



A passion for performance.

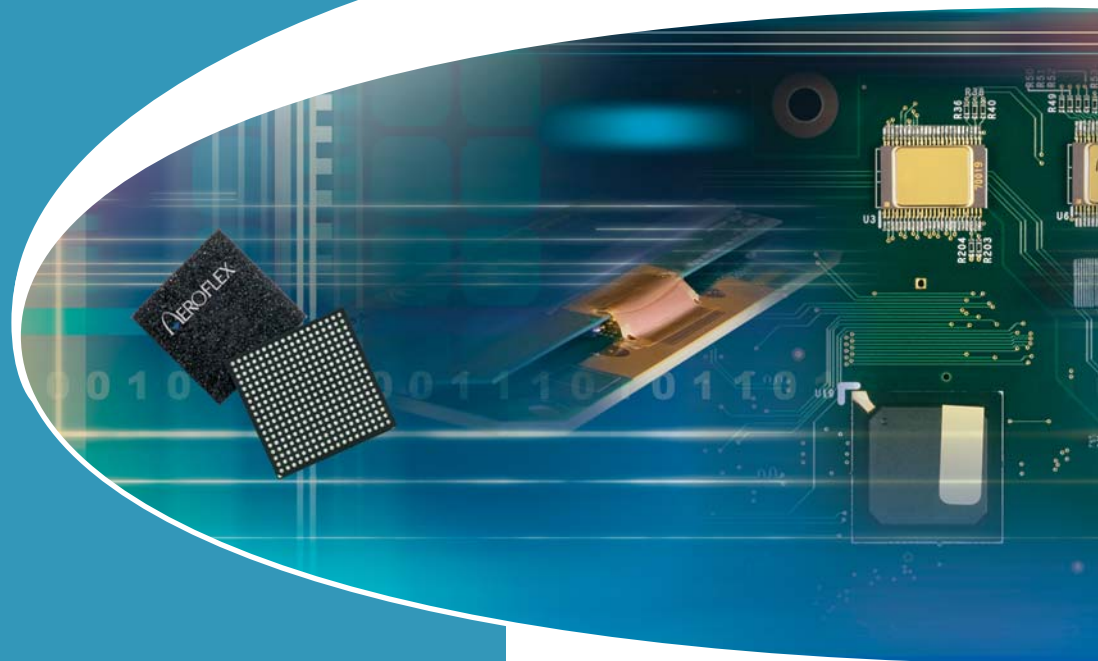
Mixed-Signal solutions  
from Aeroflex  
Colorado Springs

Standard products

Custom ASICs

Mixed-Signal modules

Circuit card assemblies



**Mixed-Signal**  
From ICs to Systems

# MIXED-SIGNAL SOLUTIONS ~ FROM ICs TO SYSTEMS

Aeroflex Colorado Springs has earned a reputation for excellence, based on our design methodology, technical expertise, rigorous quality system, competitive prices, and on-time delivery. Our design experts have delivered more than 700 complex high-performance designs to over 140 customers.

Aeroflex is a fab-independent semiconductor supplier with the flexibility to choose among numerous world-class processes that offer exceptionally high performance at low cost for your design. We exploit the advantages of third-party wafer fabrication and have installed our own process modules into commercial foundries. We boast a high rate of first-pass design success.

## Our Mixed-Signal Specialties

### Sensitivity

- | Capable of processing weak signals in noisy environments
- | High-resolution data conversion – 16 to 21 bits
- | Low noise, high dynamic range converters > -103dbSNR
- | Low power < 2mW/channel
- | Excellent channel isolation > -110dB

### Density

- | Extreme integration: up to 512 channels on a single chip
- | High level of integration includes control, signal processing, memory, programmability, power management, and embedded processors

### Security

- | All processing and encryption on-chip
- | Sensitive data stays on-chip until encrypted

