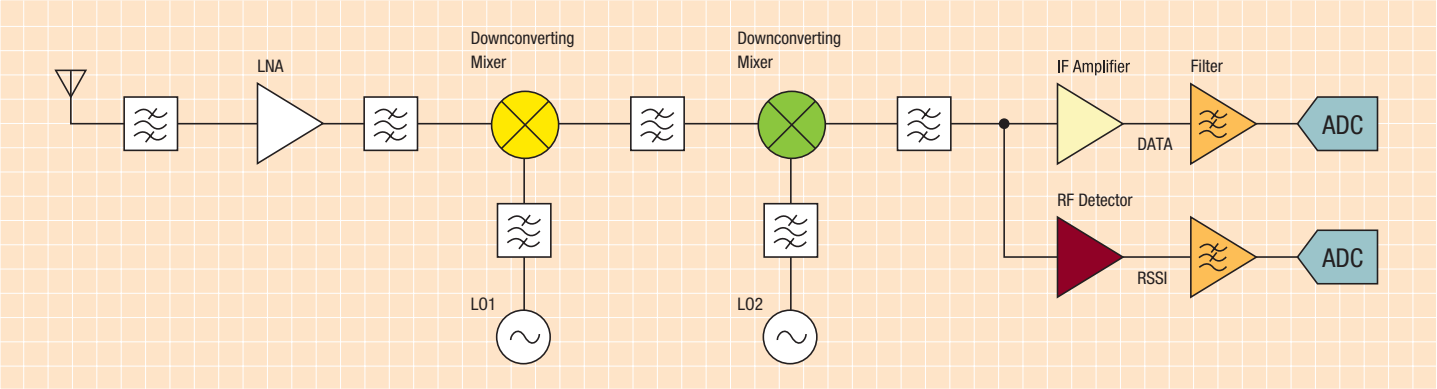
Part No.	Description	Integrated Components			RF Range (GHz)	Intermediate Frequency (MHz)	Signal Bandwidth (MHz)	Supply Voltage (V)	Power (Typ) (W)	Package
		ADC	ADC Driver	RF Mixer						
LTM9002-AA	Dual 14-Bit IF/ Baseband Receiver	Dual 14-Bit, 125Msps	Dual	–	–	170	170 (LPF)	3.0	1.3	15×11.25 LGA
LTM9004-AA	14-Bit Direct Conversion Receiver	Dual 14-Bit, 125Msps	Dual	I/Q Demodulator	0.8 to 2.7	DC (1.92 LPF)	5	5 & 3.0	1.83	22×15 LGA
LTM9004-AB	14-Bit Direct Conversion Receiver	Dual 14 Bit, 125Msps	Dual	I/Q Demodulator	0.8 to 2.7	DC (4.42 LPF)	10	5 & 3.0	1.83	22×15 LGA
LTM9004-AC	14-Bit Direct Conversion Receiver	Dual 14-Bit, 125Msps	Dual	I/Q Demodulator	0.8 to 2.7	DC (9.42 LPF)	20	5 & 3.0	1.83	22×15 LGA
LTM9004-AD	14-Bit Direct Conversion Receiver	Dual 14-Bit, 125Msps	Dual	I/Q Demodulator	0.8 to 2.7	DC (20 LPF)	40	5 & 3.0	1.83	22×15 LGA

PLL/VCO

Part No.	Features	Freq. Range	Closed-Loop Phase Noise				Spurious Products	V_{CC}	I_{CC}
			10kHz	1MHz	10MHz	40MHz			
LTC6946-1	Integer-N, PLL + VCO	0.373-3.740GHz	–100dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-2	Integer-N, PLL + VCO	0.513-4.910GHz	–100dBc	–132dBc	–152dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-3	Integer-N, PLL + VCO	0.640-5.790GHz	–94dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA

GSM / EDGE / PHS / TDMA BASE STATIONS

Superheterodyne Receiver



1st Downconverting Mixer

Part No.	Function	Op Freq.	IIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LTC5540/41/42/43	High Linearity	0.6–4.0GHz	26.4dBm	9.6dB	7.8dB	0dBm	-32dBm	3.1V–3.5V	192mA
LT5557	Wideband Low Power	0.4–3.8GHz	24.7dBm	11.7dB	2.9dB	-3dBm	-45dBm	2.9V–3.9V	81.6mA
LT5527	Integrated Xformer	0.4–3.7GHz	23.5dBm	12.5dB	2.3dB	-3dBm	-44dBm	4.5V–5.25V	78mA
LT5522	Single-Ended	0.4–2.7GHz	25dBm	12.5dB	-0.1dB	-5dBm	-50dBm	4.5V–5.25V	56mA

Downconverting IF Mixer

Part No.	Function	Op Freq.	IIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LT5512	Low Freq.	DC–3GHz	21dBm	11dB	0dB	-10dBm	-60dBm	4.5V–5.25V	57mA
LT5526	Low Power	100kHz–2GHz	15.2dBm	12.7dB	0.6dB	-5dBm	-65dBm	3V–5.3V	28mA
LT5560	Very Low Power	DC–4GHz	9.6dBm	8.8dB	2.7dB	-2dBm	-44dBm	2.7V–5.3V	10mA

IF Amplifier

Part No.	Gain	90dB SFDR @	84dB SFDR @	72dB SFDR @	NF	Supply Voltage	Supply Current	Features
LTC6404-1	R-Set	7MHz	11MHz	18MHz	13.4dB	2.7V–5.5V	27mA	Low Noise
LTC6406	R-Set	22MHz	30MHz	44MHz	14.1dB	2.7V–3.5V	18mA	RR In
LTC6409	R-Set	100MHz	105MHz	120MHz	6.9dB	2.7V–5.25V	52mA	Wide Common Mode Range

Log Amp

Part No.	Function	Op Freq.	Dyn. Range	Detect Range	Accuracy	Supply V	Supply I	Package
LT5537	IF RSSI	0.1–1GHz	90dB	-80 to 10dBm	±1.5dB	4.5V–5.5V	13mA	3x2 DFN

Filter

Part No.	Function	Order	Cutoff. Freq	SNR	HD2	HD3	Ripple	V_{CC}	I_{CC}
LT6600-2.5/ 5/10/15/20	Lowpass	4th	2.5, 5, 10, 15, 20MHz	86dB	-95dBc	-88dBc	0.5dB	3V, 5V, ±5V	30mA
LTC6602	Dual Prog. LP/HP	5th/4th	42-900kHz	–	-81dBc	-81dBc	< 0.5dB	2.7V–3.6V	105mA

ADC

Part No.	# Channels	Resolution	Sample Rate	Full Power Bandwidth	SNR	SFDR	V_{CC}	Power	Package
LTC2217	1	16-Bit	105Msps	400MHz	81.2dB	100dB	3.3V	1190mW	9x9 QFN
LTC2208	1	16-Bit	130Msps	700MHz	77.7dB	100dB	3.3V	1250mW	9x9 QFN
LTC2274[1]	1	16-Bit	105Msps	700MHz	77.6dB	100dB	3.3V	1300mW	6x6 QFN
LTC2164	1	16-Bit	105Msps	750MHz	76.7dB	90dB	1.8V	163mW	7x7 QFN

Note 1: JESD204 Serial Outputs

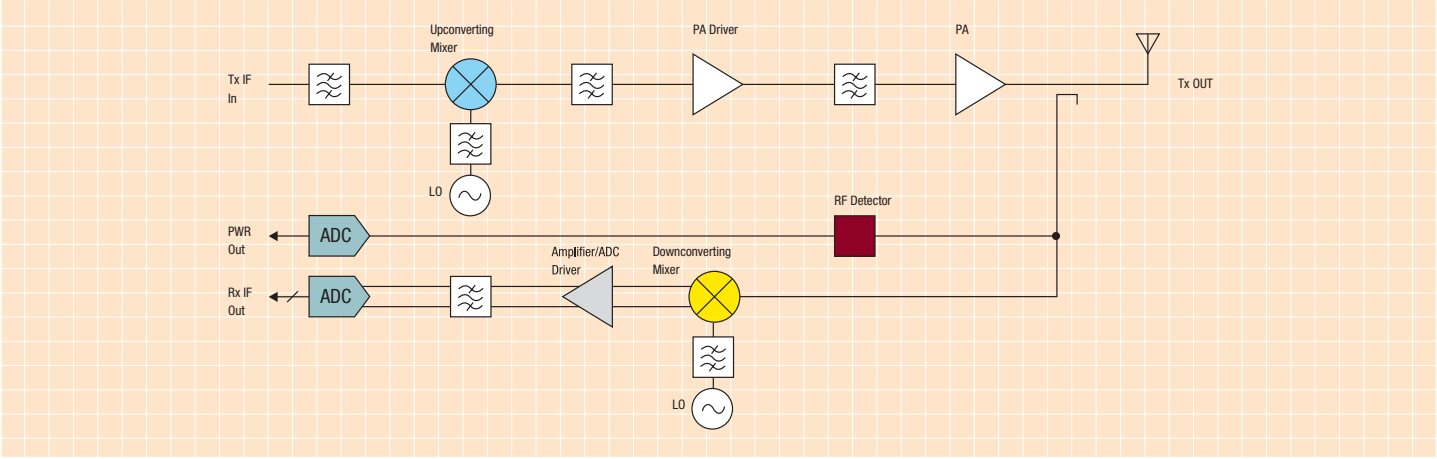
µModule Receiver Subsystems

µModule Receiver Subsystems

Part No.	# Channels	Resolution	Sample Rate	Input Frequency	Effective Gain	SNR	SFDR	V_{CC}	Package
LTM9001-AA	1	16-Bit	130Msps	162.5MHz ±25MHz	20dB	72dB	82dB	3.3V	11.25×11.25 LGA

CDMA / CDMA2000 / W-CDMA / TD-SCDMA /UMTS / SDR / LTE / WiMAX BASE STATIONS

Multicarrier Transmitter with Linearization Receiver



Upconverting Mixer

Part No.	Function	Op Freq.	IIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LT5579	WiMAX, w/ Integ. Xformer	1.5–3.8GHz	27dBm	9.2dB	1.8dB	-1dBm	-39dBm	3.15V–3.6V	226mA
LT5578	Wideband	0.4–2.7GHz	24.3dBm	10.5dB	-0.7dB	-1dBm	-46dBm	3.1V–3.5V	152mA
LT5521	Wideband	0.01–3.7GHz	24.2dBm	12.5dB	-0.5dB	-5dBm	-42dBm	3.15V–5.25V	82mA

Downconverting Mixer

Part No.	Function	Op Freq.	IIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LTC5540/ 41/42/43	Hi Linearity, High Gain	0.6–4GHz	26.4dBm	9.6dB	7.8dB	0dBm	-32dBm	3.1V–3.5V	192mA
LT5557	Wideband Low Power	0.4–3.8GHz	24.7dBm	11.7dB	2.9dB	-3dBm	-45dBm	2.9V–3.9V	81.6mA
LT5527	Single-End Inputs	0.4–3.7GHz	23.5dBm	12.5dB	2.3dB	-3dBm	-44dBm	4.5V–5.25V	78mA

RF Detector

Part No.	Function	Op Freq.	Dynamic Range	Detect Range	Accuracy	V_{CC}	I_{CC}	Package
LTC5582	RMS Power Detector	40MHz–10GHz	57dB	-56–+1dBm	±0.2dB	3.1V–3.5V	41.6mA	3x3 DFN
LTC5583	Dual RMS Detector	40MHz–6GHz	60dB	-58–+2dBm	±0.2dB	3.1V–3.5V	90.1mA	4x4 QFN
LT5581	RMS Detector	10MHz–6GHz	40dB	-34–+6dBm	±1dB	2.7V–5.25V	1.4mA	3x2 DFN
LTC5587	RMS + ADC	10MHz–6GHz	40dB	-34–+6dBm	±1dB	2.7V–3.6V	3mA	3x3 DFN

Amplifier/ ADC Driver

Part No.	Gain	90dB SFDR @	84dB SFDR @	72dB SFDR @	Noise	Supply Voltage	Supply Current	Features
LTC6400	8, 14, 20, 26dB	60MHz	120MHz	180MHz	6.2dB	2.85V to 3.5V	85mA	Fixed Gain
LT5554	2dB–18dB, Prog. 1/8 dB Step	–	200MHz	200MHz	10.3dB	4.75V to 5.25V	190mA	Digital Gain Control

ADC

Part No.	# Channels	Resolution	Sample Rate	Full Power Bandwidth	SNR	SFDR	V_{CC}	Power	Package
LTC2152-14	1	14-Bit	250Msps	1250MHz	70.0dB	90dB	1.8V	340mW	6x6 QFN
LTC2152-12	1	12-Bit	250Msps	1250MHz	68.5dB	90dB	1.8V	331mW	6x6 QFN

µModule Receiver Subsystems

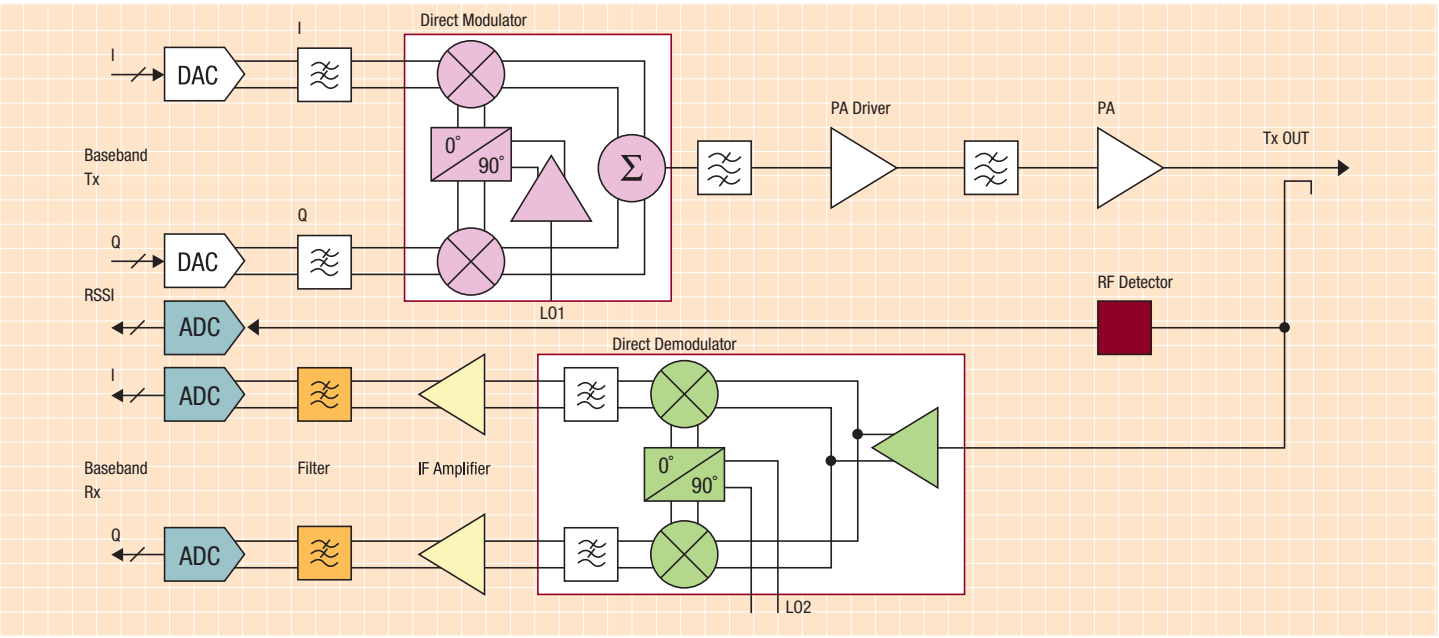
Part No.	Description	Integrated Components			RF Range (GHz)	Intermediate Frequency (MHz)	Signal Bandwidth (MHz)	Supply Voltage (V)	Power (Typ) (W)	Package
		ADC	ADC Driver	RF Mixer						
LTM9003-AA	12-Bit Digital Predistortion Receiver	12-Bit, 250Msps	Single	Downconverter	0.4 to 3.8	184	125 (BPF)	2.5 & 3.3	1.5	15×11.25 LGA
LTM9003-AB	12-Bit Digital Predistortion Receiver	12-Bit, 250Msps	Single	Downconverter	0.4 to 3.7	184	125 (BPF)	2.5, 3.3 & 5	1.6	15×11.25 LGA

