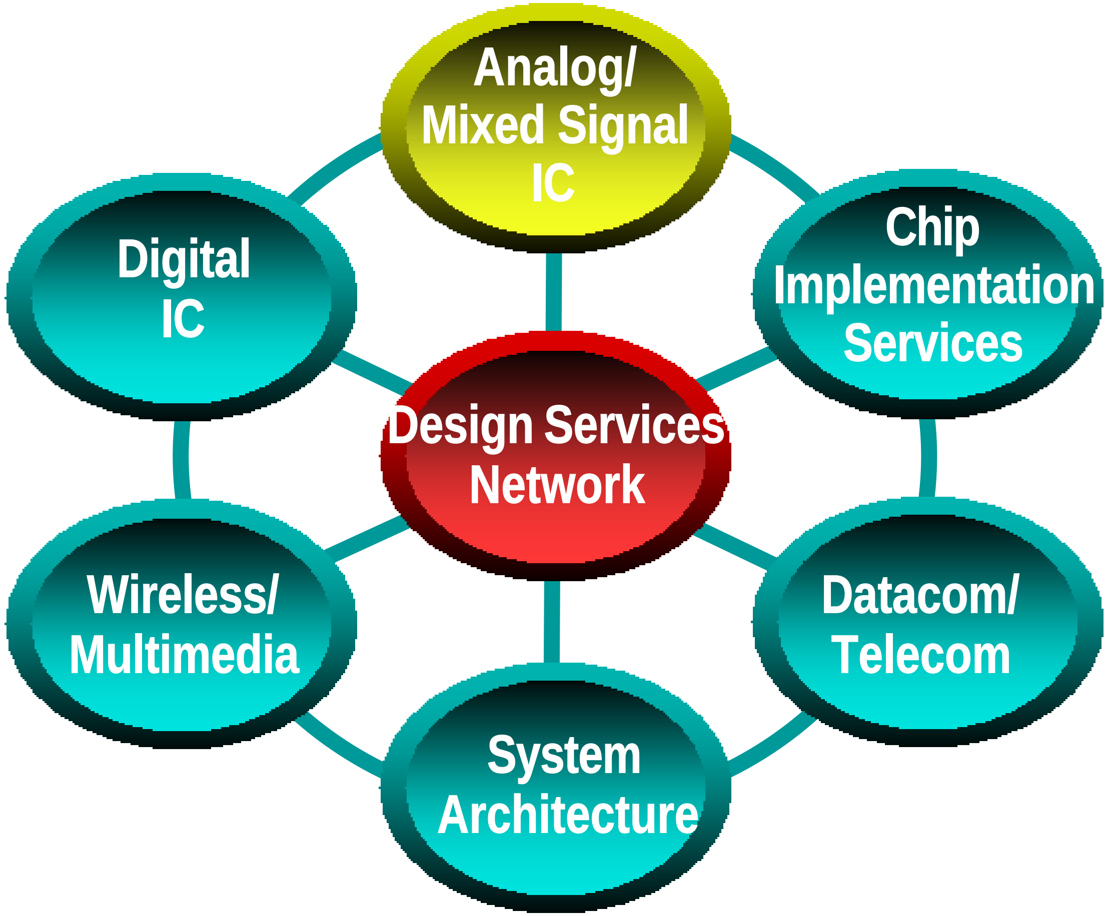
Analog / Mixed-Signal IC Design Services

Julien Ardelean Consulting

Design Services Collaboration Network



Design Companies

FRANCE
ITALY
GERMANY

Mission Statement

- Provide world-class designs for **analog/mixed-signal** products
  - Examples: smart sensors applications, automotive applications, printer applications, telecom/multimedia applications, wireless applications, general purpose libraries, discrete components, ……
- World-class acquired design expertise for **smart sensors** applications

Analog/Mixed-Signal Design Services

- Specialized in smart sensors / automotive products development
  - End-to-end product design
  - Smart sensors designs
  - Complex ASIC and SoC designs
  - Analog Macrocells for SoC designs
- Enhanced partnership with complementary Design Companies
  - Wireless/Multimedia
  - Wireline, Physical Interfaces
  - Printers
  - Digital IC
  - System Architecture