### Reliability

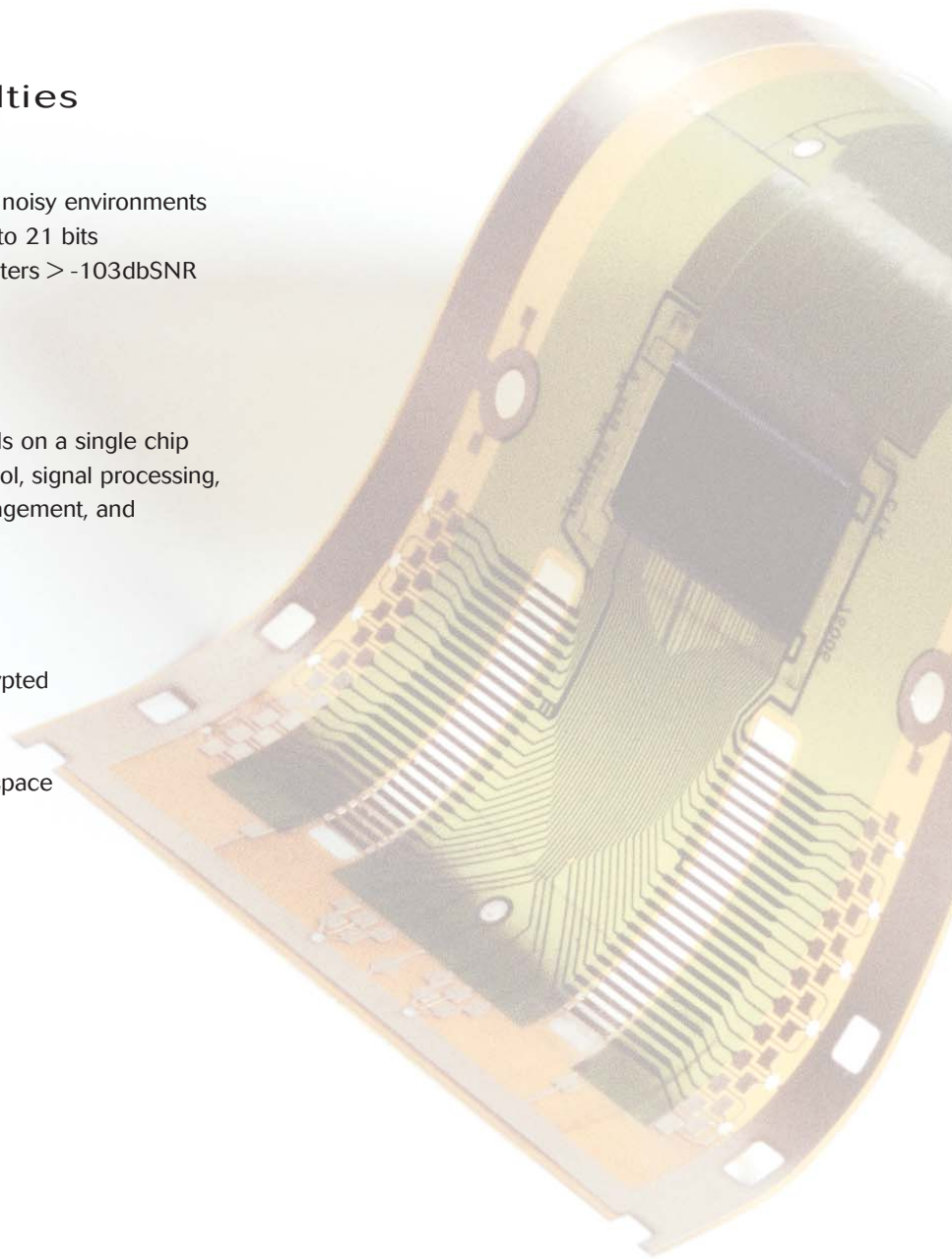
- | Extensive medical, industrial and aerospace experience
- | Extended temperature range
- | Radiation tolerant options