PLL/VCO

Part No.	Features	Freq. Range	Closed-Loop Phase Noise				Spurious Products	V_{CC}	I_{CC}
			10kHz	1MHz	10MHz	40MHz			
LTC6946-1	Integer-N, PLL + VCO	0.373-3.740GHz	–100dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-2	Integer-N, PLL + VCO	0.513-4.910GHz	–100dBc	–132dBc	–152dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-3	Integer-N, PLL + VCO	0.640-5.790GHz	–94dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA

GSM / EDGE / CDMA / CDMA2000 / W-CDMA / TD-SCDMA / UMTS / SDR / LTE / WiMAX BASE STATIONS

Direct Modulator Transmitter (Multicarrier) with Linearization Receiver



Direct Modulator

Part No.	Op Freq.	OIP3	Noise Floor	Conv. Gain	ACPR (4ch)	Carrier Supp.	Image Rejection	V_{CC}	I_{CC}
LTC5588-1	0.2–6GHz	31dBm	-160.6dBm/Hz	-2.5dB	-76dBc	-39.6dBm	-56.6dBc	3.15V–3.45V	303mA
LT5572	1.5–2.5GHz	21.6dBm	-158.6dBm/Hz	-2.5dB	-67.7dBc	-39.4dBm	-41.2dBc	4.5V–5.25V	120mA
LT5571	0.62–1.1GHz	21.7dBm	-159dBm/Hz	-4.2dB	-70dBc	-42dBm	-53dBc	4.5V–5.25V	97mA

Direct Demodulator

Part No.	Op Freq.	BB Freq.	IIP3	NF	Conv. Gain	Ampl. Match	Phase Match	V_{CC}	I_{CC}
LT5575	0.8–2.7GHz	DC - 590MHz	28dBm	12.8dB	3dB	0.03dB	0.5°	4.5–5.25V	132mA

IF Amplifier

Part No.	Gain	90dB SFDR @	84dB SFDR @	72dB SFDR @	Noise	V_{CC}	I_{CC}	Features
LTC6420-20	20dB	40MHz	80MHz	140MHz	6.2dB	2.85V–3.5V	80mA	Matched Dual
LTC6400	8, 14, 20, 26dB	60MHz	120MHz	180MHz	6.2dB	2.85V–3.5V	85mA	Fixed Gain
LTC6409	Resistor Set	100MHz	100MHz	120MHz	6.9dB	2.7V–5.25V	52mA	DC Coupled

RF Detector

Part No.	Function	Op Freq.	Dynamic Range	Detect Range	Accuracy	V_{CC}	I_{CC}	Package
LTC5582	RMS Power Detector	40MHz–10GHz	57dB	-56–+1dBm	±0.2dB	3.1V–3.5V	41.6mA	3x3 DFN
LT5538	Wideband Log Detector	40MHz–3.8GHz	75dB	-75–+5dBm	±1dB	3.0V–5.25V	29mA	3x3 DFN

PLL/VCO

Part No.	Features	Freq. Range	Closed-Loop Phase Noise				Spurious Products	V_{CC}	I_{CC}
			10kHz	1MHz	10MHz	40MHz			
LTC6946-1	Integer-N, PLL + VCO	0.373-3.740GHz	–100dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-2	Integer-N, PLL + VCO	0.513-4.910GHz	–100dBc	–132dBc	–152dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-3	Integer-N, PLL + VCO	0.640-5.790GHz	–94dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA

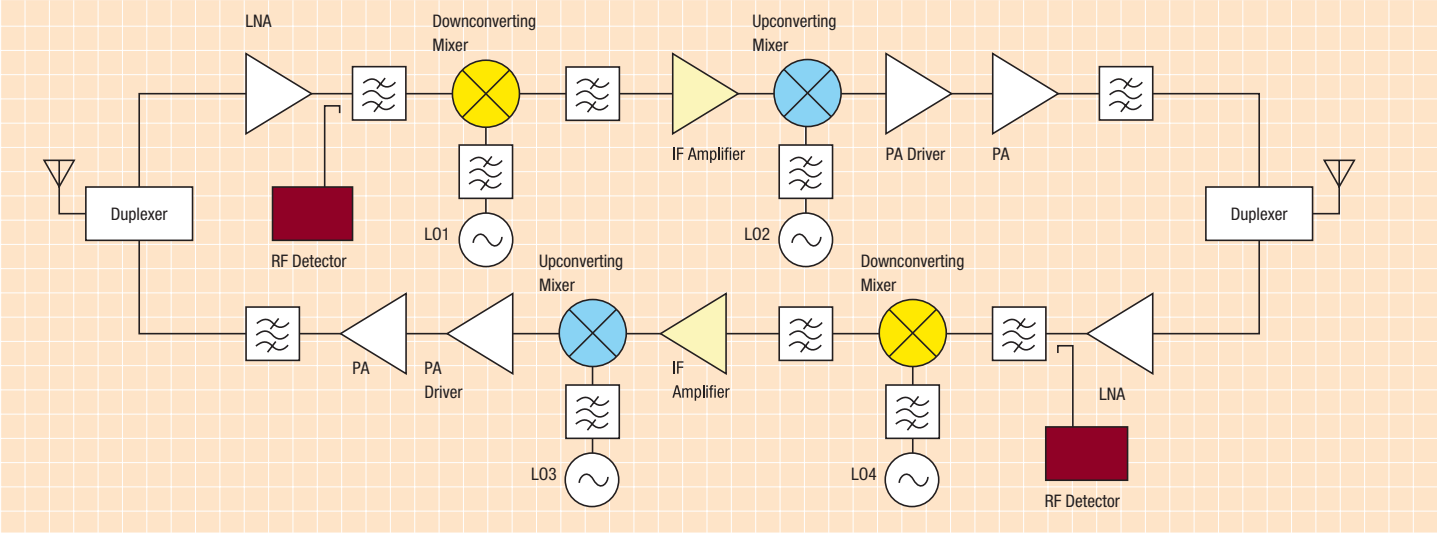
Filter

Part No.	Function	Order	Cutoff. Freq	SNR	HD2	HD3	Ripple	V_{CC}	I_{CC}
LT6604-2.5, 5/10/15	Dual Lowpass	4th	2.5, 5, 10, 15MHz	82dB	-93dBc	-96dBc	0.5dB	3V, 5V, ±5V	31mA
LTC6602	Dual SPI Prog. HP/LP	5th / 4th	42kHz–900kHz	–	< -75dBc	< -75dBc	< 0.5dB	2.7V–3.6V	105mA

ADC

Part No.	# Channels	Resolution	Sample Rate	Full Power Bandwidth	SNR	SFDR	V_{CC}	Power	Package
LTC2145-14	2	14-Bit	125Msps	750MHz	73.1dB	90dB	1.8V	189mW	9x9 QFN
LTC2185	2	16-Bit	125Msps	555MHz	76.8dB	90dB	1.8V	370mW	9x9 QFN

Wireless Picocell Repeater



Downconverting Mixer

Part No.	Function	Op Freq.	IIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LT5557	Wideband Low Power	0.4–3.8GHz	24.7dBm	11.7dB	2.9dB	-3dBm	-45dBm	2.9V–3.9V	81.6mA
LT5527	Single-Ended Inputs	0.4–3.7GHz	23.5dBm	12.5dB	2.3dB	-3dBm	-44dBm	4.5V–5.25V	78mA
LT5522	Single-Ended Inputs	0.4–2.7GHz	25dBm	12.5dB	-0.1dB	-5dBm	-50dBm	4.5V–5.25V	56mA

Upconverting Mixer

Part No.	Function	Op Freq.	OIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LT5579	WiMAX, w/ Integ. Xformer	1.5–3.8GHz	27.3dBm	9.2dB	2.6dB	-1dBm	-35dBm	3.15V–3.6V	226mA
LT5521	Wideband	0.01–3.7GHz	24.0dBm	12.5dB	-0.5dB	-5dBm	-42dBm	3.15V–5.25V	82mA
LT5578	Integrated Xformer	0.4–2.7GHz	24.3dBm	8.6dB	-0.7dB	-1dBm	-46dBm	3.1–3.5V	152mA

IF Amplifier

Part No.	Gain	90dB SFDR @	84dB SFDR @	72dB SFDR @	Noise	V_{CC}	I_{CC}	Features
LTC6401	8, 14, 20, 26dB	40MHz	90MHz	135MHz	6.1dB	2.85V–3.5V	45mA	Fixed Gain
LT5514	Digital VGA (1.5dB Steps)	–	120MHz	200MHz	7.4dB	4.75V–5.25V	148mA	10.5dB–33dB
LTC6412	-14dB–17dB	–	120MHz	280MHz	10dB	3.3V	110mA	Analog VGA

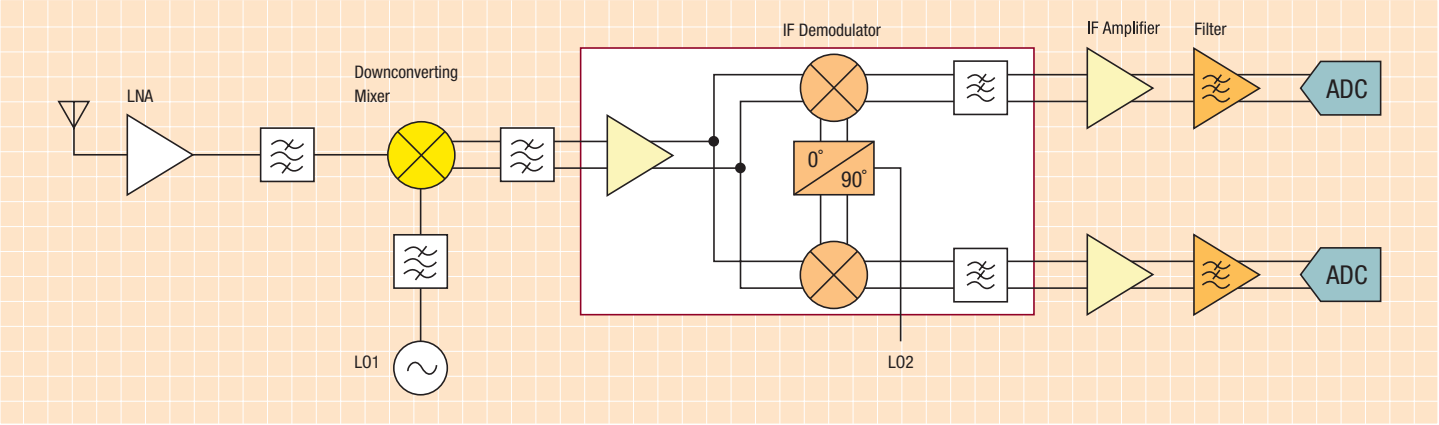
RF Detector

Part No.	Function	Op Freq.	Dynamic Range	Detect Range	Accuracy	V_{CC}	I_{CC}
LT5538	Log Detector	40MHz–3.8GHz	75dB	-75 – +5dBm	±1dB	3.0V–5.25V	29mA
LT5534	Log Detector	50MHz–3GHz	60dB	-63 – -2dBm	±0.5dB	2.7V–5.25V	7mA
LTC5582	RMS Power Detector	40MHz–10GHz	57dB	-56 – +1dBm	±0.2dB	3.1V–3.5V	41.6mA
LTC5583	Dual RMS Detector	40MHz–6GHz	60dB	-58 – +2dBm	±0.2dB	3.1V–3.5V	90.1mA
LT5581	RMS, Low Power	10MHz–6GHz	40dB	-34 – +6dBm	±1dB	2.7V–5.25V	1.4mA
LTC5587	RMS + ADC	10MHz–6GHz	40dB	-34 – +6dBm	±1dB	2.7V–3.6V	3mA

PLL/VCO

Part No.	Features	Freq. Range	Closed-Loop Phase Noise				Spurious Products	V_{CC}	I_{CC}
			10kHz	1MHz	10MHz	40MHz			
LTC6946-1	Integer-N, PLL + VCO	0.373-3.740GHz	–100dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-2	Integer-N, PLL + VCO	0.513-4.910GHz	–100dBc	–132dBc	–152dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-3	Integer-N, PLL + VCO	0.640-5.790GHz	–94dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA

Satellite, Set-Top Box and GPS Receivers



Downconverting Mixer

Part No.	Function	Op Freq.	IIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LT5527	Single-Ended	0.4–3.7GHz	23.5dBm	12.5dB	2.3dB	-3dBm	-44dBm	4.5V–5.25V	78mA
LT5522	Single-Ended	0.6–2.7GHz	21.5dBm	13.9dB	-0.1dB	-5dBm	-50dBm	4.5V–5.25V	56mA
LT5525	Low Power	0.8–2.5GHz	17.6dBm	15.1dB	-1.9dB	-5dBm	-50dBm	3V–5.3V	28mA

IF Demodulator

Part No.	Function	Op Freq.	BB Freq.	IIP3	NF	Conv. Gain	Ampl. / Φ Match	V_{CC}	I_{CC}
LT5517	High Dynamic Range	40–900MHz	DC - 130MHz	23.5dBm	9dB	4dB	0.03dB / 0.7°	4.5V–5.25V	90mA
LT5546	Low Power / VGA	40–500MHz	DC - 17MHz	-1dBm	7.8dB	1.6–56dB	0.14dB / 0.6°	1.8V–5.25V	24mA

IF Amplifier

Part No.	Gain	90dB SFDR @	84dB SFDR @	72dB SFDR @	Noise	Supply Voltage	Supply Current	Features
LTC6403	R-Set	4MHz	6.5MHz	10MHz	10.8dB	2.7V–5.5V	11mA	Low Power
LTC6406	R-Set	22MHz	30MHz	44MHz	14.1dB	2.7V–3.5V	18mA	RR In
LTC6409	R-Set	100MHz	105MHz	120MHz	6.9dB	2.7V–5.25V	52mA	DC Coupled

Filter

Part No.	Function	Order	Cutoff Freq.	SNR	HD2	HD3	Ripple	V_{CC}	I_{CC}
LTC6602	Dual Prog. LP / HP	5th / 4th	42 kHz–900kHz	–	< -81dBc	< -81dBc	< 0.5dB	2.7V–3.6V	105mA
LT6604-2.5/ 5/10/15	Dual Config. LP	2nd	2.5, 5, 10, 15MHz	82dB	-93dBc	-96dBc	< 0.5dB	3V, 5V, ±5V	31mA