Market Target Focus

- Smart Sensors and Automotive
- Smart Power
- Multimedia Video & Audio
- Wireless RF & IF Communications
- Broadband Networking Transceivers

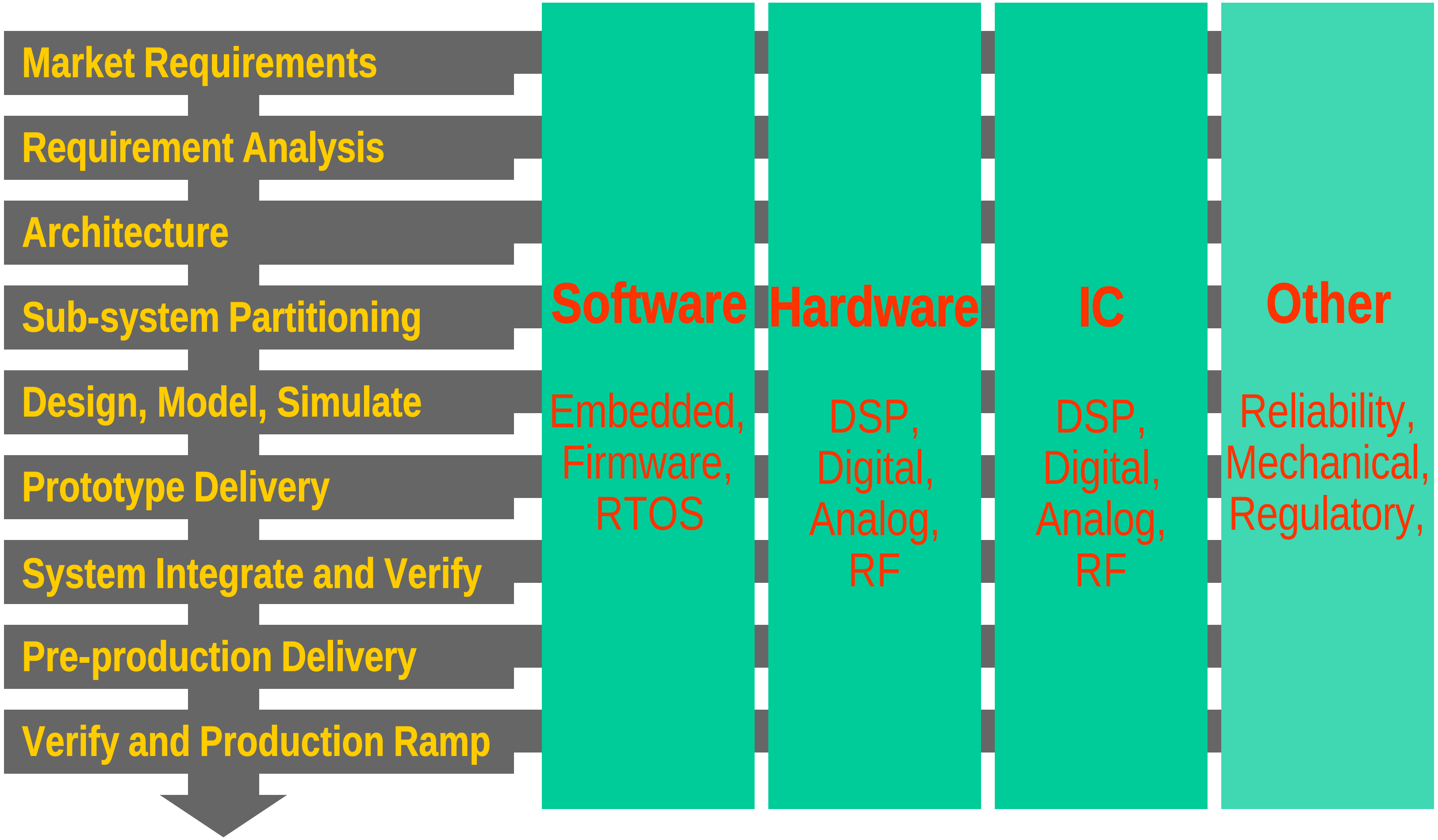
Core Competencies

- Analog Mixed Signal Specification Development
- Technology Selection
- Architecture Trades
- Circuit and Physical Design/Verification
- Post GDS test, debug & characterization
- Process Retargets
- Multiple Sourcing (1 Design to Multiple Foundries)
- Project Management