### Flexibility

- | Die sales up to board-level solutions
- | Device programmability

### Innovation

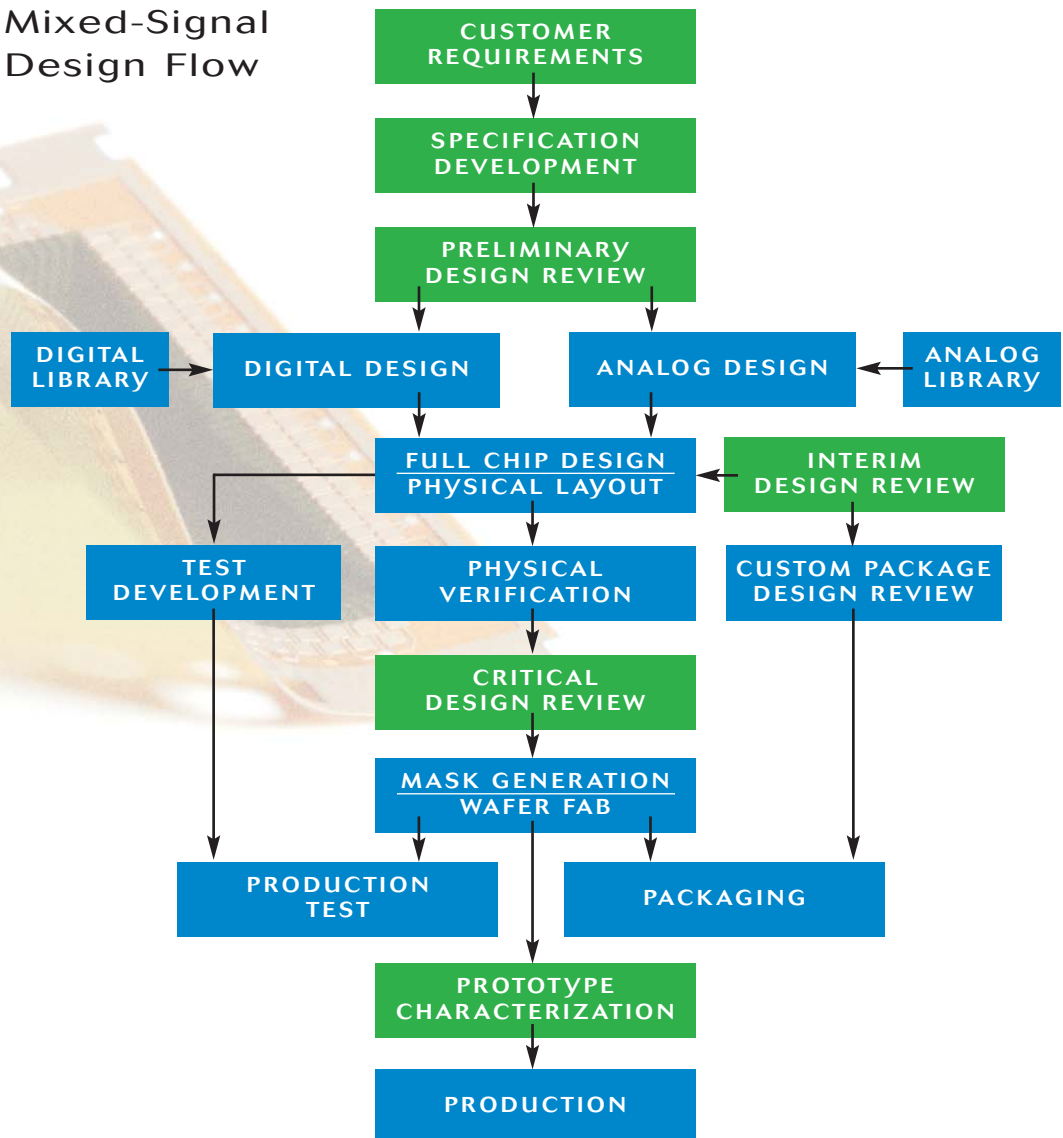
- | Broad technology portfolio
- | Extensive design expertise