ADC

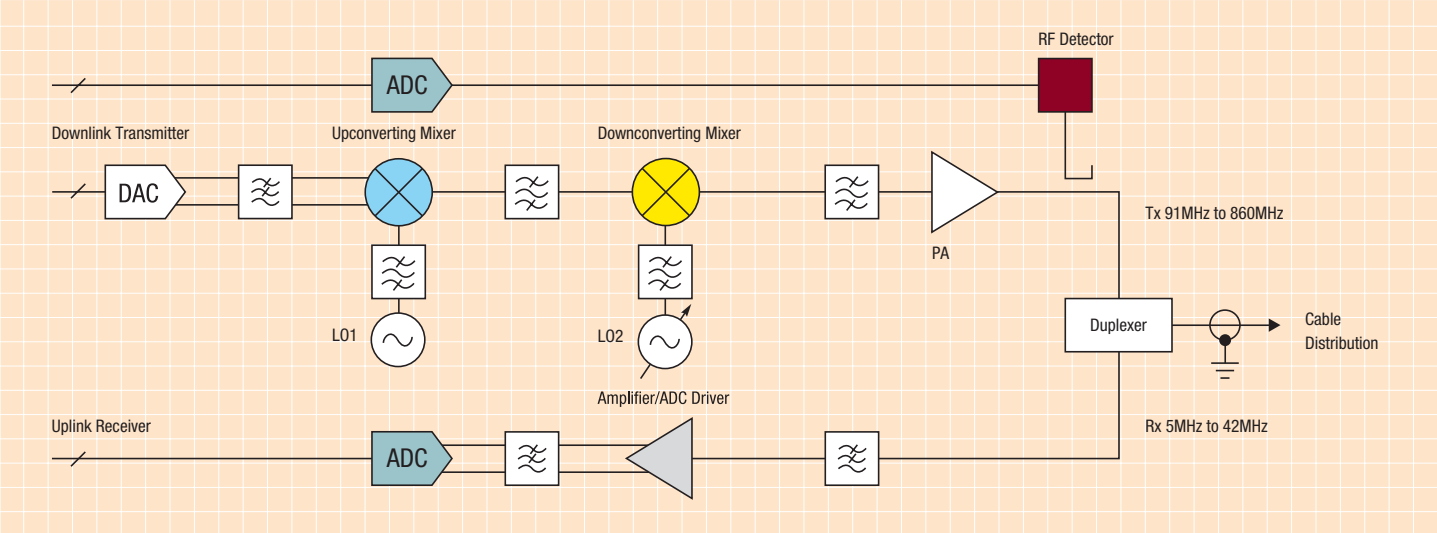
Part No.	# Channels	Resolution	Sample Rate	Full Power Bandwidth	SNR	SFDR	V_{CC}	Power	Package
LTC2263-14[1]	2	14-Bit	25Msps	800MHz	73.7dB	90dB	18V	94mW	6x6 QFN
LTC2265-12[1]	2	12-Bit	65Msps	800MHz	71dB	90dB	18V	167mW	6x6 QFN
LTC2172-12[1]	4	12-Bit	65Msps	800MHz	71dB	90dB	18V	306mW	7x8 QFN

Note 1: Serial LVDS Outputs

PLL/VCO

Part No.	Features	Freq. Range	Closed-Loop Phase Noise				Spurious Products	V_{CC}	I_{CC}
			10kHz	1MHz	10MHz	40MHz			
LTC6946-1	Integer-N, PLL + VCO	0.373-3.740GHz	–100dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-2	Integer-N, PLL + VCO	0.513-4.910GHz	–100dBc	–132dBc	–152dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-3	Integer-N, PLL + VCO	0.640-5.790GHz	–94dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA

Cable / Video-On-Demand Infrastructure



Upconverting Mixer

Part No.	Op Freq.	IIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LT5521	0.01–3.7GHz	24.2dBm	12.5dB	-0.5dB	-5dBm	-42dBm	3.15V–5.25V	82mA
LT5579	1.5–3.8GHz	29dBm	9.2dB	1.8dB	-1dBm	-39dBm	3.15V–3.6V	226mA

Downconverting Mixer

Part No.	Op Freq.	IIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LT5522	0.6–2.7GHz	25dBm	13.9dB	-0.1dB	-5dBm	-50dBm	4.5V–5.25V	56mA

Amplifier / ADC Driver

Part No.	Gain	90dB SFDR @	84dB SFDR @	72dB SFDR @	Noise	V_{CC}	I_{CC}	Features
LT6411	0, 6dB	–	10MHz	40MHz	24.6dB	4.5V–12.5V	16mA	Selectable Gain
LTC6405	R-Set	22MHz	30MHz	44MHz	14.4dB	2.7V–5.25V	18mA	RR In, V_S=5V
LTC6406	R-Set	22MHz	30MHz	44MHz	14.1dB	2.7V–3.5V	18mA	RR In, V_S=3V
LT5554	Digital VGA 2dB–18dB	–	200MHz	200MHz	10.3dB	4.75V–5.25V	190mA	Low Noise ⅛dB Step

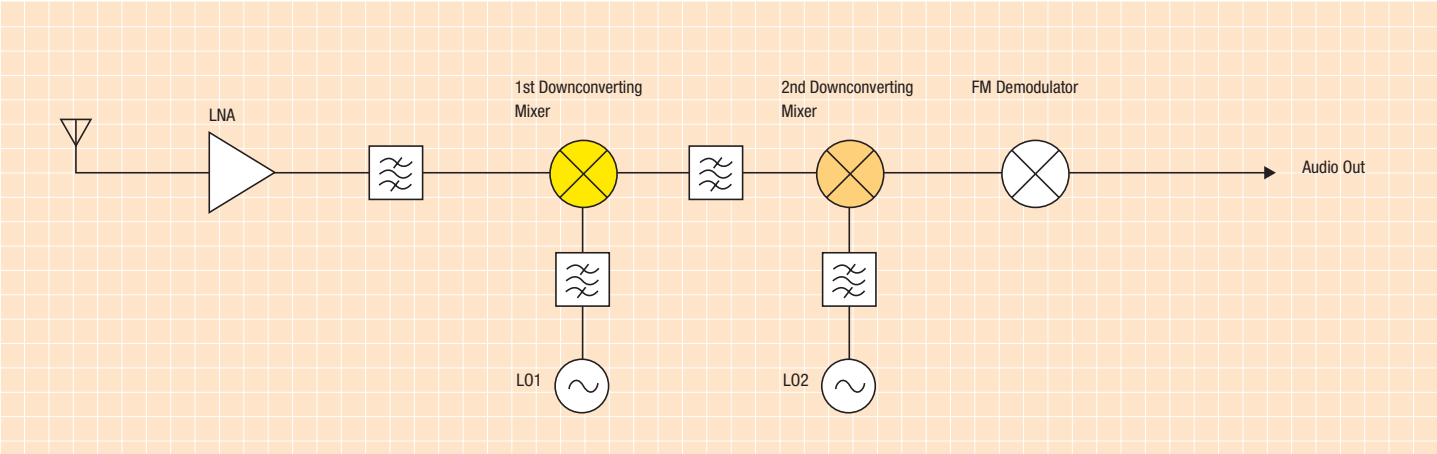
RF Detector

Part No.	Function	Op Freq.	Dynamic Range	Detect Range	Accuracy	V_{CC}	I_{CC}	Package
LT5534	Log-Linear	50MHz–3GHz	60dB	-63–-2dBm	±0.5dB	2.7V–5.25V	7mA	2x2 SC70
LT5537	Log-Linear	LF - 1GHz	83dB	-80–0dBm	±1dB	2.7V–5.25V	13.5mA	3x2 DFN
LT5581	RMS	10MHz–6GHz	40dB	-35–5dBm	±1dB	2.7V–5.25V	1.4mA	3x2 DFN
LTC5587	RMS + ADC	10MHz–6GHz	40dB	-35–5dBm	±1dB	2.7V–3.6V	3mA	3x3 DFN
LTC5582	RMS	40MHz–10GHz	57dB	-56–1dBm	±0.5dB	3.1V–3.5V	42mA	3x3 DFN

ADC

Part No.	# Channels	Resolution	Sample Rate	Full Power Bandwidth	SNR	SFDR	V_{CC}	Power	Package
LTC2157-14	2	14-Bit	250Msps	1250MHz	70dB	90dB	1.8V	650mW	9x9 QFN
LTC2261-14	1	14-Bit	125Msps	800MHz	73.4dB	85dB	1.8V	127mW	6x6 QFN
LTC2152-14	1	14-Bit	250Msps	1250MHz	70dB	90dB	1.8V	331mW	6x6 QFN

Wireless Microphone and Other Low Power, High Performance FM Receivers



1st Downconverting Mixer

Part No.	Function	Op Freq.	IIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LT5560	Very Low Power	DC - 4GHz	9.7dBm	10.1dB	2.6dB	2dBm	-57dBm	2.7V–5.3V	10mA
LT5526	Low Power	100kHz–2GHz	16.5dBm	11dB	0.6dB	-5dBm	-65dBm	3V–5.3V	28mA
LT5512	High Linearity	1kHz–3GHz	21dBm	11dB	0dBm	-10dBm	-60dBm	4.5V–5.25V	57mA

2nd Downconverting Mixer

Part No.	Function	Op Freq.	IIP3	NF	Conv. Gain	LO Drive	LO Leakage	V_{CC}	I_{CC}
LT5560	Low Power	DC - 4GHz	10.1dBm	10.5dB	2.7dB	-2dBm	-52dBm	2.7V–5.3V	10mA

ADC

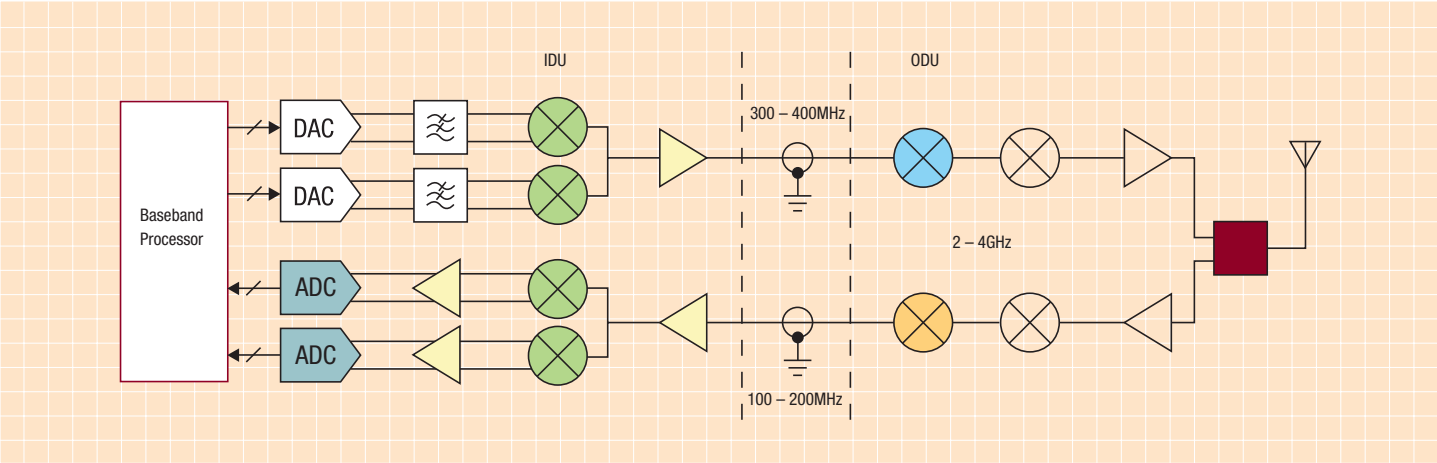
Part No.	# Channels	Resolution	Sample Rate	Full Power Bandwidth	SNR	SFDR	V_{CC}	Power	Package
LTC2205	1	16-Bit	65Msps	700MHz	79dB	100dB	3.3V	610mW	7x7 QFN
LTC2258-12	1	12-Bit	65Msps	800MHz	71.1dB	88dB	1.8V	79mW	6x6 QFN
LTC2265-12[1]	2	12-Bit	65Msps	800MHz	71dB	90dB	1.8V	167mW	6x6 QFN

Note 1: Serial LVDS Outputs

PLL/VCO

Part No.	Features	Freq. Range	Closed-Loop Phase Noise				Spurious Products	V_{CC}	I_{CC}
			10kHz	1MHz	10MHz	40MHz			
LTC6946-1	Integer-N, PLL + VCO	0.373-3.740GHz	–100dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-2	Integer-N, PLL + VCO	0.513-4.910GHz	–100dBc	–132dBc	–152dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-3	Integer-N, PLL + VCO	0.640-5.790GHz	–94dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA

Microwave Data Link / Fixed Wireless Access



Up Mixer

Part No.	Op Freq.	OIP3	Conv. Gain	LO Leakage	Output Noise Floor	V_{CC}	I_{CC}
LT5579	1.5–3.8GHz	27.3dBm	2.6dB	-35dBm	-158dBm/Hz	3.15V–3.6V	226mA
LT5578	0.4–2.7GHz	24.3dBm	-0.7dB	-46dBm	-158dBm/Hz	3.1V–3.5V	152mA

Down Mixer

Part No.	Op Freq.	OIP3	Conv. Gain	NF	P1dB	V_{CC}	I_{CC}
LTC5543	2.3–4GHz	25.6dBm	7.1dB	11.6dBm	13.9dBm	3.1V–3.5V	201mA
LT5557	0.4–3.8GHz	24.7dBm	2.9dB	11.7dBm	8.8dBm	2.9V–3.9V	82mA

I/Q Demod

Part No.	Op Freq.	IIP3	Conv. Gain	NF	I/Q Phase Error	I/Q Ampl. Error
LT5517	40–900MHz	24dBm	3.3dB	9dB	0.7°	0.03dB
LT5575	0.8–2.7GHz	22.6dBm	4.2dB	12.7dB	0.4°	0.01dB

I/Q Mod

Part No.	Op Freq.	OIP3	Conv. Gain	Output Noise FI	Image Rejection	Carrier Leakage
LTC5598	5–1600MHz	26dBm	-2.1dB	-160.9dBm/Hz	55.0dBc	-51.0dBm
LTC5588-1	0.2–6GHz	31dBm	0.2dB	-160.6dBm/Hz	56.6dBc	-39.6dBm

Amp

Part No.	Features	OIP3	NF	Gain Range	V_{CC}	I_{CC}
LTC6400/20	Single/Dual	36dBm	6.2dB	8, 14, 20, 26dB	2.85V–3.5V	85mA
LTC6412	Analog VGA	35dBm	10dB	-14 to 17dB	3.3V	110mA
LTC6409	DC Capable	48dBm	6.9dB	Resistor Set	2.7V–5.25V	52mA

ADC

Part No.	# Channels	Resolution	Sample Rate	Full Power Bandwidth	SNR	SFDR	V_{CC}	Power	Package
LTC2283	2	12-Bit	125Msps	640MHz	70.2dB	88dB	3V	790mW	9x9 QFN

PLL/VCO

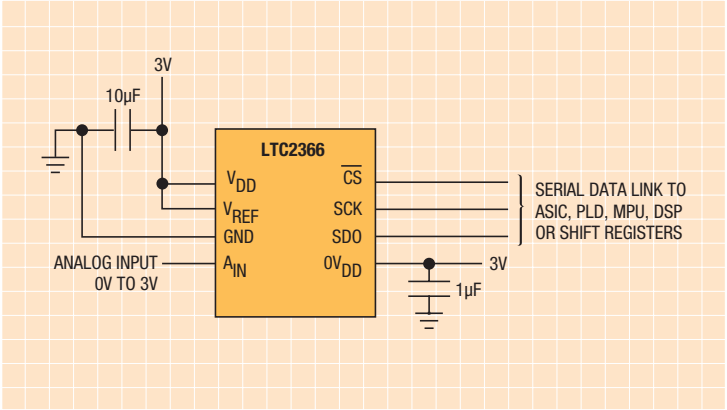
Part No.	Features	Freq. Range	Closed-Loop Phase Noise				Spurious Products	V_{CC}	I_{CC}
			10kHz	1MHz	10MHz	40MHz			
LTC6946-1	Integer-N, PLL + VCO	0.373-3.740GHz	–100dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-2	Integer-N, PLL + VCO	0.513-4.910GHz	–100dBc	–132dBc	–152dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-3	Integer-N, PLL + VCO	0.640-5.790GHz	–94dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA

Tiny General Purpose SAR ADC Family

Linear offers a comprehensive family of 12-, 14- and 16-bit general purpose ADCs that feature a combination of speed, low power and small package size, measuring 1, 2, 6 or 8 input channels. Our LTC236x SAR ADC family is a 12-bit resolution, pin- and software-compatible family, with optimized sampling performance and lowest power for measuring the output of RF and RMS Detectors.

