High Speed Analog-to-Digital Converter
Product Selection Guide!

Communications Infrastructure
  Digital Pre-Distortion (DPD) Loops
  Direct Conversion Receivers
  Diversity (MIMO) Receivers

Instrumentation
  Digital Oscilloscopes
  Spectrum Analyzers
  Hi-Definition Video Digitizing

Sensing & Control
  Ultrasound
  Magnetic Resonance Imaging (MRI)
  Radar & Security Sensors
  Radio Astronomy & Atmospheric LIDAR

Analog-to-Digital Converter Solutions
We offer Analog-to-Digital Converters (ADCs) that combine high speed and high SNR performance with lowest power dissipation. These ADCs provide uniquely configurable functionality including: crosspoint switches, clock dividers and programmable sampling rates / resolution / number of channels.
Introduction

Standard Analog-to-Digital Converter Products

Hittite offers a wide range of High Speed ADCs for Communication, Instrumentation, Industrial, Medical & Military applications. Low power consumption & high performance is combined with a high degree of flexibility.

- Sampling Rates: 3 to 1000 MSPS
- Resolution: 8 to 14 bits
- CMOS & LVDS Outputs
- Configurable Power Consumption & Functionality with SPI Settings
- Integrated Instrumentation Functionality

Analog Made Easy™

With our Analog Made Easy™ philosophy, we are committed to user friendly products. We have built multiple features & functionality into our ADCs that make our products easy to use, thus reducing overall cost for the system designer.

- EasySuite™: Evaluation and Prototyping Platform Environment
- EasyBoard™: Supplied Evaluation Board Connected to Xilinx® Standard FMC Board
- EasyStack™: Firmware Code Stack, Currently Available for Xilinx®

Custom Analog-to-Digital Converter Solutions

Hittite offers ADCs with customer specified integrated functions.

- Integrated LNA, VGAs and Analog Multiplexers (Analog Front End)
- Digital DownConverters (DDC)
- LVDS and JESD204 Outputs
- MCMs integrating RF and Microwave Functions with ADCs
- Ultra High Speed GSPS ADCs, page 10
## High Speed, Low Power Analog-to-Digital Converters

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Hittite has consolidated the original Arctic Silicon Devices (ASD) part number options by their sampling rates into 14 Hittite part numbers. No ASD parts were discontinued. Contact: adc@hittite.com
Digital Pre-Distortion (DPD) Receiver Subsystem Featuring the HMCAD1520

[1] You may choose from a variety of HMC PLL+VCO combinations specific to your application

[2] You may choose from a variety of MMIC Mixers specific to your application
A/D Converter Applications

Communications Infrastructure

**Direct Conversion Receiver with Diversity Featuring the HMCAD1520**

**HMC860LP3E**
- High PSRR DC Regulator
  - 3.35 V - 5.6 V

**HMC871LP4E**
- Dual Channel LNA
  - 55 - 1200 MHz
  - 0.5 dB Noise Figure

**HMC818LP3E**
- Dual Channel LNA
  - 1700 - 2200 MHz
  - 0.5 dB Noise Figure

**HMC820LP6GE**
- Tri-band PLL + VCO
  - Low Phase Noise,
  - -110 dBc/Hz @ 10 kHz

**HMC830LP6GE**
- Wideband PLL + VCO
  - 180 fs RMS jitter
  - Low Phase Noise,
  - -110 dBc/Hz @ 10 kHz

**HMC617LP3E**
- LNA, 55 - 1200 MHz
  - 0.5 dB Noise Figure
  - 24 dB Gain

**HMC618LP3E**
- LNA, 1700 - 2200 MHz
  - 0.75 dB Noise Figure
  - 16 dB Gain

**HMC817LP3E**
- Dual Channel LNA
  - 55 - 1200 MHz
  - 0.5 dB Noise Figure

**HMC900LP5E**
- Dual Baseband LPF
  - 3.5 to 50 MHz
  - 3 dB BW Programmable
  - 12 dB Noise Figure
  - +30 dBm OIP3

**HMC900LP5E**
- Dual Baseband LPF
  - 3.5 to 50 MHz
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  - 12 dB Noise Figure
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**HMC900LP5E**
- Dual Baseband LPF
  - 3.5 to 50 MHz
  - 3 dB BW Programmable
  - 12 dB Noise Figure
  - +30 dBm OIP3

**HMC900LP5E**
- Dual Baseband LPF
  - 3.5 to 50 MHz
  - 3 dB BW Programmable
  - 12 dB Noise Figure
  - +30 dBm OIP3

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[1] You may choose from a variety of HMC LNAs specific to your application

[2] You may choose from a variety of HMC PLL+VCO combinations specific to your application

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JUNE 2011
Heterodyne Receiver with MIMO Featuring the HMCAD1520