# Mixed-Signal Process Technologies

	0.13μm CMOS	0.18μm CMOS	0.35μm CMOS
Metal layers	6-8 Al/Cu	5-6 Al	3-4 Al-Cu
Capacitors	MiM	MiM	MiM/PiP
High-value resistors	Yes	Yes	Yes
High voltage support	3.3V	5V, 20V	5V, 10V, 30V
Digital/analog supply voltages (VSS=0)	3.3, 2.5, 1.8, 1.5, 1.2	5.0, 3.3, 1.8	10.0, 5.0, 3.3
Alternate analog supply voltages	±0.75V, ±1.65V	±0.9V, ±1.65V, ±2.5V	±1.65V, ±2.5V, ±5.0V
Substrate isolation	Yes	Yes	Yes
Maximum toggle frequency	5.0GHz	2.4GHz	375MHz
Power consumption (nW/MHz/gate)	10	20	150
Gate delay (25°C)	20ps	50ps	140ps
Flip-chip I/O available	No	Yes	Yes
5V compliant and tolerant	No	Yes	Yes

## Mixed-Signal Design Flow



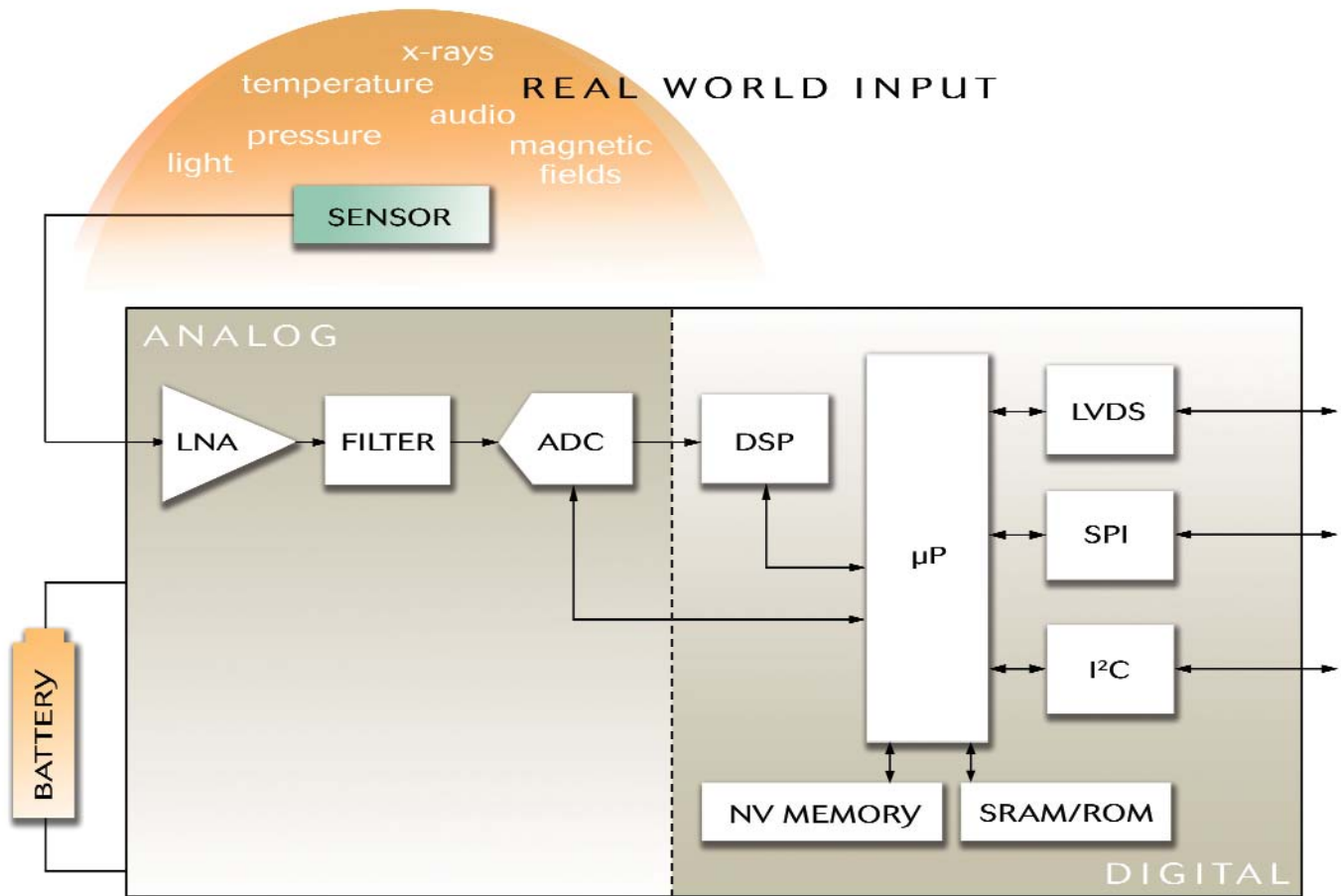
# Intellectual Property and Capabilities