LTC2366 12-Bit, 3Msps Tiny SAR ADC Features:

- Low Noise: 72dB SNR
- Low Power Dissipation: 7.2mW
- Single Supply 2.35V to 3.6V Operation
- No Data Latency
- Sleep Mode with 1nA Typical Supply Current
- Dedicated External REF Pin on 8-Lead TSOT
- Dedicated Output Supply Pin on 8-Lead TSOT
- SPI/Microwire Compatible Serial I/O
- Guaranteed Operation from –40°C to 125°C
- 6- and 8-Lead TSOT-23 Packages



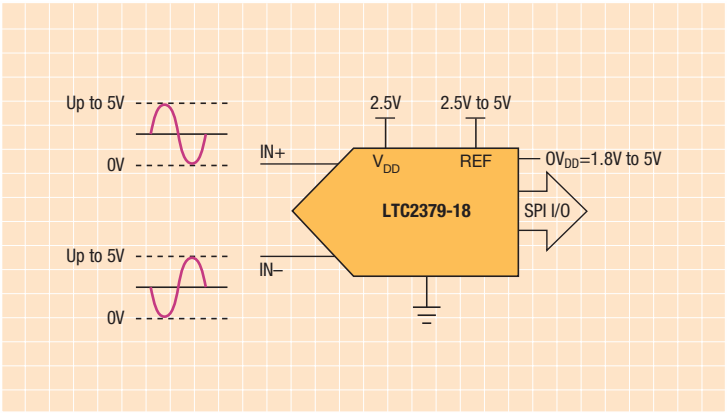
Part No.	Resolution	Channels	Sample Rate	Power @ Max Sample Rate	Package
LTC2360	12-Bit	1	100ksps	1.5mW	TSOT23-6/8
LTC2361	12-Bit	1	250ksps	2.2mW	TSOT23-6/8
LTC2362	12-Bit	1	500ksps	3.3mW	TSOT23-6/8
LTC2365	12-Bit	1	1Msps	6mW	TSOT23-6/8
LTC2366	12-Bit	1	3Msps	7.8mW	TSOT23-6/8

18-/16-Bit 250ksps to 2Msps High Performance SAR ADC Family

The LTC2379-18 leads a pin-compatible family of no-latency SAR ADCs featuring unrivaled 101dB SNR at 18 bits and 96dB SNR at 16 bits from 250ksps to 2Msps. Explicit Busy and Chain pins, along with a user-friendly SPI interface, simplify digital timing. A unique digital gain compression feature eliminates the need for a negative ADC driver supply while preserving the full resolution of the ADC, dramatically lowering the total power consumption of the signal chain.

LTC2379-18: 18-Bit 1.6Msps SAR ADC Features:

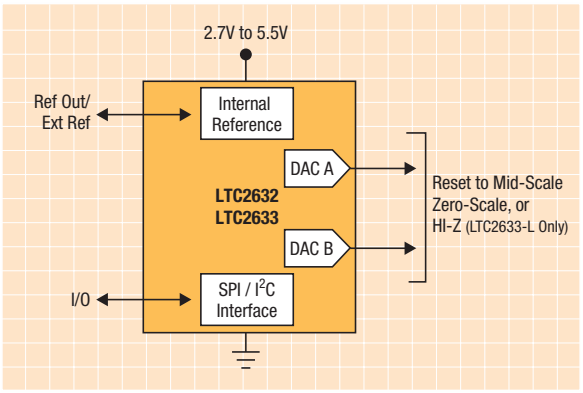
- 1.6Msps Throughput Rate
- 101.2dB SNR (Typ) at f_{IN}= 2kHz
- ±2LSB INL (Max), ±0.9LSB DNL (Max)
- 120dB THD (Typ) at f_{IN}=2kHz
- Low Power: 18mW at 1.6Msps, 18µW at 1.6ksps
- Power Down Mode: 2.25µW
- Fully Differential Input Range ±V_{REF}
- Digital Gain Compression Eliminates Negative Rails
- –40ºC to 125ºC Guaranteed Temperature Range
- 16-Pin MSOP and 4mm x 3mm DFN Packages



	250ksps	500ksps	1Msps	1.6Msps	2Msps
18-Bit 101dB SNR	**LTC2376-18**	**LTC2377-18**	**LTC2378-18**	**LTC2379-18**	
16-Bit 96dB SNR	**LTC2376-16**	**LTC2377-16**	**LTC2378-16**		**LTC2380-16**
Power Consumption	3.4mW	6.75mW	13.5mW	18mW	19mW

Ultra-Tiny 12-/10-/8-Bit DACs with 10ppm/°C Internal Reference

The LTC263x DAC family includes singles, duals, quads and octals with ordering options for 12-/10-/8-bit resolution, internal 1.25V or 2.048V, 10ppm/°C typical reference, SPI or I²C interface and power-on reset to zero-, mid-scale, or hi-z.



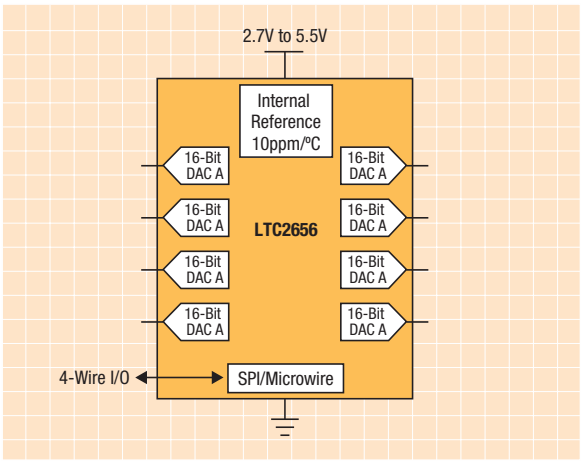
LTC2632 Dual DAC Features:

- Integrated Precision Reference:
  – 2.5V Full-Scale 10ppm/°C (LTC2632-L)
  – 4.096V Full-Scale 10ppm/°C (LTC2632-H)
- Maximum INL Error: ±1LSB (LTC2632A-12)
- Guaranteed Operation from –40°C to 125°C
- Low Noise: 0.7mV$_{P-P}$, 0.1Hz to 200kHz
- Guaranteed Monotonic Over Temperature
- Selectable Internal or External Reference
- 2.7V to 5.5V Supply Range (LTC2632-L)
- Low Power Operation: 14mA at 3V
- Power-On Reset to Zero- or Mid-Scale Options
- SPI Interface

	Single			Dual		Quad		Octal	
Resolution	SPI	SPI (External Ref)	I²C	SPI	I²C	SPI	I²C	SPI	I²C
12-Bit	LTC2630-12	LTC2640-12	LTC2631-12	LTC2632-12	LTC2633-12	LTC2634-12	LTC2635-12	LTC2636-12	LTC2637-12
10-Bit	LTC2630-10	LTC2640-10	LTC2631-10	LTC2632-10	LTC2633-10	LTC2634-10	LTC2635-10	LTC2636-10	LTC2637-10
8-Bit	LTC2630-8	LTC2640-8	LTC2631-8	LTC2632-8	LTC2633-8	LTC2634-8	LTC2635-8	LTC2636-8	LTC2637-8
Package	SC70-6	TSOT23-8	TSOT23-8	TSOT23-8	TSOT23-8	3 x 3 QFN-16 MSOP-10	3 x 3 QFN-16 MSOP-10	4 x 3 DFN-14 MSOP-16	4 x 3 DFN-14 MSOP-16

16-/14-/12-Bit Single, Dual, Quad, Octal DAC Family

For system calibration of offset and gain, Linear Technology's LTC2600 and LTC2656 family of data converters are ideal. The LTC2656 family of quad and octal DACs integrates a precision 1.25V or 2.048V reference that achieves 10ppm/°C maximum temperature coefficient.

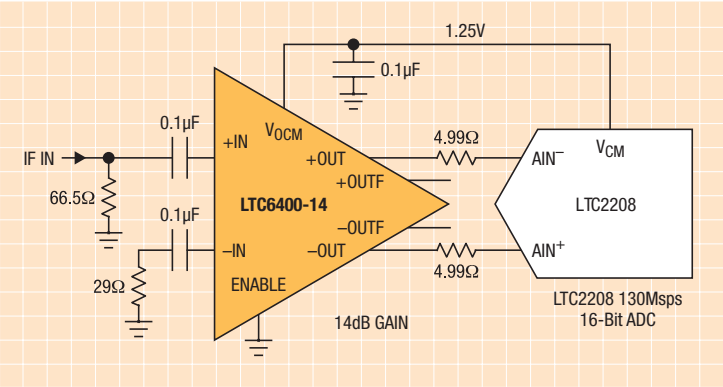


LTC2656 Family Features:

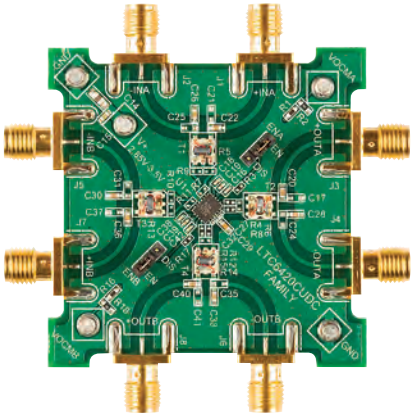
- Internal Precision Reference
  – 2.5V Full-Scale (LTC2656-L)
  – 4.096V Full-Scale (LTC2656-H)
- Maximum INL Error: ±4LSB at 16 Bits
- Guaranteed 16-Bit Monotonic Over Temperature
- Selectable Internal or External Reference
- 2.7V to 5.5V Supply Range
- Ultralow Crosstalk Between DACs (<1nV•s)
- –40°C to 85°C Temperature Range
- Power-On Reset to Zero- or Mid-Scale
- SPI or I²C Interfaces

		Single		Dual		Quad		Octal	
Resolution	Reference	SPI	I²C	SPI	I²C	SPI	I²C	SPI	I²C
16-Bit	External	LTC2601	LTC2606	LTC2602	LTC2607	LTC2604	LTC2609	LTC2600	LTC2605
	Internal					LTC2654-16	LTC2655-16	LTC2656-16	LTC2657-16
14-Bit	External	LTC2611	LTC2616	LTC2612	LTC2617	LTC2614	LTC2619	LTC2610	LTC2615
12-Bit	External	LTC2621	LTC2626	LTC2622	LTC2627	LTC2624	LTC2629	LTC2620	LTC2625
	Internal					LTC2654-12	LTC2655-12	LTC2656-12	LTC2657-12

High Speed Amplifiers



LTC6420-20 Demo Board



Part No.	Gain	90dB SFDR @	84dB SFDR @	72dB SFDR @	Noise	Supply Voltage	Supply Current	Features
High Speed Differential Amplifiers/ADC Drivers								
LT1994	R-Set	1.5MHz	2MHz	2.7MHz	3nV/√Hz	2.375V–12.6V	14mA	Wide V_S Range
LT6600	R-Set	<1MHz	2MHz	4.5MHz	14nV/√Hz	3V–11V	35mA	4th order filter
LTC6403	R-Set	4MHz	6.5MHz	10MHz	10.8dB	2.7V–5.5V	11mA	Low Power
LTC6404-1/-2/-4	R-Set	7MHz	11MHz	18MHz	13.4dB	2.7V–5.5V	27mA	Low Noise
LT6411	0, 6dB	–	10MHz	40MHz	24.6dB	4.5V–12.5V	16mA	Selectable Gain
LT6402	6, 12, 20dB	–	20MHz	40MHz	15dB	4V–5.25V	30mA	Fixed Gain
LTC6405	R-Set	22MHz	30MHz	44MHz	14.4dB	2.7V–5.25V	18mA	RR In
LTC6406	R-Set	22MHz	30MHz	44MHz	14.1dB	2.7V–3.5V	18mA	RR In
LT1993	6, 12, 20dB	12MHz	30MHz	60MHz	13.7dB	4V–5.25V	100mA	Fixed Gain
LTC6401	8, 14, 20, 26dB	40MHz	90MHz	135MHz	6.1dB	2.85V–3.5V	45mA	Fixed Gain
LTC6421	8, 14, 20, 26dB	–	–	110MHz	6.2dB	2.85V–3.5V	40mA	Matched Dual
LTC6400	8, 14, 20, 26dB	60MHz	120MHz	180MHz	6.2dB	2.85V–3.5V	85mA	Fixed Gain
LTC6420	8, 14, 20, 26dB	40MHz	80MHz	140MHz	6.2dB	2.85V–3.5V	80mA	Matched Dual
LTC6409	R-Set	90MHz	100MHz	130MHz	6.9dB	2.7V–5.25V	52mA	Input Range Includes Grnd

Part No.	Gain	-3dB BW	OIP3 @ 70MHz @	OIP3 @ 140MHz @	OIP3 @ 300MHz @	Noise	Supply Voltage	Supply Current	Features
RF Gain Block									
LTC6410-6	6dB	1.4GHz	36dBm	33dBm	31dBm	11dB	2.8V–5.25V	125mA	RF Gain Block

Part No.	Gain Range	Op Freq.	OIP3	HD2/HD3	NF	Supply Voltage	Supply Current	Features
VGAs								
LT5554	2dB–18dB	LF - 1GHz	46dBm	-84dBc/-74dBc	10.3dB	4.75V–5.25V	190mA	Low Switch Noise, Digitally Controlled
LT5514	10.5dB–33dB	LF - 850MHz	47dBm	-82dBc/-72dBc	7.3dB	4.75V–5.25V	148mA	Digitally Controlled Gain
LT5524	4.5dB–27dB	LF - 540MHz	40dBm	-76dBc/-72dBc	8.6dB	4.75V–5.25V	75mA	Digitally Controlled Gain
LTC6412	-14dB–17dB	LF - 380MHz	35dBm	-80dBc/-80dBc	10dB	3.3V	110mA	Analog Controlled Gain

Part No.	Channel	GBW	SR	Noise	HD2	HD3	Gain	Rail to Rail	Supply V	Supply I	Package
High Speed Low Noise Op Amps											
LT6200-10	1	1600MHz	450V/µs	0.95nV/√Hz	-95dBc	-92dBc	A_V≥10V/V	In/Out	2.5V–12.6V	23mA	S6/S8
LT6230-10	1	1450MHz	320V/µs	1.1nV/√Hz	-72dBc	-68dBc	A_V≥10V/V	Out	2.5V–12.6V	3.9mA	S6
LT6200-5	1	800MHz	250V/µs	0.95nV/√Hz	-97dBc	-97dBc	A_V≥5V/V	In/Out	2.5V–12.6V	23mA	S6/S8
LT1818/9	1/2	400MHz	2500V/µs	6nV/√Hz	-85dBc	-89dBc	A_V≥1V/V	No	5V–12.6V	10mA	S5/S8/MS8
LT6233-10	1	375MHz	115V/µs	1.9nV/√Hz	-62dBc	-66dBc	A_V≥10V/V	Out	2.5V–12.6V	1.4mA	S6
LT1806/7	1/2	325MHz	140V/µs	3.5nV/√Hz	-98dBc	-105dBc	A_V≥1V/V	In/Out	2.5V–12.6V	16mA	S6/S8/MS8
LT6230/1/2	1/2/4	215MHz	70V/µs	1.1nV/√Hz	-86dBc	-88dBc	A_V≥1V/V	Out	2.5V–12.6V	3.9mA	S6/S8/DFN/GN16
LT1809/10	1/2	180MHz	350V/µs	16nV/√Hz	-102dBc	-108dBc	A_V≥1V/V	In/Out	2.5V–12.6V	20mA	S6/S8/MS8
LT6200/1	1/2	165MHz	50V/µs	0.95nV/√Hz	-85dBc	-100dBc	A_V≥1V/V	In/Out	2.5V–12.6V	23mA	S6/S8/DFN
LT6202/3/4	1/2/4	100MHz	25V/µs	1.9nV/√Hz	-82dBc	-85dBc	A_V≥1V/V	In/Out	2.5V–12.6V	3.5mA	S5/S8/MS8/ DFN/GN16/S14
LT6252/3/4	1/2/4	720MHz	280V/µs	2.75	-95dBc	-104dBc	A_V≥1V/V	In/Out	2.5V–5.5V	3.5mA	S6/S8/MS8/ DFN/MS10/MS16