HMC617LP3E [1]
- LNA, 55 - 1200 MHz
- 0.5 dB Noise Figure
- 24 dB Gain

HMC618LP3E [1]
- LNA, 1700 - 2200 MHz
- 0.75 dB Noise Figure
- 16 dB Gain

HMC624LP4E
- 6-Bit DATT
- DC - 6.0 GHz
- +55 dBm High IIP3

HMC589ST89E
- HBT Gain Block
- DC - 4 GHz
- +33 dBm OIP3

HMC890LP5E
- Band Pass Filter
- 200 ns Tuning Response

HMC891LP5E
- Band Pass Filter
- 200 ns Tuning Response

HMC890LP5E
- Band Pass Filter
- 200 ns Tuning Response

HMC891LP5E
- Band Pass Filter
- 200 ns Tuning Response

HMC820LP6CE
- Dual Downconverters
- 1700 - 2200 MHz

HMC860LP4E
- 5-Bit DVG with Diff. Outputs
- 30 - 400 MHz
- -4 to +19 dB Gain
- +40 dBm OIP3

HMC820LP6CE
- Tri-band PLL + VCO
- Low Phase Noise, -110 dBc/Hz @ 10 kHz

HMC860LP4E
- Tri-band PLL + VCO
- Low Phase Noise, -110 dBc/Hz @ 10 kHz

HMC830LP6GE [2]
- Wideband PLL + VCO
- 180 fs RMS Jitter
- Low Phase Noise, -110 dBc/Hz @ 10 kHz

HMC617LP3E [1]
- Dual Channel LNA
- 55 - 1200 MHz
- 0.5 dB Noise Figure

HMC817LP3E [1]
- Dual Channel LNA
- 1700 - 2200 MHz
- 0.5 dB Noise Figure

HMC624LP4E
- 6-Bit DATT
- DC - 8.0 GHz
- +55 dBm High IIP3

HMC860LP4E
- 5-Bit DVG with Diff. Outputs
- 30 - 400 MHz
- -4 to +19 dB Gain
- +40 dBm OIP3

HMC820LP6CE
- Dual Downconverters
- 700 - 1000 MHz

HMC860LP4E
- Dual Downconverters
- 700 - 1000 MHz

HMC624LP4E
- Dual Downconverters
- 1700 - 2200 MHz

HMC680LP4E
- Dual Downconverters
- 700 - 1000 MHz

HMC820LP6CE
- Analog-to-Digital Converter
- 14-Bit ADC
- 105 MSPS
- 4 Channels

[1] You may choose from a variety of HMC LNAs specific to your application
[2] You may choose from a variety of HMC PLL+VCO combinations specific to your application
Digital Oscilloscopes Featuring the HMCAD1510 & HMCAD1511

**HMC860LP3E**
- High PSRR DC Regulator
  - 3.35 V - 5.6 V

**HMC830LP6GE**
- Wideband PLL + VCO
  - 180 fs RMS Jitter
  - Low Phase Noise, -110 dBc/Hz @ 10 kHz

**HMCAD1510**
- 8-Bit A-to-D Converter
  - 125/250/500 MSPS
  - Quad/Dual/Single Ch.

**HMCAD1511**
- 8-Bit A-to-D Converter
  - 250/500/1000 MSPS
  - Quad/Dual/Single Ch.

Digital Oscilloscopes Featuring the HMCAD1510 & HMCAD1511

SNR with Digital Gain Compared with Traditional Ideal 8-Bit Converter

**Part Number** | **Function / Mode** | **Resolution (bits)** | **Sample Rate** | **# of Channels** | **Power Dissipation [3][4]** | **SNR (dBFS)** | **SFDR (dBc)** |
--- | --- | --- | --- | --- | --- | --- | --- |
HMCAD1511 | Single Channel | 8 | 1 GSPS | 1 | 710 mW | 49.8 | 49 / 65 [R] |
| Dual Channel | 8 | 500 MSPS | 2 | 710 mW | 49.8 | 57 / 60 [R] |
| Quad Channel | 8 | 250 MSPS | 4 | 710 mW | 49.8 | 57 / 67 [R] |
HMCAD1510 | Single Channel | 8 | 500 MSPS | 1 | 295 mW | 49.8 | 49 / 65 [R] |
| Dual Channel | 8 | 250 MSPS | 2 | 295 mW | 49.8 | 59 / 69 [R] |
| Quad Channel | 8 | 125 MSPS | 4 | 295 mW | 49.7 | 60 / 69 [R] |

[R] Excluding Interleaving Spurs.

[3] Supply Voltage (Vdd): +1.8 Vdc Analog Supply (AVdd) and +1.8 Vdc Digital Supply (DVdd)

[4] Output Supply Voltage (OVdd): +1.7 to +3.6 Vdc

You may choose from a variety of HMC PLL+VCO combinations specific to your application

Analog-to-Digital Converter Solutions: [adc@hittite.com](mailto:adc@hittite.com)

Visit us at www.hittite.com JUNE 2011
Spectrum Analyzers Featuring the HMCAD1520 In Precision Mode

HMC860LP3E
High PSRR DC Regulator
• 3.35 V - 5.6 V

HMC830LP6GE [1]
Wideband PLL + VCO
• 180 fs RMS Jitter
• Low Phase Noise,
-110 dBc/Hz @ 10 kHz