Skill Set

- **Specialized Industry Skills**
  - Knowledge of industry specifications for several application domains
  - Deep Smart Sensors experience
  - Experience with network work methods
- **Pre-built IP Blocks for Rapid Product Development**
  - instrumentation amplifiers
  - low-noise pre-amplifiers
  - specific drivers
  - voltage regulators
  - etc.
- **Broad Design Capabilities**
  - All phases of design, from concept through implementation and test
  - Full range of implementation technologies: chip and board design; digital, analog and software

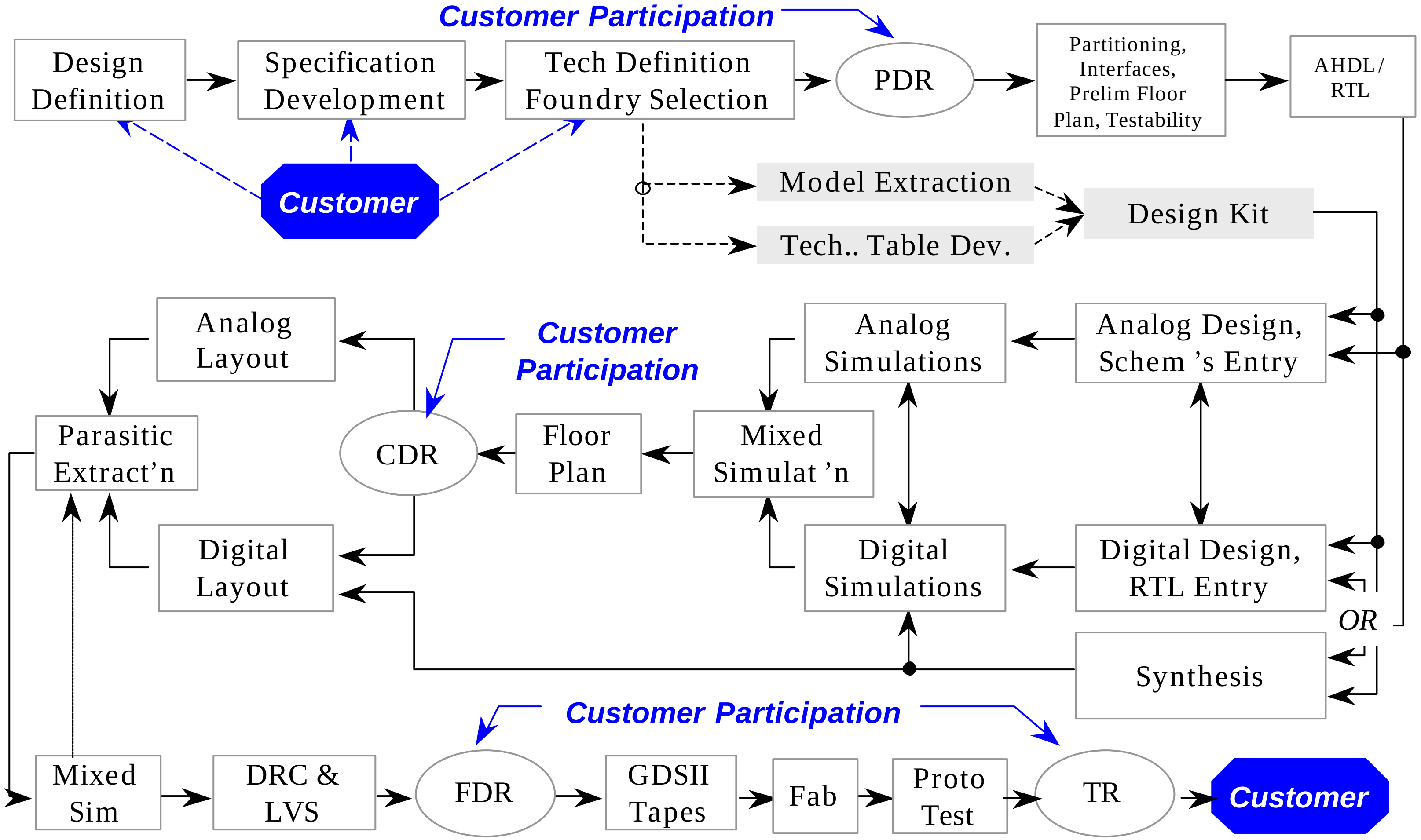
Complete Development Capability



- Market Requirements
- Requirement Analysis
- Architecture
- Sub-system Partitioning
- Design, Model, Simulate
- Prototype Delivery
- System Integrate and Verify
- Pre-production Delivery
- Verify and Production Ramp