High Speed Comparators

Part No.	Channel	Prop. Delay	Toggle Freq.	Comp. Out	Latch	Rail to Rail	Supply V	Supply I	Package
LT1719	Single	4.2ns	70MHz	no	no	yes	2.7V–10.5V	4.2mA	S8
LT1711	Single	4.5ns	100MHz	yes	yes	yes	2.4V–12V	10mA	MS8
LT1394	Single	7ns	100MHz	yes	yes	no	4.5V–12V	8.5mA	MS8/S8
LT1713	Single	7ns	65MHz	yes	yes	yes	2.4V–12V	4mA	MS8
LT1016	Single	9ns		yes	yes	no	4.5V–±5V	35mA	S8/N8
LT1715	Dual	4ns	150MHz	no	no	yes	2.7V–12V	7.5mA	MS10
LT1712	Dual	4.5ns	100MHz	yes	yes	yes	2.4V–12V	10mA	GN16
LT1720	Dual	4.5ns	70MHz	no	no	yes	2.7V–6V	4mA	MS8/S8/DD
LT1714	Dual	7ns	65MHz	yes	yes	yes	2.4V–12V	4mA	GN16
LT1721	Quad	4.5ns	70MHz	no	no	yes	2.7V–6V	4mA	S16/GN16

Precision Series-Type References for High Speed ADCs

Ref. Family	Output Voltages (*)	Max Temp Range	Accuracy Max 25°C	TempCo Max 25°C	Packages	Max Quiescent Current	Typ P-P Noise 0.1–10Hz	Comments
Precision Series-Type References for High Speed ADCs								
LT1461	2.5V, 3V, 3.3V, 4.096V, 5V	-40°C–125°C	0.04%	3ppm/°C	SO-8	50µA	20µV	Low Dropout, Includes SHDN Pin
LT1790	1.25V, 2.048V, 2.5V, 3V, 3.3V, 4.096V, 5V	-40°C–85°C	0.05%	10ppm/°C	SOT-23-6	60µA	10µV	Low Dropout, SOT-23 Package
LT1019	2.5V, 4.5V, 5V, 10V	-40°C–85°C	0.05%	5ppm/°C	DIP-8, SO-8	1.0mA	6.25µV	Tight Tolerance, Low TC
LT1460	2.5V, 5V, 10V	-40°C–85°C	0.075%	10ppm/°C	DIP-8, SO-8, MSOP-8, TO-92	130µA	10µV	Output Cap Optional
LT1460xxS3	2.5V, 3V, 3.3V, 5V, 10V	-40°C–85°C	0.20%	20ppm/°C	SOT-23-6	130µA	10µV	Output Cap Optional, SOT-23 Package
LT6652	1.25V, 2.048V, 2.5V, 3V, 3.3V, 4.096V, 5V	-40°C–125°C	0.05%	5ppm/°C	MSOP-8	560µA	3µV	Source & Sink 5mA
LTC6655	1.25V, 2.048V, 2.5V, 3V, 3.3V, 4.096V, 5V	-40°C–125°C	0.025%	2ppm/°C	MSOP-8	7mA	0.6µV	Ultra Low Noise, High Precision
LT6654	1.25V, 2.048V, 2.5V, 3V, 3.3V, 4.096V, 5V	-55°C–125°C	0.05%	10ppm/°C	SOT-23-6	600µA	3.8µV	Low Dropout, SOT-23 Package Wide Temperature Range

* Bold indicates most commonly used value for ADC Interface

Mixers

Part No.	Features	Frequency	IIP3	NF	Conversion Gain	LO Drive	LO-RF Isolation	V_{CC}	I_{CC}
Downconverting Mixers									
LTC5590	Dual High Gain	0.6–1.7GHz	+26dBm	9.7dB	8.7dB	0dBm	<-36dBm	3.1V–3.5V	379mA
LTC5591	Dual High Gain	1.3–2.3GHz	+26.2dBm	9.9dB	8.5dB	0dBm	<-30dBm	3.1V–3.5V	380mA
LTC5592	Dual High Gain	1.6–2.7GHz	+27.3dBm	9.8dB	8.3dB	0dBm	<-34dBm	3.1V–3.5V	401mA
LTC5569	Dual Wideband	0.3–4GHz	+26.7dBm	11.7dB	2dB	0dBm	-50dBm	3.0V–3.6V	180mA
LT5557	Wideband with Integrated Transformers	0.4–3.8GHz	+24.7dBm	11.7dB	2.9dB	-3dBm	42dBc	2.9V–3.9V	81.6mA
LT5527	Integrated Transformers, Low Spurious Distortion	0.4–3.7GHz	+23.5dBm	12.5dB	2.3dB	-3dBm	41dBc	4.5V–5.25V	78mA
LT5522	Integrated Transformer, 1GHz IF BW	0.4–2.7GHz	+21.5dBm	13.9dB	-0.1dB	-5dBm	45dBc	4.5V–5.25V	56mA
LT5525	Integrated Transformer, Low Power	0.8–2.5GHz	+18dBm	15dB	-1.7dB	-5dBm	38dBc	3.0V–5.3V	28mA
LT5512	Wideband, Low Frequency Op.	DC–3GHz	+17dBm	14dB	1dB	-10dBm	43dBc	4.5V–5.25V	57mA
LT5526	Low Power	DC–2GHz	+14.1dBm	13.7dB	0.4dB	-5dBm	50dBc	3.0V–5.3V	28mA
LT5560	Very Low Power, Low Cost	DC–4GHz	+9.7dBm	10.1dB	2.6dB	-2dBm	55dBc	2.7V–5.3V	10mA
LT5500	Low Voltage, Low Power LNA + Mixer	1.8–2.7GHz	-2.5dBm	4dB	5dB	-10dBm	37dBc	1.8V–5.25V	23mA

Part No.	Features	Frequency	IIP3	NF	Conversion Gain	LO Drive	LO-RF Isolation	V_{CC}	I_{CC}
Upconverting Mixers									
LT5579	WiMAX Optimized w/ Integrated Transformer	1500–3800MHz	+29dBm	9.2dB	1.8dB	-1dBm	-39dBm	3.15V–3.6V	226mA
LT5578	Wideband with Integrated RF Transformer	400–2.7MHz	+24.3dBm	10.5dB	-0.7dB	-1dBm	-46dBm	3.1V–3.5V	152mA
LT5521	Wideband	10–3700MHz	+24.2dBm	12.5dB	-0.5dB	-5dBm	-42dBm	3.15V–5.25V	82mA
LT5519	Integrated Transformer	700–1400MHz	+17.1dBm	13.6dB	-0.6dB	-5dBm	-44dBm	4.5V–5.25V	60mA
LT5520	Integrated Transformer	1300–2300MHz	+15.9dBm	15dB	-1dB	-5dBm	-41dBm	4.5V–5.25V	60mA
LT5511	Broadband, Low Frequency	10–3000MHz	+17dBm	15dB	0dB	-10dBm	-46dBm	4V–5.25V	56mA
LT5560	Very Low Power, Low Cost	0.01–4000MHz	+9.0dBm	9.3dB	2.4dB	-2dBm	-41dBm	2.7V–5.3V	10mA

Direct Conversion I/Q Modulators and Demodulators

Part No.	Features	Frequency	OIP3	Noise Floor	Image Suppress	LO Suppress	V_{CC}	I_{CC}
Direct Conversion I/Q Modulators								
LTC5588-1	Ultrahigh OIP3	0.2–6GHz	31dBm	-160.0dBm/Hz	-56.6dBc	-39.6dBc	3.15V–3.45V	303mA
LT5528	R_{IN}=50Ω, V_{CM}=0.53V	5–1600MHz	25.5dBm	-160.9dBm/Hz	-55dBc	-51dBc	4.5V–5.25V	165mA
LT5572	High Output, High R_{IN}	1.5–2.5GHz	21.6dBm	-158.6dBm/Hz	-41.2dBc	-39.4dBc	4.5V–5.25V	120mA
LT5528	R_{IN}=50Ω, V_{CM}=0.53V	1.5–2.4GHz	21.8dBm	-159.3dBm/Hz	-45dBc	-42dBc	4.5V–5.25V	125mA
LT5518	R_{IN}=3kΩ, V_{CM}=2.1V	1.5–2.4GHz	22.8dBm	-158.2dBm/Hz	-40dBc	-49dBc	4.5V–5.25V	128mA
LT5571	Low Power, R_{IN}=90k, V_{CM}=0.5V	0.62–1.1GHz	21.7dBm	-159dBm/Hz	-53dBc	-42dBc	4.5V–5.25V	97mA
LT5568	R_{IN}=50Ω, V_{CM}=0.54V	0.75–1.1GHz	22.7dBm	-159.6dBm/Hz	-46dBc	-45dBc	4.5V–5.25V	117mA
LT5568-2	850MHz–965MHz GSM Optimized	0.7–1GHz	22.9dBm	-159.4dBm/Hz	-52dBc	-43dBc	4.5V–5.25V	110mA
LT5558	R_{IN}=3kΩ, V_{CM}=2.1V	0.6–1.1GHz	22.4dBm	-158dBm/Hz	-49dBc	-43.7dBc	4.5V–5.25V	108mA
LT5503	Low Voltage, Low Power	1.2–2.7GHz	2dBm	-142dBm/Hz	-34dBc	-32dBc	1.8V–5.25V	11.9mA

Part No.	Features	Frequency	IIP3	P1dB	NF	Conversion Gain	I/Q Gain Mismatch	I/Q Phase Mismatch	LO-RF Isolation	V_{CC}	I_{CC}
Direct Conversion I/Q Demodulators											
LT5575	Integrated Transformers	800–2700MHz	+28dBm	+13.2dBm	12.8dB	3dB	0.03dB	0.5°	-60.8dB	4.5V–5.25V	132mA
LT5516	1GHz Direct Conversion Demodulator	800–1500MHz	+21.5dBm	+9dBm	12.8dB	4.3dB	0.2dB	1°	-55dB	4V–5.25V	117mA
LT5517	2 x LO Input	40–900MHz	+21dBm	+10dBm	12.4dB	3.3dB	0.03dB	0.7°	-59dB	4.5V–5.25V	90mA
LT5515	2GHz Direct Conversion Demodulator	1500–2500MHz	+20dBm	+9dBm	16.8dB	-0.7dB	0.3dB	1°	-41dB	4V–5.25V	125mA
LT5506	Integrated VGA + 8.8MHz I/Q BW	40–500MHz	-0.5dBm	-11.5dBm	6.8dB	0.9 to 59dB	0.2dB	0.6°	–	1.8V–5.25V	26.5mA
LT5546	Integrated VGA + 17MHz I/Q BW	40–500MHz	-1dBm	-10dBm	7.8dB	1.6 to 56dB	0.14dB	0.6°	–	1.8V–5.25V	24mA
LT5502	IF Limiter + RSSI	70–400MHz	–	–	4dB	–	0.1dB	0.6°	–	1.8V–5.25V	25mA

Part No.	Features	Freq. Range	Closed-Loop Phase Noise				Spurious Products	V_{CC}	I_{CC}
			10kHz	1MHz	10MHz	40MHz			
Frequency Synthesizers									
LTC6946-1	Integer-N, PLL + VCO	0.373-3.740GHz	–100dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-2	Integer-N, PLL + VCO	0.513-4.910GHz	–100dBc	–132dBc	–152dBc	–158dBc	–103dBc	3.3V/5V	143mA
LTC6946-3	Integer-N, PLL + VCO	0.640-5.790GHz	–94dBc	–140dBc	–156dBc	–158dBc	–103dBc	3.3V/5V	143mA

RF Power Detectors

Part No.	Features	Operating Frequency	Dynamic Range	Min Detect	Max Detect	Typical Accuracy	V_{CC}	I_{CC}
RMS Detector								
LTC5583	Dual, High Accuracy	40–6000MHz	60dB	-58dBm	+2dBm	±0.2dB	3.1V–3.5V	90.1mA
LTC5582	High Dynamic Range Single-Ended	40MHz–10GHz	57dB	-56dBm	+1dBm	±0.2dB	3.1V–3.5V	41.6mA
LT5570	Fast, Accurate Power Measurement of High Crest-Factor Signals	40–2700MHz	51dB	-38dBm	+13dBm	±0.3dB	4.75V–5.25V	26.5mA
LT5581	High Dynamic Range Low Power	10–6000MHz	40dB	-34dBm	+6dBm	±1dB	2.7V–5.25V	1.4mA
LTC5587	RMS Detector w/Integrated 12-Bit ADC	10–6000MHz	40dB	-34dBm	+6dBm	±1dB	2.7V–3.6V	3mA

Part No.	Features	Operating Frequency	Dynamic Range	Min Detect	Max Detect	Typical Accuracy	Demod BW	V_{CC}	I_{CC}
Logarithmic Detectors									
LT5537	Log Linear Detector	10–1000MHz	83dB	-76dBm	+14dBm	± 1dB	6MHz	2.7V–5.25V	13.5mA
LT5504	Log Linear Detector / Receiver	800–2700MHz	80dB	-80dBm	+2dBm	± 2dB	2MHz	2.7V–5.25V	14.7mA
LT5538	Broadband Detector	40–3800MHz	75dB	-75dBm	+5dBm	± 0.8dB	2MHz	3.0V–5.25V	29mA
LT5534	High Accuracy Log Detector	50–3000MHz	60dB	-63dBm	+2dBm	± 0.5dB	30MHz	2.7V–5.25V	7mA

Part No.	Features	Operating Frequency	Dynamic Range	Min Detect	Max Detect	Demod BW	V_{CC}	I_{CC}
Schottky Peak Detectors								
LTC5564	Ultrafast 7ns Schottky Detector w/ Comparator	600MHz–15GHz	40dB	-24dBm	+16dBm	75MHz	2.7V–5.25V	44mA
LTC5507	Low Frequency Detect	0.1–1000MHz	46dB	-32dBm	+14dBm	2MHz	2.7V–5.25V	0.55mA
LTC5505-1	Low Cost, High Signal Level	300–3000MHz	46dB	-28dBm	+18dBm	4MHz	2.7V–5.25V	0.5mA
LTC5508	7GHz, w/ Shutdown	300–7000MHz	44dB	-32dBm	+12dBm	2MHz	2.7V–5.25V	0.55mA
LTC5505-2	Low Cost	300–3500MHz	44dB	-32dBm	+12dBm	4MHz	2.7V–5.25V	0.5mA
LTC5532ES6	7 GHz Precision w/ Gain + V_{OS} Adj	300–7000MHz	42dB	-32dBm	+10dBm	2MHz	2.7V–5.25V	0.5mA
LTC5532EDC	12 GHz, w/ Gain + V_{OS} Adj	300MHz–12GHz	42dB	-32dBm	+10dBm	2MHz	2.7V–5.25V	0.5mA
LTC5531	7 GHz Precision w/ Shutdown, V_{OS} Adj	300–7000MHz	42dB	-32dBm	+10dBm	2MHz	2.7V–5.25V	0.5mA
LTC5533	Dual, Shutdown, V_{OS} Adj	300MHz–11GHz	44dB	-32dBm	+12dBm	2MHz	2.7V–5.25V	0.9mA
LTC5530	7 GHz Precision w/ Shutdown, Gain Adj	300–7000MHz	42dB	-32dBm	+10dBm	2MHz	2.7V–5.25V	0.5mA
LTC5535	Wide Demodulation BW, Gain + V_{OS} Adj	600–7000MHz	42dB	-32dBm	+10dBm	12MHz	2.7V–5.25V	2mA
LTC5536	Detector + Fast Comparator	600–7000MHz	38dB	-26dBm	+12dBm	–	2.7V–5.25V	2.1mA
LTC5509	High Resolution for Portable	300–3000MHz	36dB	-30dBm	+6dBm	1.5MHz	2.7V–5.25V	0.58mA