## APPLICATION

## AEROFLEX SOLUTION

Signal processing	Switched capacitor filters, custom DSP, Opamps, instrumentation amplifiers, peak detectors, rectifiers
Data conversion	Sigma-Delta, Flash, Pipeline, SAR ADCs, Sigma-Delta, R2R, multiplying and segmented DACs; speeds >100MHz; resolution >20bits; up to 512 channels with >110dB isolation
Power management	Switching regulators, LDOs, bandgap references, negative supply generation (e.g. $\pm 5V$ ), power-on reset, bias current generators
Clock generation	RC and crystal oscillators, phase-locked loops (PLL), delay-locked loops (DLL), clock trees
Embedded control	LEON 3FT, ARM9, ARM7, 8051, 68HC11, watchdog circuits
Memory	Flash to >40MHz, EEPROM, SRAM, multi-port RAM, FIFO, ROM
Interface	USB2.0, USB1.1, IEEE 1394, Serial (I2C, SPI, TWI), PCI, LVDS, RS-232 ( $\pm 5V$ , $\pm 10V$ ), RS-485, UARTs
Portable design	1.8V circuits, low power design techniques
RadTolerant circuits	Most circuits available 100-300 krad(Si)

## Example of a Real-World Mixed-Signal Solution



# Mixed-Signal Capabilities ~ From ICs to Systems

## 64-channel RadTolerant security imaging ASSP

- | 64 parallel ADC channels
- | 2ksp/s to 100ksp/s sample rate
- | Programmable resolution — 14, 16, 18 bit
- | 6 programmable gains (40:1)
- | On-chip temperature sensor
- | SPI configurable
- | LVDS output
- | RadTolerant to 200 krad(Si)
- | Plastic  $\mu$ BGA