Software	Hardware	IC	Other
Embedded, Firmware, RTOS	DSP, Digital, Analog, RF	DSP, Digital, Analog, RF	Reliability, Mechanical, Regulatory,

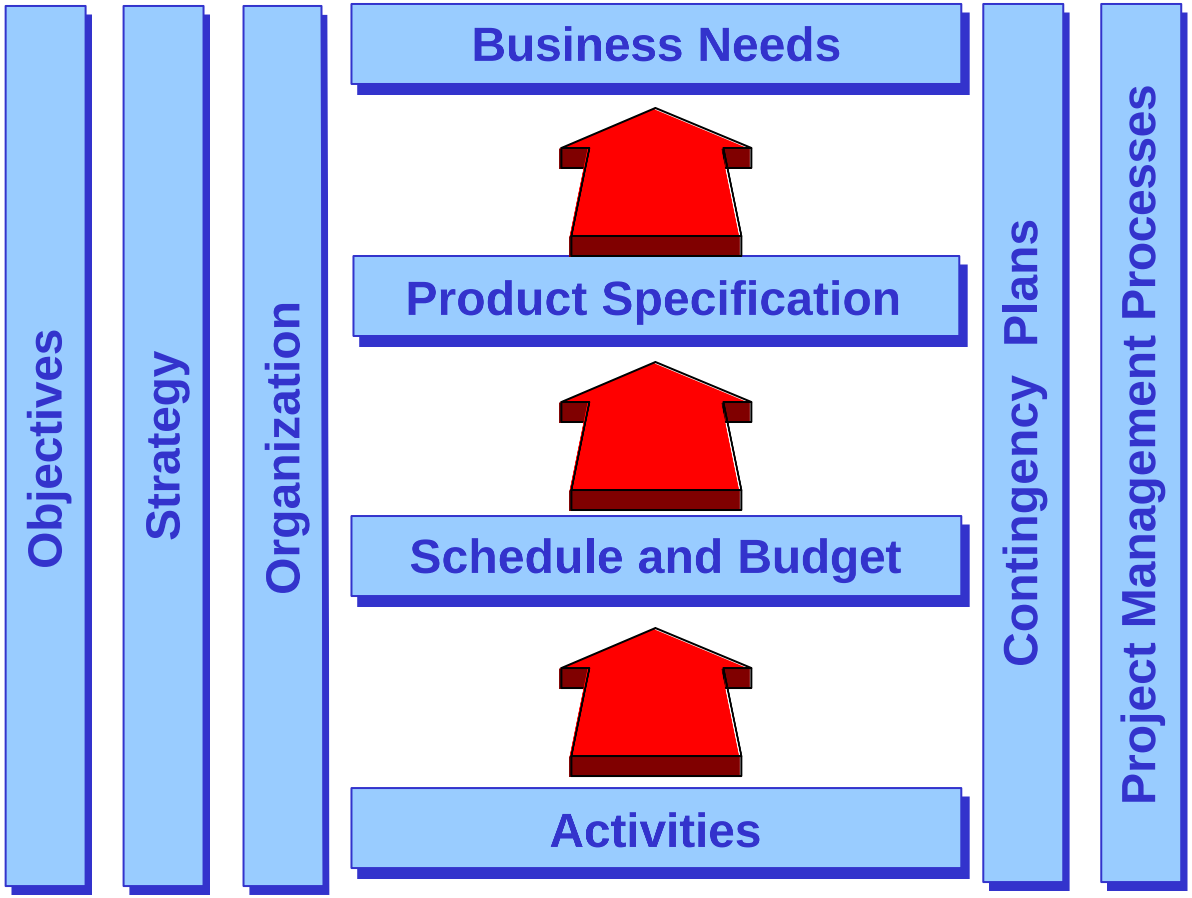
Mixed-Signal Design Flow



Project Management

Planning, **organizing** and **controlling** resources toward completing a series of activities, carried out against an agreed-upon schedule and budget

