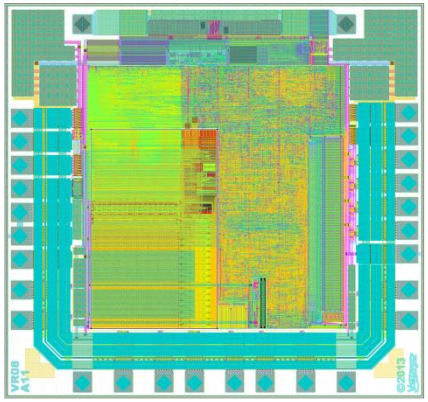
RADLogic

www.radlogic.com.au

Rob Clarke

Mixed-Signal IC Design Services

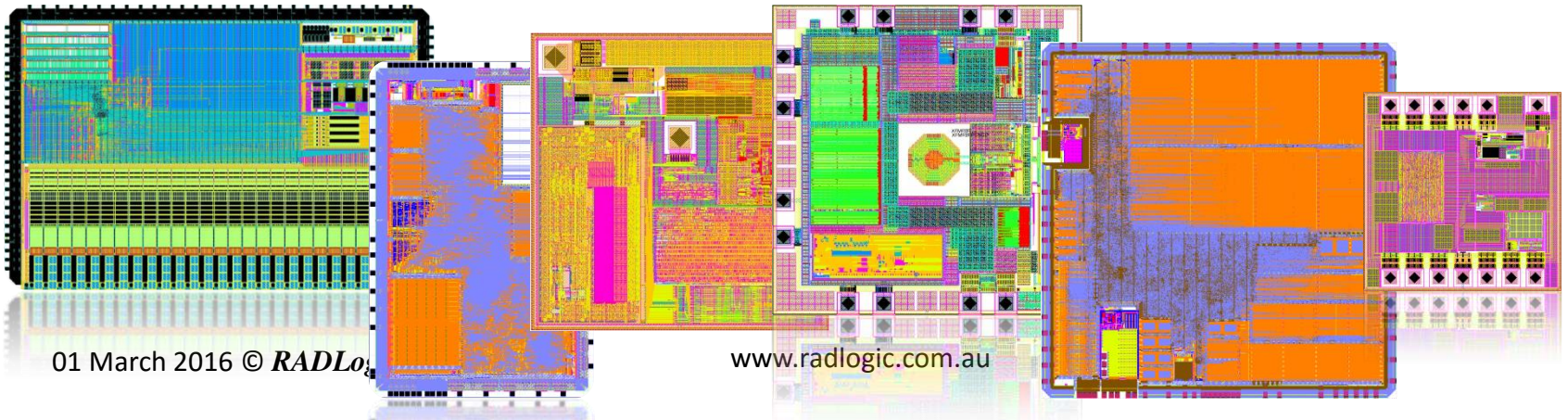
From Concept



To Reality

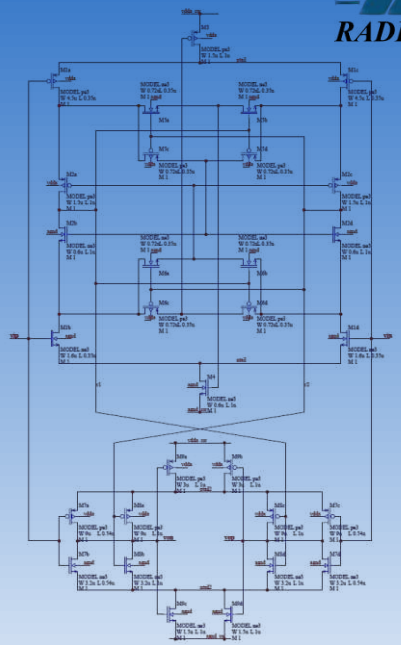
CMOS Analog, Digital and Mixed-Signal IC Design Services

- Incorporated in 1990, currently 5 engineers, extensive experience.
- Full or Partial Design Services, offered world-wide.
- Not a manufacturer, but can assist customers with Wafer Foundry Interface, etc.
- Technology & Applications determined by our customers
- 10,000 to 10M transistor complexity
- Typical Processes: CMOS 130nm & 180nm, 55nm, 6-layer metal

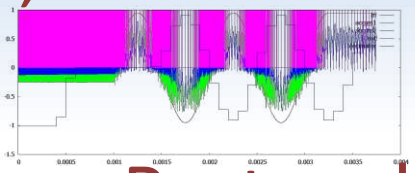


```
module adc_format
  (
   output [15:0] out, // Output to memory (for pads use out[15:4])
   input [21:0]  in,  // Inout from decimator (before any limiting)
   input [2:0]   osr, // Oversampling Ratio
   input [3:0]   shift,         // Selector for 16 bits from the 21
   input         use_unsigned   // dont convert to 2's complement is asserted
   );
   wire [20:0]   jamout;        // intermediate signal all 1's for limited

   wire [20:0]   decout;        // Decimator output (before shifter)

   wire          osr128;        // osr[]=000 128x oversampling
   wire          osr64;         // osr[]=001 64x oversampling
   wire          osr32;         // osr[]=010 32x oversampling
```