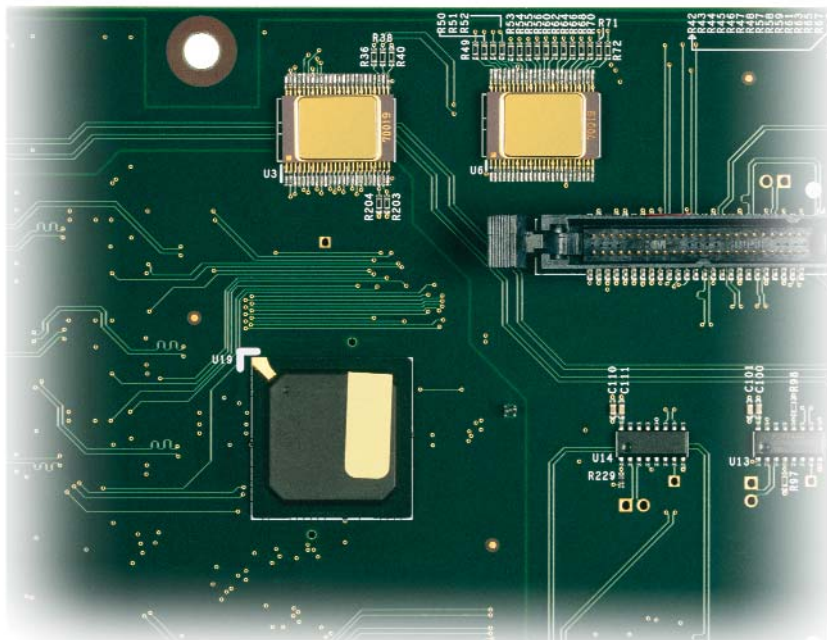
## Flip-Chip-on-Flex technology

- | Flex dimension 40x16mm (typical)
- | Die bump pitch to 250 $\mu$ m
- | Solder pitch to 450 $\mu$ m
- | ACF pitch to 100 $\mu$ m



## Complete system solutions

- | Custom PBC design
- | Customized firmware
- | RadTolerant electronics
- | Custom power, communications, control, and timing



## TYPICAL APPLICATIONS

### MEDICAL

- Computed Tomography
- Oncology Therapy Imaging
- Ultrasound



- Biometric Readers

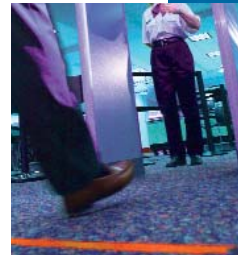


- Glucose Monitors

- Pulse Oximetry

### INDUSTRIAL

- Machine Vision
- Pattern Recognition
- Point-of-Sale



- Barcode Scanners

- Process Monitoring

- Rotation Encoders/Decoders

- Telemetry

### SECURITY

- X-Ray Screening
- Building Access
- Alarm Systems
- Magnetic Stripe Readers

# What Aeroflex Can Do For You

## One-stop shopping

- | From specification through production
- | All design and layout performed in-house
- | Flexible design interface

## World-class foundry partners

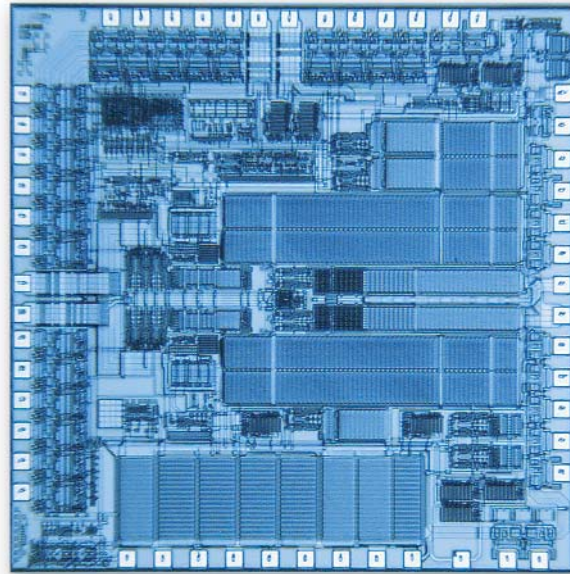
- | Mixed-Signal CMOS, BiCMOS high-voltage, and non-volatile CMOS to 0.13 $\mu$ m
- | ISO-9001/AS9000 certified; QML-Q/QML-V

## In-house test and assembly

- | Class 100 assembly clean room
- | Test floor with digital, memory and Mixed-Signal automated test equipment
- | Fully-equipped on-site failure analysis lab
- | Package development

## In-house circuit card design and assembly

- | Mentor and Cadence circuit card design tools



**AEROFLEX**  
A passion for performance.



Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.

**WEB SITE** [www.aeroflex.com/MixedSignal](http://www.aeroflex.com/MixedSignal)

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