HMC880LP4E
5-Bit DVGA
• 30 - 400 MHz
• -4 to +19 dB Gain
• +40 dBm OIP3

HMC680LP4E
5-Bit DVGA with Differential Outputs
• 30 - 400 MHz
• -4 to +19 dB Gain
• +40 dBm OIP3

HMCAD1520
Quad Channel Precision Mode
14-Bit A-to-D Converter
• 80 / 105 MSPS
• Integrated Cross Point Switch (Analog Mux)

[1] You may choose from a variety of HMC PLL+VCO combinations specific to your application
Medical & Industrial Imaging (Ultrasound) Featuring the HMCAD1100/1101/1102

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<th>Resolution (bits)</th>
<th>Sample Rate</th>
<th># of Channels</th>
<th>Power Dissipation [2][3]</th>
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<th>SFDR (dBc)</th>
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<td>51 mW / Channel</td>
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<td>41 mW / Channel</td>
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[2] Supply Voltage (Vdd): +1.8 Vdc Analog Supply (AVdd) and +1.8 Vdc Digital Supply (DVdd)
[3] Output Supply Voltage (OVdd): +1.7 to +3.6 Vdc
[1] You may choose from a variety of HMC PLL+VCO combinations specific to your application
Hittite’s Ultra High Speed GSPS A/D Converters

In addition to the standard product, 3 to 1000 MSPS ADCs, Hittite offers ultra high bandwidth, non-interleaved flash and folding/interpolating-flash ADCs. These ADCs are capable of operating at sampling rates up to 26 GSPS and leverage Hittite’s industry-leading track-and-hold design patents and advanced packaging capabilities. Operating over the full -55 °C to +85 °C temperature range, these ADCs are fully capable of supporting sub-sampling applications into Ku-band, and are ideal for wideband receiver systems and test instrumentation applications. Hittite can develop advanced flash and folding/interpolating-flash architecture ADCs to meet your custom specifications.

Atmospheric LIDAR Featuring the HMC5448 8-Bit, 5 GSPS A/D Converter

Please Contact: adc@hittite.com for Information on the HMC5448 Ultra High Speed ADC

[1] You may choose from a variety of HMC PLL+VCO combinations specific to your application
Radio Astronomy Featuring The HMC5831 3-Bit, 26 GS/s A/D Converter

**HMC5831**
- 3-Bit, 26 GS/s ADC
- 10 GHz Full Bandwidth
- 20 GHz / 10 GS/s Clock / Data Rate
- 256 mVp-p Single-Ended RF Input Level

**HMC577LP3E**
- SPDT Switch
- DC - 20 GHz
- > 45 dBm Isolation

**HMC572LP3E**
- Analog VGA
  - 0.5 - 6.0 GHz
  - -35 to +15 dB Gain Control
  - +28 dBm OIP3

**ADC**
- Clock ÷ 8

**PLL**
- x 2
- 2:1 Selector
- 4 GHz
- 20 GHz
- 10 GSPS

**REF +5V**
- +3V
- +5V

**FPGA**
- 10 GSPS
- 10 GSPS

**TFF Q**
- 2 GHz
- Clock x 8

**HMC749LC3C**
- 26 GHz T Flip-Flop
  - 18 / 17 ps Rise / Fall Time
  - 2 ps Deterministic Jitter
  - 0.6 to 1.2 Vp-p Differential Output Voltage Swing

**HMC859LC3**
- Clock Divide-by-8
  - Up to 26 GHz Clock Rate
  - 19 / 17 ps Fast Rise / Fall Times
  - 146 ps Propagation Delay

**HMC749LC3**
- Fractional-N PLL + Sweeper
  - DC to 8 GHz
  - Low Phase Noise: -112 dBc
  - -23 dBm Output

**HMC837LP6E**
- PLL + VCO
  - 1.025 - 4.6 GHz
  - Low Phase Noise, < -111 dBc/Hz @ 10 kHz

**HMC859LC3B**
- 14 Gbps 2:1 Diff. Selector
  - 19 / 20 ps Rise / Fall Time
  - Propagation Delay: 87 ps
  - 0.5 to 1.3 Vp-p Differential Output Voltage Swing

**HMC780LP3E**
- High PSRR DC Regulator
  - 3.35 V - 5.6 V

**HMC860LP3E**
- Wideband Driver
  - DC - 20 GHz
  - 15 dB Gain
  - +24 dBm Saturated Output Power

**HMC941**
- 5-Bit DATT Chip
  - 1 - 30 GHz
  - 15.5 dB Step Attenu. (0.5 dB)

**HMC580LP5E**
- VCO with Fo/2 & Fo/4 Output
  - 9.5 - 10.8 GHz Fo
  - Low Phase Noise, < -110 dBc/Hz @ 10 kHz
  - < 11 dBm Pout

**HMC703LP4E**
- Fractional-N PLL + Sweeper
  - DC to 8 GHz
  - Low Phase Noise: -112 dBc
  - -23 dBm Output

Please Contact: adc@hittite.com for Information on the HMC5831 Ultra High Speed ADC