High Speed ADC Portfolio

		10Msps	25Msps	40Msps	65Msps	80Msps	105Msps	125Msps to 150Msps	160Msps to 185Msps	210Msps	250Msps	310Msps
16-Bit	Single	2202	2203	2204	2205	2206	2207	2208	2209			
					2215	2216	2217					
					2272	2273	2274					
			2160	2161	2162	2163	2164	2165				
	Dual		2180	2181	2182	2183	2184	2185				
			2190	2191	2192	2193	2194	2195				
14-Bit	Single	2245	2246	2247	2248	2249	2254	2255				
			2256-14	2257-14	2258-14	2259-14	2260-14	2261-14	2150-14	2151-14	2152-14	2153-14
								2262-14				
	Dual	2295	2296	2297	2298	2299	2284	2285	2155-14	2156-14	2157-14	2158-14
			2140-14	2141-14	2142-14	2143-14	2144-14	2145-14				
			2263-14	2264-14	2265-14	2266-14	2267-14	2268-14				
	Quad		2170-14	2171-14	2172-14	2173-14	2174-14	2175-14				
	Octal					9009-14	9010-14	9011-14				
12-Bit	Single	2225	2226	2227	2228	2229	2252	2253	2240-12	2241-12	2242-12	
			2256-12	2257-12	2258-12	2259-12	2260-12	2261-12	2150-12	2151-12	2152-12	2153-12
								2262-12				
	Dual	2290	2291	2292	2293	2294	2282	2283	2155-12	2156-12	2157-12	2158-12
			2140-12	2141-12	2142-12	2143-12	2144-12	2145-12				
			2263-12	2264-12	2265-12	2266-12	2267-12	2268-12				
	Quad		2170-12	2171-12	2172-12	2173-12	2174-12	2175-12				
10-Bit	Single		2236	2237	2238	2239	2250	2251	2240-10	2241-10	2242-10	
	Dual		2286	2287	2288	2289	2280	2281				

Parallel

6 x 6	7 x 7	9 x 9	1.8V Lowest Power, Single & Dual ADCs, CMOS/DDR CMOS/DDR LVDS
	7 x 7	9 x 9	3.3V High SNR/SFDR ADCs, CMOS/LVDS
		9 x 9	2.5V ADCs, CMOS/LVDS
	6 x 6	9 x 9	1.8V High IF Undersampling Single & Dual ADCs, DDR LVDS
		5 x 5	3V ADCs, CMOS
		9 x 9	3V Dual ADCs, CMOS

Serial

6 x 6	3.3V JESD204 2-Wire Serial ADCs
7 x 8	1.8V Dual ADCs, Serial LVDS
6 x 6	1.8V Dual ADCs, Serial LVDS
7 x 8	1.8V Quad ADCs, Serial LVDS
11 x 9	1.8V Octal ADCs, Serial LVDS

14-/12-Bit 25Msps to 150Msps Single ADC Family with Parallel Outputs

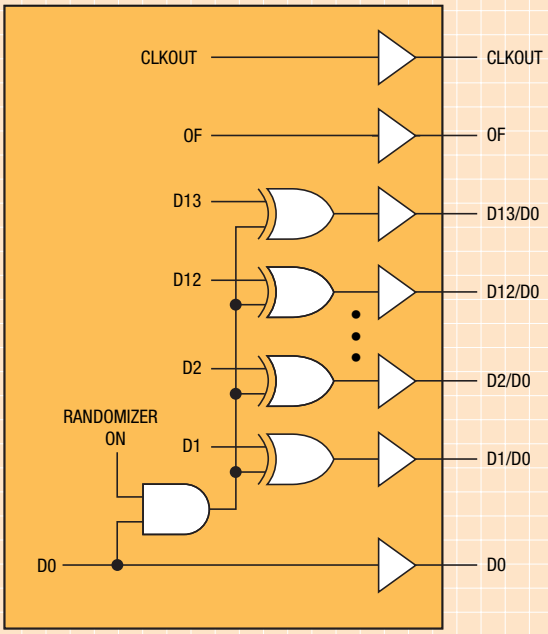
	25Msps	40Msps	65Msps	80Msps	105Msps	125Msps	150Msps
14-Bit 73.2dB SNR	2256-14	2257-14	2258-14	2259-14	2260-14	2261-14	2262-14
12-Bit 70.6dB SNR	2256-12	2257-12	2258-12	2259-12	2260-12	2261-12	2262-12
Power Consumption	35mW	49mW	81mW	89mW	106mW	127mW	149mW

6 x 6 QFN 1.8V Single ADCs, CMOS, DDR CMOS or DDR LVDS Outputs

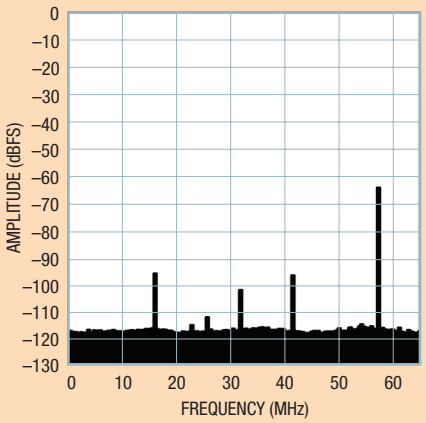
Features:

- Pin-Compatible Family of 14- /12-Bit, 25Msps to 150Msps ADCs
- Single 1.8V Supply
- Flexible Digital Interface: CMOS, DDR CMOS or DDR LVDS
- Selectable Input Ranges: $1V_{P-P}$ to $2V_{P-P}$
- 800MHz Full-Power Bandwidth S/H
- Optional Data Output Randomizer
- Alternate Bit Polarity Mode
- Optional Clock Duty Cycle Stabilizer
- Shutdown and Nap Modes
- Serial SPI Port for Configuration
- Easy Evaluation Using PScope™ Analysis Software

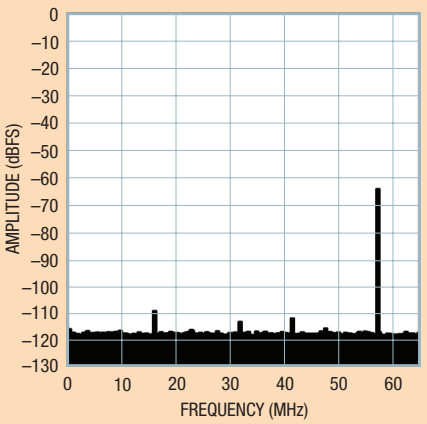
Digital Output Randomizer Reduces Digital Feedback



Alternate Bit Polarity and Randomizer Off



Alternate Bit Polarity and Randomizer On



LTC2261-14, 125Msps, A_{IN} = 70MHz, –65dBFS Averaged 128k Point FFTs

14-Bit/12-Bit 25Msps to 125Msps Quad/Dual ADC Family with Serial LVDS Outputs

	25Msps	40Msps	65Msps	80Msps	105Msps	125Msps
14-Bit	2170-14 2263-14	2171-14 2264-14	2172-14 2265-14	2173-14 2266-14	2174-14 2267-14	2175-14 2268-14
12-Bit	2170-12 2263-12	2171-12 2264-12	2172-12 2265-12	2173-12 2266-12	2174-12 2267-12	2175-12 2268-12
Power Consumption	40mW/Ch	50mW/Ch	80mW/Ch	95mW/Ch	110mW/Ch	140mW/Ch

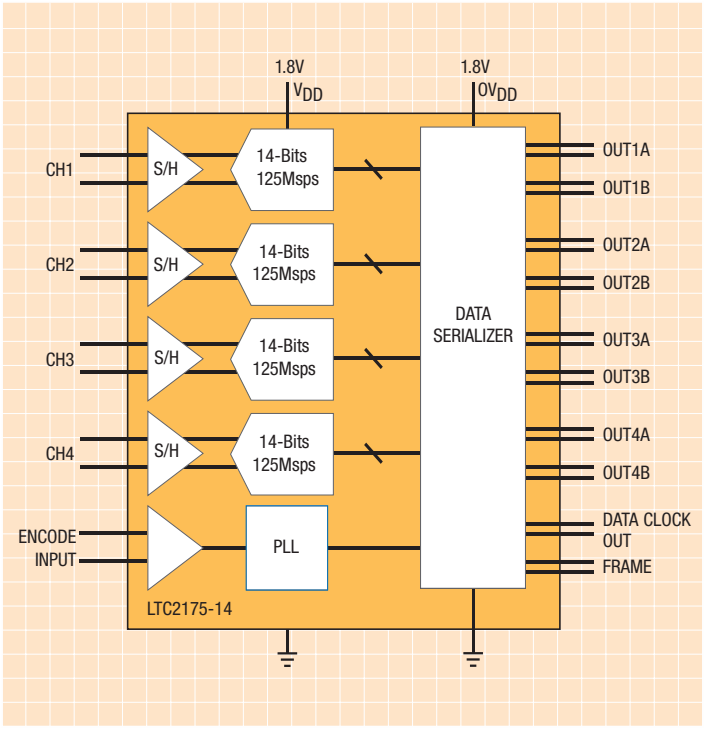
6 x 6 QFN Dual ADCs, Serial LVDS Outputs

7 x 8 QFN Quad ADCs, Serial LVDS Outputs

Features:

- Quad/Dual-Channel Simultaneous Sampling ADCs (LTC2175/LTC2268)
- 73.1dB SNR (14-Bit Resolution)
- 88dB SFDR
- Single 1.8V Analog & Digital Supplies
- Serial LVDS Outputs
- Selectable Input Ranges: $1V_{P-P}$ to $2V_{P-P}$
- 800MHz Full-Power Bandwidth S/H
- Optional Data Output Randomizer
- Optional Clock Duty Cycle Stabilizer
- 1mW Sleep and 50mW Nap Modes
- Serial SPI Port for Configuration
- Pin-Compatible 14-Bit and 12-Bit Versions
- 52-Pin (7mm × 8mm) QFN Package (Quad Versions)
- 40-Pin (6mm × 6mm) QFN Package (Dual Versions)
- Easy Evaluation Using PScope Analysis Software

Simultaneous Sampling Quad ADCs



Quad ADCs with Low Power Consumption

The LTC2175 quad high speed ADC family achieves one-third the power consumption of alternate solutions without compromising AC performance. Operating from a low 1.8V supply, the 14-bit, 125Msps LTC2175 dissipates 140mW/channel while maintaining 73.1dB SNR and 88dB SFDR at baseband. Digital outputs can be configured as single lane (<65Msps) or dual lane serial LVDS to minimize FPGA pin count.

16-Bit 25Msps to 125Msps Single/Dual ADC Family

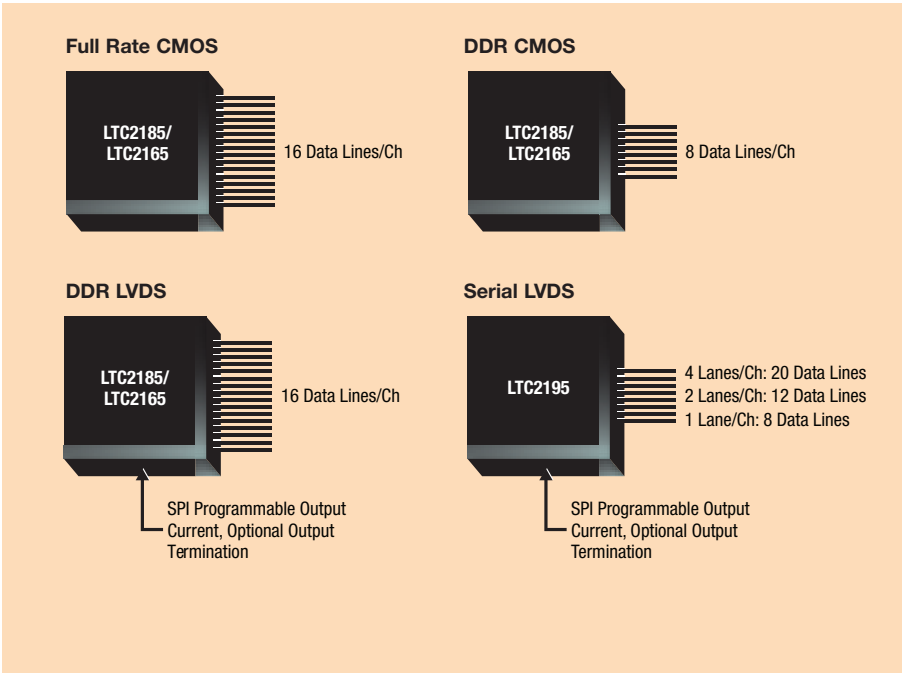
	25Msps	40Msps	65Msps	80Msps	105Msps	125Msps
Single Channel	2160	2161	2162	2163	2164	2165
Dual Channel	2180 2190	2181 2191	2182 2192	2183 2193	2184 2194	2185 2195
Power Consumption	40mW/Ch	50mW/Ch	80mW/Ch	100mW/Ch	155mW/Ch	185mW/Ch

7 x 8 QFN	1.8V Dual ADCs, Serial LVDS Outputs
9 x 9 QFN	1.8V Dual ADCs, Parallel Outputs
7 x 7 QFN	1.8V Single ADCs, Parallel Outputs

Features:

- 16-Bit, 25Msps to 125Msps ADCs
- 76.8dB SNR, 90dB SFDR
- Single 1.8V Supply
- Flexible Digital Interfaces:
  - LTC2185/LTC2165: CMOS, DDR CMOS or DDR LVDS Outputs
  - LTC2195: Serial LVDS
- Selectable Input Ranges: $1V_{P-P}$ to $2V_{P-P}$
- 550MHz Full-Power Bandwidth S/H
- Optional Data Output Randomizer
- Optional Clock Duty Cycle Stabilizer
- Shutdown and Nap Modes
- Serial SPI Port for Configuration
- Easy Evaluation Using PScope Analysis Software

Flexible Digital Outputs



16-Bit/14-Bit/12-Bit 25Msps to 125Msps Dual ADC Family with Parallel Outputs

	25Msps	40Msps	65Msps	80Msps	105Msps	125Msps
16-Bit 76.8dB SNR	2180	2181	2182	2183	2184	2185
Power Consumption	39mW/Ch	58mW/Ch	80mW/Ch	100mW/Ch	154mW/Ch	185mW/Ch
14-Bit 73.2dB SNR	2140-14	2141-14	2142-14	2143-14	2144-14	2145-14
12-Bit 70.6dB SNR	2140-12	2141-12	2142-12	2143-12	2144-12	2145-12
Power Consumption	24mW/Ch	33mW/Ch	46mW/Ch	55mW/Ch	75mW/Ch	95mW/Ch

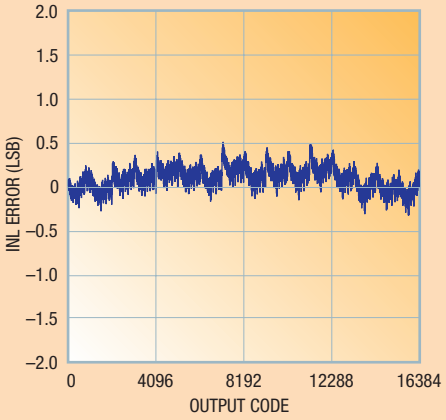
9 x 9 QFN 1.8V Dual ADCs, CMOS, DDR CMOS or DDR LVDS