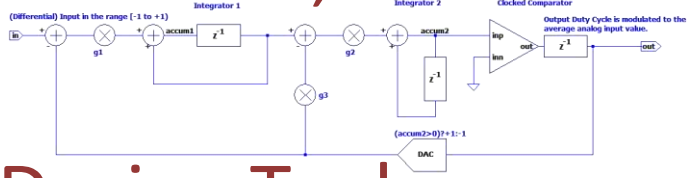
Capabilities



- Full Chip Design and Development
- Analog and Digital IP Development
- Test Development & Support
- HDL (VHDL, Verilog), Analog Design, Simulation, Layout and Verification



- RFID, RF, USB, Processor Architecture, Protocol Engines, Signal Processing.

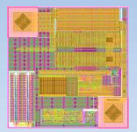


- Mentor, Cadence, Synopsys Design Tools

RFID

- Standard Protocols: ISO 14443, NFC, ISO 15693, ISO 18000-3 Modes 1,2, UHF EPC Gen2/ISO18000-6

- Characteristics:
  - RF Powered.
  - Low Power, Low Cost, Low Pin Count (2 pins), small chips.
  - ~30% Analog, 30% Digital, 30% Memory.
  - AFE includes Rectification, Voltage Regulation, Clock extraction/ generation, Command demodulation, Reply modulation.
  - Digital includes Command Decoding, Protocol Engine, Memory Management, Security Features (e.g., SHA).



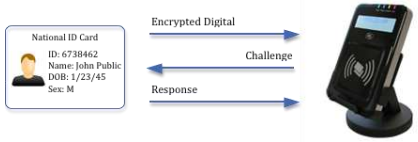
- Protocol Engine Generator: Rapidly creates low-power, minimal hardware that is extensible (interfaces to wired COMMs, security devices, etc).
- RADLogic licenses a synthesisable digital logic core for the EPC Gen2 UHF RFID Protocol, and also a UHF AFE design.

Example Applications

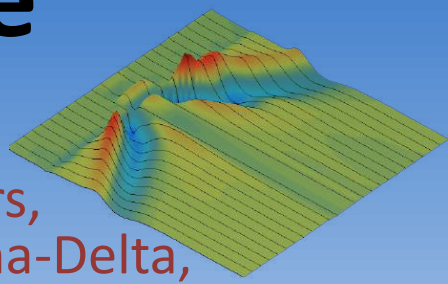
- RFID:
  - Authentication (Drugs, Security, Print Cartridges), Tracking (Medical, Aeronautical), Tagging (e.g, blood), Gaming (chips in chips), Meter Reading, …

- USB: Hubs, Bridges & Peripherals
- Medical: Neural Stimulation and Response measurement

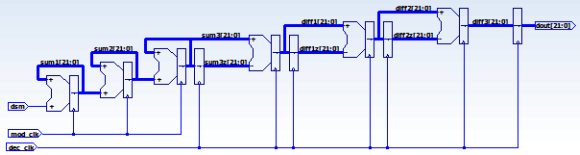
- Sensors: Temperature, Capacitive Touch, Optical, Frost, etc.
- Controllers: Display Controllers & Microcontrollers
- Silicon Fingerprints: Inherent process variation



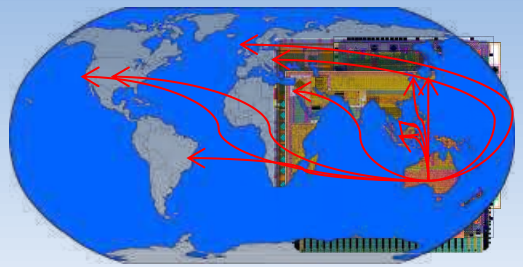
Summary & Experience



- Analog Experience:
  - Power Supplies, PLL, DLL, Demodulators, modulators, Amplifiers, Filters & Comparators, ADC & DAC (Sigma-Delta, Switched Capacitor, Resistive), RF Transmission (900MHz), Memory Design (RAM, ROM, EEPROM/MTP), I/O Pads, …
- Digital Experience:
  - Processor Architecture, State Machine & General Logic design, HDL Coding, Test benches, High Level Modelling, FPGA prototyping, Logic Synthesis, Place & Route, Timing Closure, etc.
- Other
  - High Voltage Processes
  - Printed Electronics (Silicon Ink)
  - Optical sensors (Photo-sensors and SPADs)
  - MEMS (Printer Ink Application)
  - Liquid Crystal on Silicon (LCOS)



Thankyou for Listening



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