Time-to-Market Challenges and Time-to-Market Commitment



Objectives

Strategy

Organization

Business Needs

Product Specification

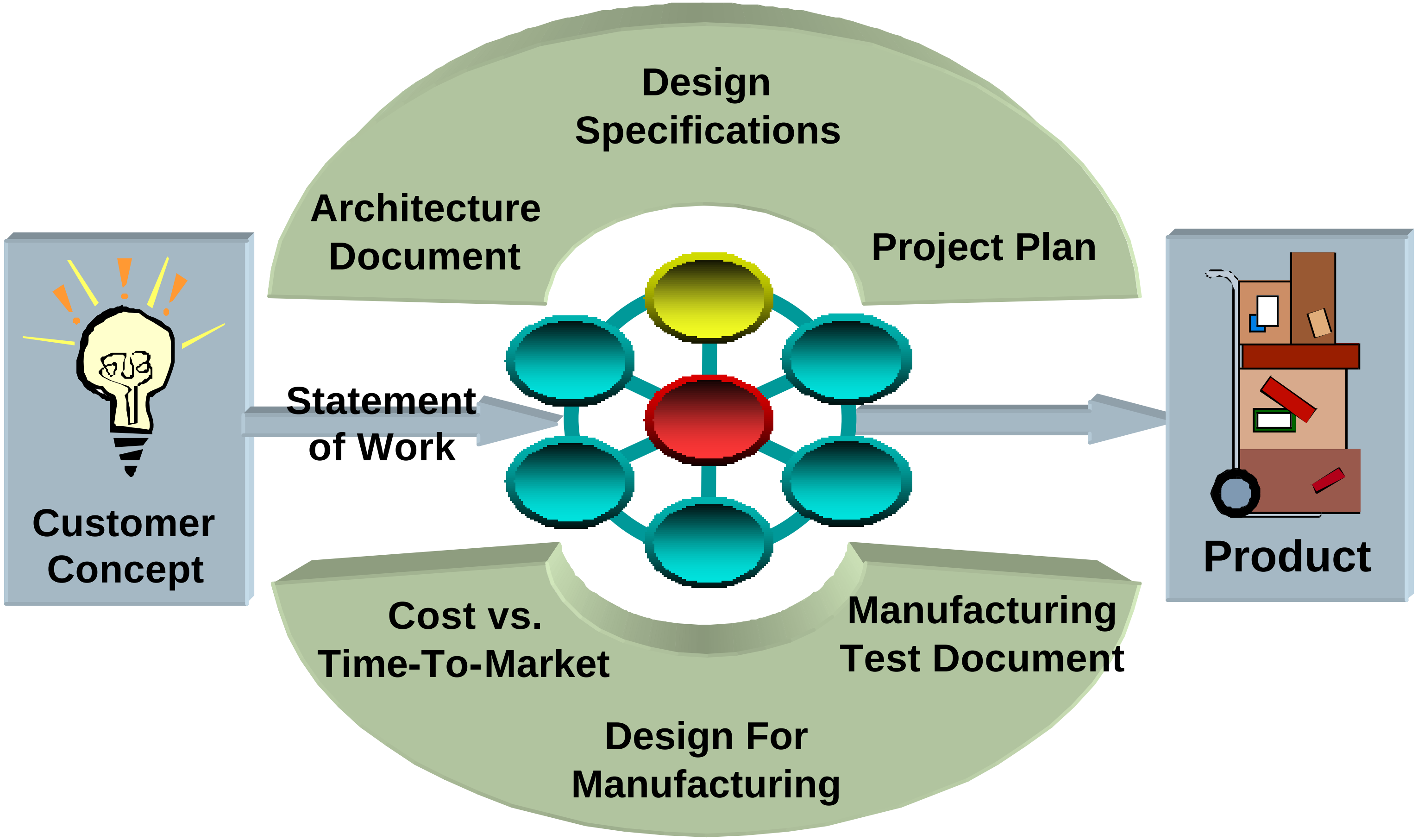
Schedule and Budget

Activities

Contingency Plans

Project Management Processes

Design Specifications Assumptions



Design Specifications

Architecture Document

Project Plan

Customer Concept

Statement of Work

Product

Cost vs. Time-To-Market

Manufacturing Test Document

Design For Manufacturing

Success stories

The Pressure Sensor Interface IC for automotive applications

- automotive break system smart sensor
- for a foundry and third party customer

The Thermal Ink Jet Driver IC for printer applications

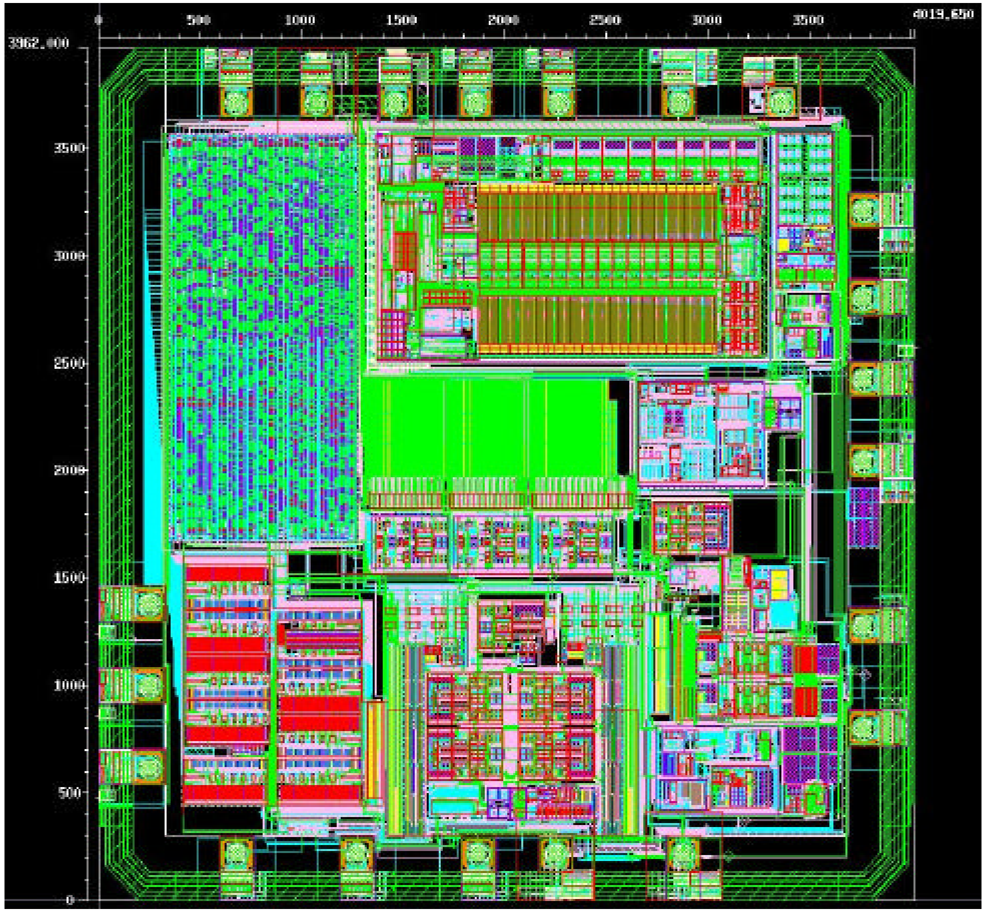
- low-cost ink jet printer head driver
- for a foundry and third party customer

The Spread Spectrum Clock Generator module for printer applications

- printer applications electromagnetic compliance solution
- for a foundry and third party customer

Pressure Sensor Interface IC

General considerations



- Pressure Sensor Interface IC
  - High performance analog design
  - First pass success required (time to market)
  - #I/O, Die size constrained (cost target)
  - 15 months design time
- Key Integrated Features
  - Linearity: 1% (full-scale)
  - Hysteresis: < 0.1%
  - Total error: 1.5% (full-scale and entire temperature range)
  - Temperature range: -40°C...+135°C
- Chip profile
  - 4.0 x 4.2 sqmm die
  - 0.5 µm, HF5CMOS process