Features:

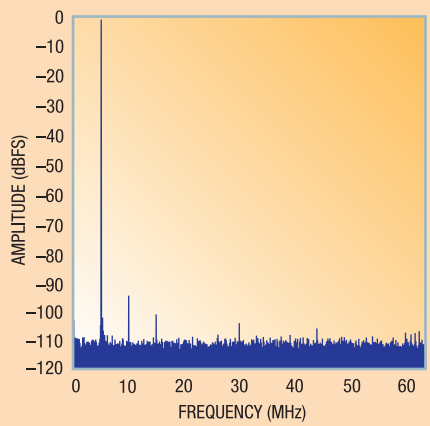
- Pin-Compatible Family of 16-/14-/12-Bit, 25Msps to 125Msps Dual ADCs
- 76.8dB SNR, 90dB SFDR at 16-Bit
- Single 1.8V Supply
- Flexible Digital Interface: CMOS, DDR CMOS or DDR LVDS
- Selectable Input Ranges: $1V_{P-P}$ to $2V_{P-P}$
- 750MHz Full-Power Bandwidth S/H
- Optional Data Output Randomizer
- Optional Clock Duty Cycle Stabilizer
- Shutdown and Nap Modes
- Serial SPI Port for Configuration
- Easy Evaluation Using PScope Analysis Software

Clean Performance, Very Low Power

LTC2145-14: Integral Nonlinearity (INL)



LTC2145-14: 64k Point FFT, f_{IN} = 5MHz –1dBFS, 125Msps

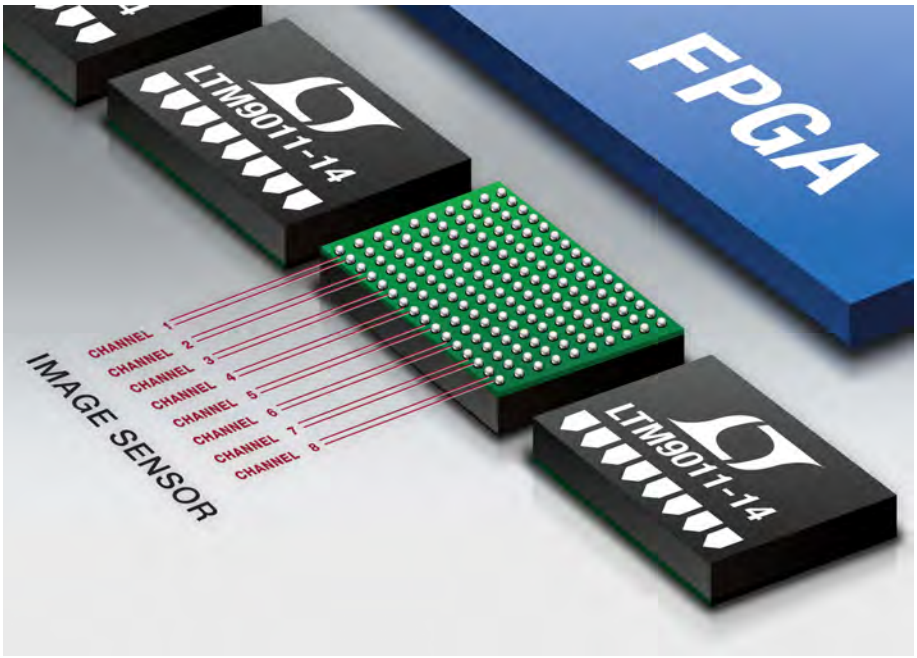


14-Bit 80Msps to 125Msps Octal ADC Family with Serial LVDS Outputs

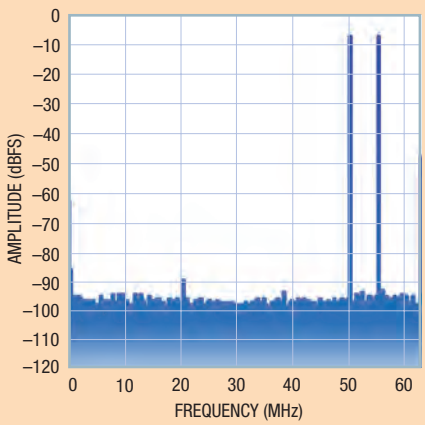
The LTM9011-14 is part of a family of 14-bit, 80Msps, 105Msps and 125Msps octal ADCs that provide excellent AC performance and low power in a small form factor. The BGA µModule packaging allows the integration of bypass capacitance and provides a flow-through pinout, reducing the required board area for routing data I/O lines and simplifying layout.

Features:

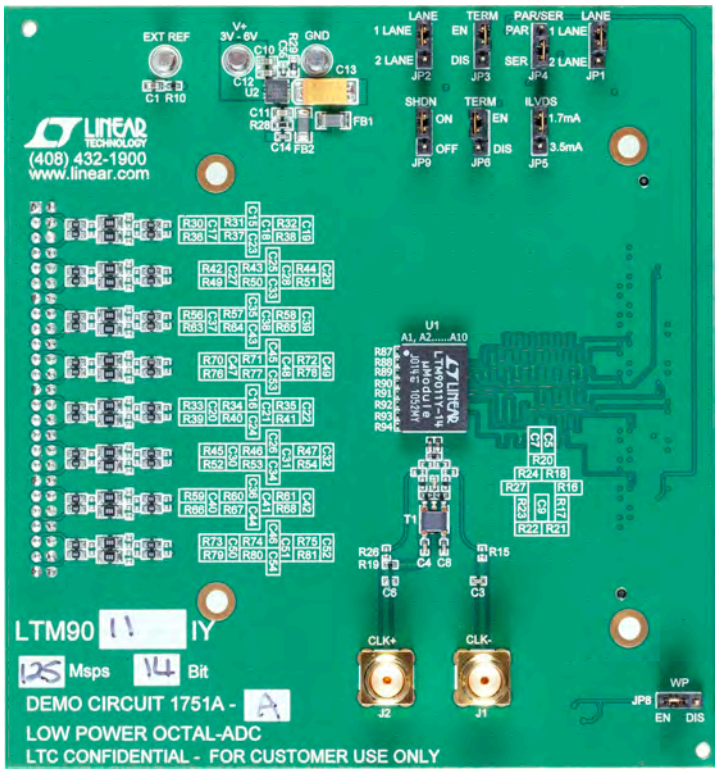
- 8-Channel Simultaneous Sampling ADC Family
- 125Msps/105Msps/80Msps Versions
- 73.1dB SNR, 88dB SFDR
- Low Power: 140mW/113mW/94mW per Channel
- Single 1.8V Supply
- Serial LVDS Outputs: 1 or 2 Bits per Channel
- Selectable Input Ranges: $1V_{P-P}$ to $2V_{P-P}$
- 800MHz Full-Power Bandwidth S/H
- Shutdown and Nap Modes
- Internal Bypass Capacitance, No External Components
- 140-Pin (11.25mm × 9mm) BGA Package
- Easy Evaluation Using PScope Analysis Software



LTM9011-14, 125Msps, 2-Tone FFT, f_{IN} = 70MHz and 75MHz



DC1751A: Actual Size



14-Bit/12-Bit 170Msps to 310Msps Single/Dual ADC Family with DDR LVDS Outputs

High Undersampling Performance to 900MHz

The LTC2153 and LTC2158 are a family of single and dual, high IF sampling 12-/14-bit, 170Msps to 310Msps ADCs that maintain excellent SFDR performance at input frequencies up to 900MHz. These ADCs have been specifically designed to meet the needs of today's communications systems, where high undersampling capability saves cost by eliminating downconversion stages.

Features:

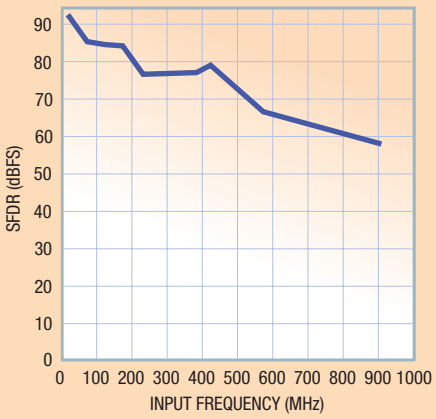
- 1.8V Single-Supply Operation
- DDR LVDS Outputs
- Easy-to-Drive 1.5V_{P-P} Input Range
- 1.25GHz Full-Power Bandwidth S/H
- Optional Clock Duty Cycle Stabilizer
- Low Power Sleep and Nap Modes
- Serial SPI Port for Configuration
- Easy Evaluation Using PScope Analysis Software

	170Msps	210Msps	250Msps	310Msps
14-Bit 70dB SNR	2155-14 2150-14	2156-14 2151-14	2157-14 2152-14	2158-14 2153-14
12-Bit 68.6dB SNR	2155-12 2150-12	2156-12 2151-12	2157-12 2152-12	2158-12 2153-12
Power Consumption	284mW/Ch	308mW/Ch	325mW/Ch	362mW/Ch

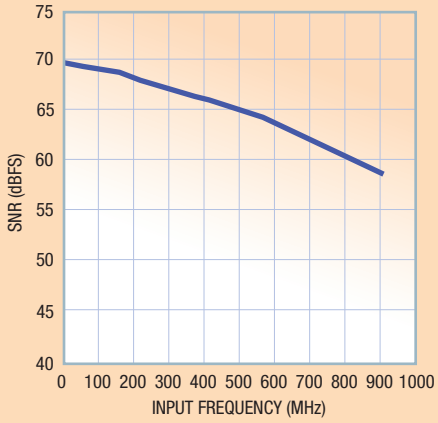
6 x 6 QFN 1.8V Single ADCs, DDR LVDS Outputs

9 x 9 QFN 1.8V Dual ADCs, DDR LVDS Outputs

LTC2157-14: SFDR vs Input Frequency, -1dBFS, 250Msps



LTC2157-14: SNR vs Input Frequency, -1dBFS, 250Msps



16-Bit 10Msps to 160Msps Single ADC Family with Parallel Outputs

10Msps	25Msps	40Msps	65Msps	80Msps	105Msps	130Msps	160Msps
2202	2203	2204	2205	2206	2207	2208	2209
81.6dB, 140mW	81.6dB, 220mW	79.1dB, 480mW	79dB, 610mW	77.9dB, 725mW	77.9dB, 900mW	77.7dB, 1250mW	77.1dB, 1450mW
			2215	2216	2217		
			81.5dB, 700mW	81.3dB, 970mW	81.2dB, 1190mW		
			2272	2273	2274		
			77.5dB, 990mW	77.5dB, 1100mW	77.6dB, 1300mW		

6 x 6 QFN 3.3V JESD204 2-Wire Serial ADCs

7 x 7 QFN 3.3V High SNR/SFDR ADCs, CMOS

9 x 9 QFN 3.3V High SNR/SFDR ADCs, CMOS/LVDS

High SNR/SFDR Performance 16-Bit ADCs

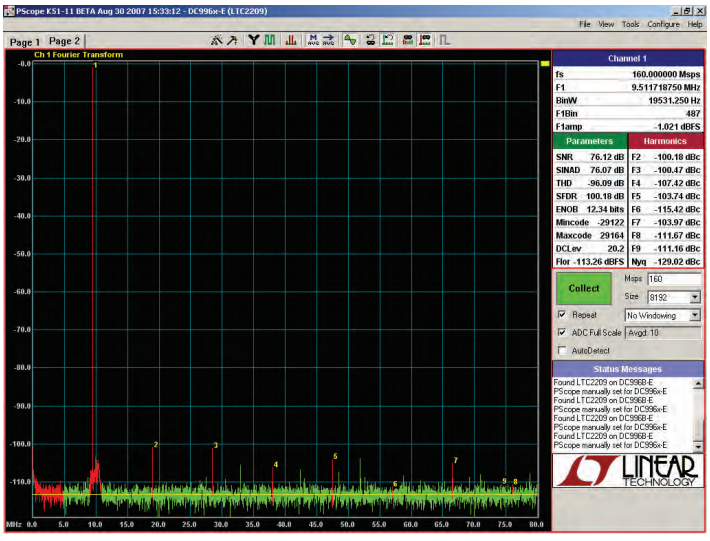
The LTC2209 high performance family of 16-bit ADCs is designed for the most demanding wideband, low noise, signal acquisition applications. This ADC family addresses the key requirements for maximizing performance of high sensitivity receivers and data acquisition systems. Exceptional SFDR performance of 100dBc, combined with SNR of up to 81.6dB, enable the ADCs to resolve low level signals in the presence of large interferers and blockers.

The LTC2209 family uses innovative ADC technology for digital receivers by incorporating two unique features that simplify receiver design and improve system performance. The first is an internal transparent dither circuit that improves the ADCs spurious free dynamic range response well beyond 100dBc for low level input signals. The second feature is a digital output randomizer that dramatically reduces unwanted tones caused by digital feedback. All ADCs excluding LTC2215, LTC2216 and LTC2217 feature a programmable gain amplifier (PGA) front end that eases the ADC driver output power requirements when driving the lower input range of 1.5Vp-p for improved distortion performance. The LTC2274 series offers a high speed, 2-wire serial interface for interfacing to the SerDes port offered on most FPGAs.

Features:

- Highest SNR
- 100dBc SFDR
- Single 3.3V supply
- Internal Transparent Dither
- Data Output Randomizer

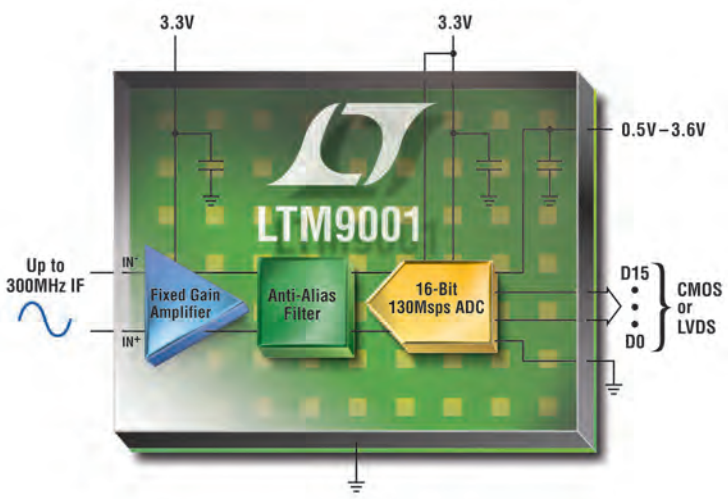
High SFDR Performance of LTC2209 Demonstrated by PScope Analysis Software



LTM9001: 16-Bit IF/Baseband µModule Receiver

Features:

- 16-Bit High Speed ADC
- Up to 300MHz IF Range
- 75dB SNR, 83dB SFDR (LTM9001-AD)
- Low Noise, Low Distortion Amplifiers
  Fixed Gain: 8dB, 14dB, 20dB or 26dB
  50Ω, 200Ω or 400Ω Input Impedance
- Integrated Passive Components
  Anti-Alias Filter
  Supply and Reference Bypass Capacitance
- No External Components Required
- Selectable LVDS or CMOS Outputs
- Optional Data Output Randomizer
- Optional Internal Dither
- 11.25mm x 11.25mm LGA Package



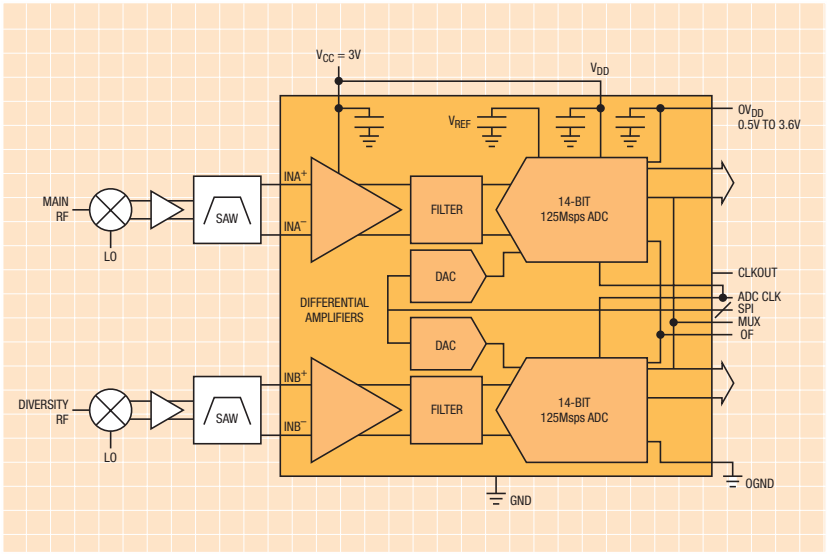
Amplifier IF Range	Amplifier Input Impedance	Amplifier Gain	Filter	ADC Sample Rate	ADC Resolution	Output	Part Number
Semi-Custom Options LTM9001							
300MHz	200Ω	20dB	162.5MHz BPF, 50MHz BW	130Msps	16-Bit	LVDS/CMOS	**LTM9001-AA**
300MHz	200Ω	14dB	70MHz BPF, 25MHz BW	130Msps	16-Bit	LVDS/CMOS	**LTM9001-AD**
300MHz	400Ω	8dB	DC-300MHz LPF	160Msps	16-Bit	LVDS/CMOS	**LTM9001-BA**
300MHz	400Ω	8dB	DC-10MHz LPF	25Msps	16-Bit	CMOS	**LTM9001-GA**

LTM9002: 14-Bit, 125Msps Dual-Channel IF/ Baseband µModule Receiver

Features:

- Integrated Dual 14-Bit, High Speed ADC, Passive Filters and Fixed Gain Differential Amplifiers
- Up to 300MHz IF Range
  – Lowpass and Bandpass Filter Versions
- Integrated Low Noise, Low Distortion Amplifiers
  – Fixed Gain: 8dB, 14dB, 20dB or 26dB
  – 50Ω, 200Ω or 400Ω Input Impedance
- Integrated Bypass Capacitance, No External Components Required
- 66dB SNR Up to 140MHz Input (LTM9002-AA)
- 76dB SFDR Up to 140MHz Input (LTM9002-AA)
- Auxiliary 12-Bit DACs for Gain Adjustment
- Clock Duty Cycle Stabilizer
- Single 3V to 3.3V Supply
- Low Power: 1.3W (665mW/ch.)
- Shutdown and Nap Modes
- 15mm × 11.25mm LGA Package

Dual Channel IF Receiver

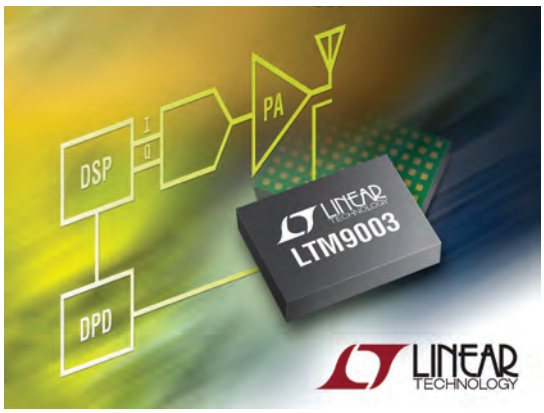


Amplifier IF Range	Amplifier Input Impedance	Amplifier Gain	Filter	ADC Sample Rate	ADC Resolution	Auxiliary DAC	Part Number
Semi-Custom Options LTM9002							
300MHz	50Ω	26dB	170MHz LPF	125Msps	14-Bit	12-Bit, SPI	**LTM9002-AA**
140MHz	200Ω (Channel A) 400Ω (Channel B)	20dB (Channel A) 8dB (Channel B)	25MHz LPF	65Msps	12-Bit	–	**LTM9002-LA**

LTM9003: 12-Bit, 250Msps Digital Predistortion µModule Receiver

Features:

- Fully Integrated Receiver Subsystem for Digital Predistortion Applications
- Downconverting Mixer with Wide RF Frequency Range: 400MHz to 3.8GHz
- 125MHz Wide Bandpass Filter, <0.5dB Passband Ripple
- Low Power ADC with Up to 12-Bit Resolution, 250Msps Sample Rate
- –145.5dBm/Hz Input Noise Floor, 25.8dBm IIP3
- 1.5W Total Power Consumption
- 50Ω Single-Ended RF and LO Ports
- Internal Bypass Capacitance, No External Components
- ADC Clock Duty Cycle Stabilizer
- 11.25mm x 15mm LGA Package

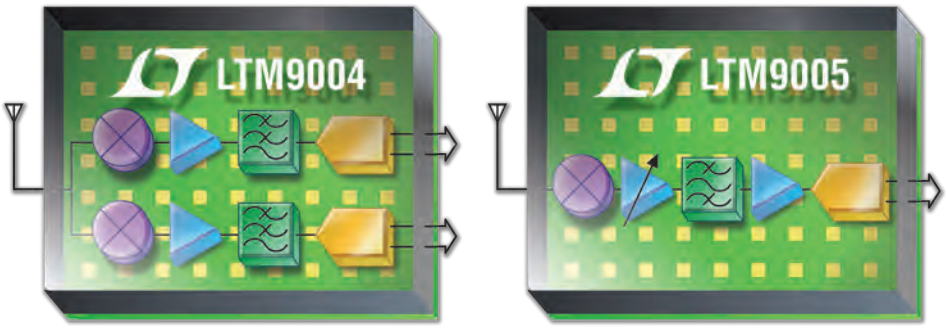


RF-to-Digital µModule Receivers

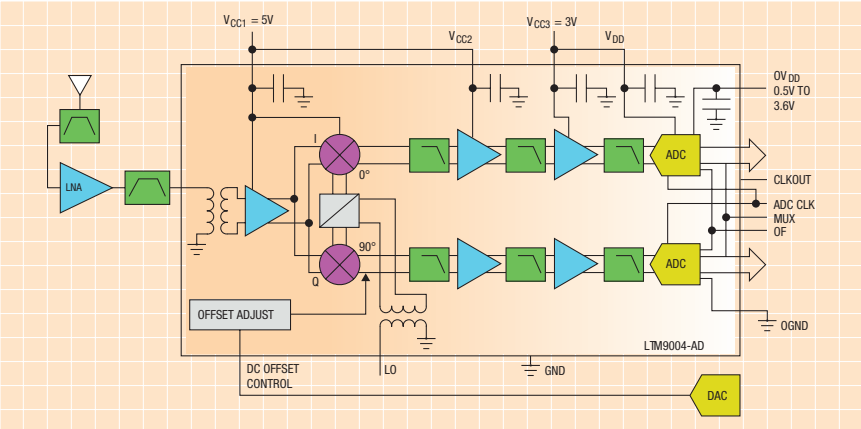
The LTM9004 (Direct Conversion) and LTM9005 (IF Sampling) µModule receivers offer unprecedented integration for more compact, low power designs and dramatically faster time-to-market. Integrating the RF, signal filtering, gain stages and high speed ADCs, these receivers eliminate time-consuming design, layout and component sourcing associated with high performance communication systems. With no performance compromise, they enable dense, multichannel macrocells or compact remote radio heads.

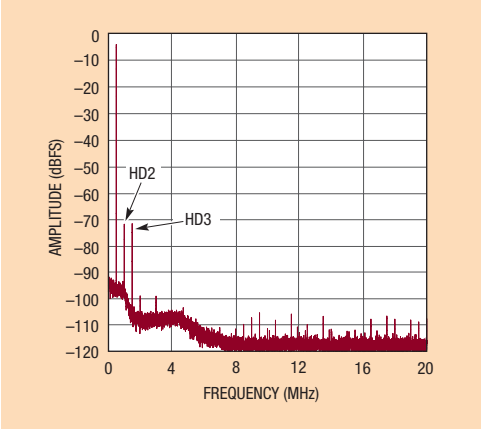
Features:

- Fully Integrated RF-to-Digital Receivers
- 14-Bit, 125Msps Low Power ADC
- Direct Conversion Architecture (LTM9004)
  - 700MHz to 2.7GHz RF Input Range
  - I/Q Demodulation & Dual ADC
  - 5V & 3V Supplies, 1.8W Total
- IF-Sampling Architecture (LTM9005)
  - 400MHz to 3.8GHz RF Input Range
  - 20MHz SAW Filter, 140MHz IF
  - 3.3V Supply, 1.3W Total
- 22mm × 15mm LGA Package



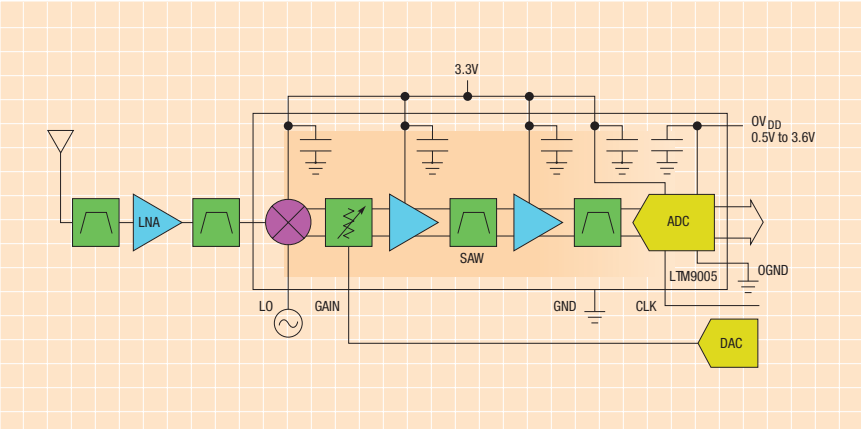
LTM9004 Block Diagram and Performance

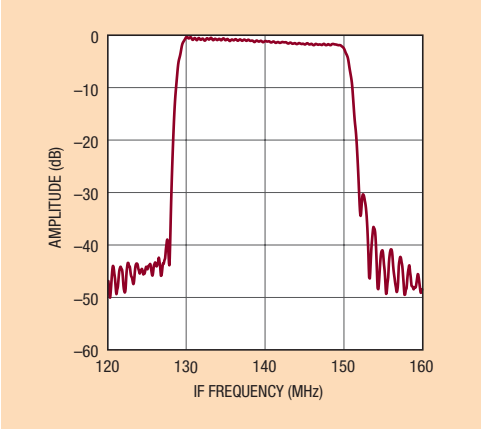




Option	Filter Cutoff	Signal Bandwidth
LTM9004-AA	1.92MHz	3.84MHz (1-Carrier WCDMA)
LTM9004-AB	4.42MHz	8.84MHz (2-Carrier WCDMA)
LTM9004-AC	9.42MHz	18.84MHz (4-Carrier WCDMA)
LTM9004-AD	20MHz	40MHz

LTM9005 Block Diagram and Performance





Option	Center Frequency	Signal Bandwidth
LTM9005-AA	140MHz	16MHz
LTM9005-AB	140MHz	20MHz

µModule Receiver Features

- Ease of Use, Faster Time-to-Market
- Eliminates Most Challenges of Driving High Speed ADCs
- Integrates Key Components
- Simplifies Layout without Sacrificing Performance
- Provides System-Level Testing
- Dramatically Smaller and Simpler than Discrete Implementations
- Proven Linear Technology Quality, Reliability and Service
- ECCN 5A991 — No Export License Required

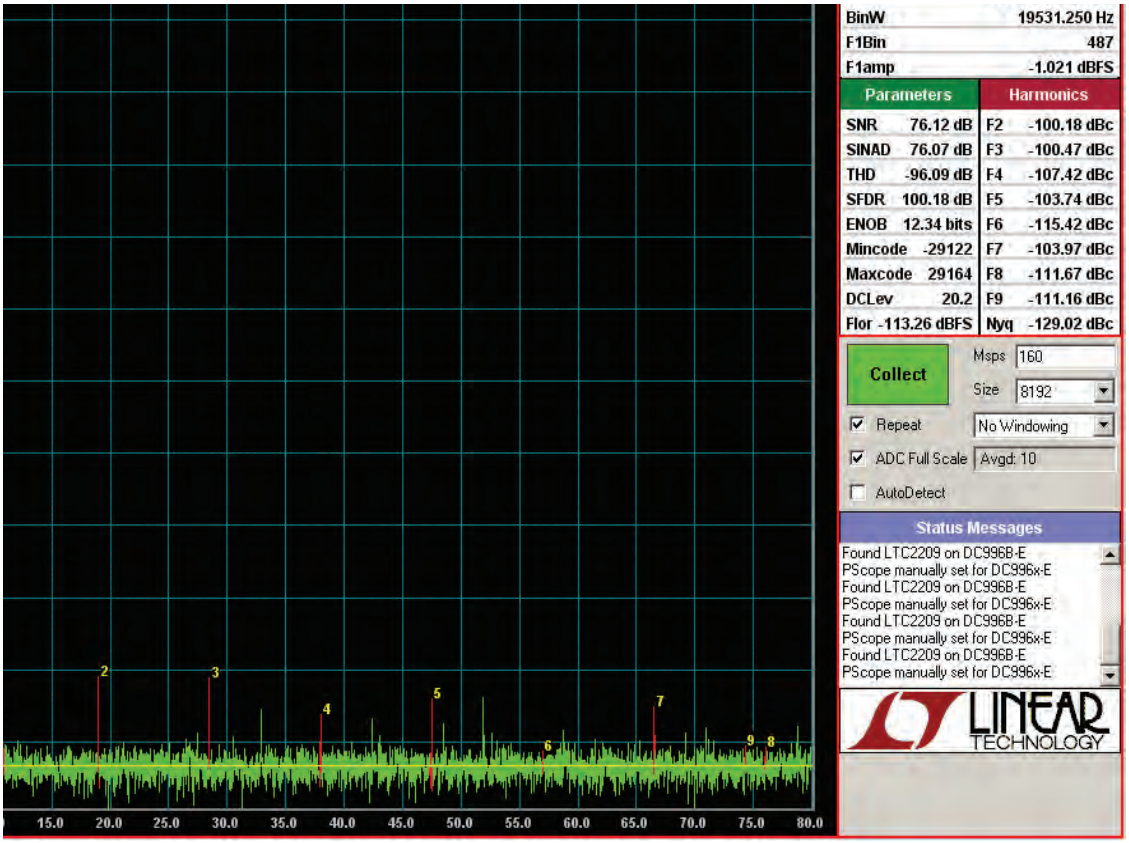
Semi-Custom Options

The LTM900x family is available in semi-custom options, subject to business approval. Changes are limited to filter configurations and the ADC speed and resolution where pin-compatible alternatives are available. Contact Linear Technology for details.

PScope Data Collection and Analysis Software Tool

The PScope tool is Linear Technology's high speed ADC evaluation software. Using this powerful software tool, engineers can evaluate the performance of Linear Technology's high speed ADC and signal chain receiver family. For a simple program it performs complicated calculations in seconds. PScope software allows engineers to evaluate the signal-to-noise ratio (SNR), spurious free dynamic range (SFDR), total harmonic distortion (THD), as well as other key parameters of high speed ADCs quickly and easily. PScope can also perform more complicated calculations such as intermodulation distortion from a 2-tone test, or adjacent channel power ratios (ACPR) from a spread spectrum signal with the click of a button. It also supports multiple channel ADCs such as the LTM9011, allowing the measurement of eight ADC channels simultaneously.

Screenshot of PScope Data Collection and Analysis Software



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