First pass silicon success; high customer satisfaction

Pressure Sensor Interface IC

Complementary Expertise

✍ **Customer**

- Applications expertise
- System-level specification & design
- High volume electronics manufacturing & distribution

✍ **JAC**

- IC mixed signal design
- Proven mixed-signal flow
- Architecture
- Silicon implementation services
- Analog/mixed-signal test and characterization
- Program and project management

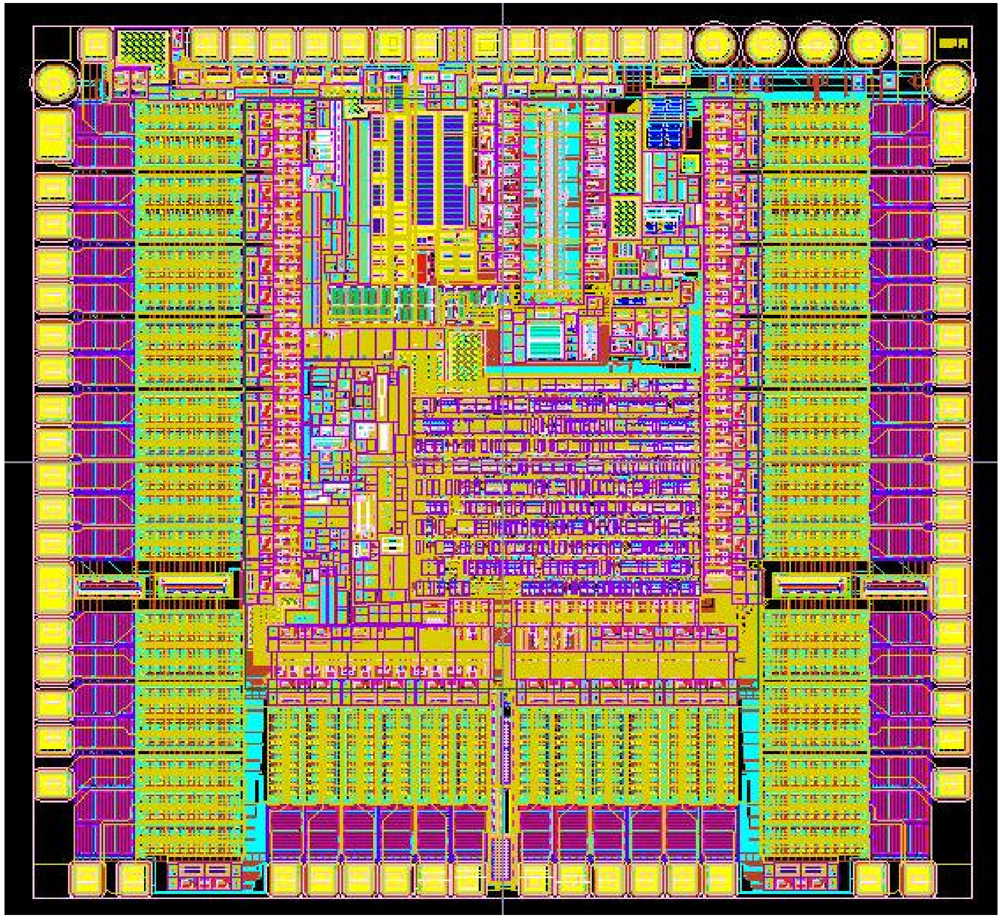
Pressure Sensor Interface IC

Responsibilities & Deliverables

- **Customer Responsibilities**
  - Product specifications
  - System-level IC design constraints
  - Digital communication protocol
- **Deliverables**
  - Specification development
  - Architecture
  - Board level and IC design constraints
  - Technology Selection
  - IC design to meet specifications
  - Full-chip GDSII physical design
  - Test and Debug/Characterization
  - Program and project management

Scooby Thermal Ink Jet Driver IC

General considerations



- ✍ Scooby TIJD IC
  - ✍ High performance analog design
  - ✍ First pass success required (time to market)
  - ✍ #I/O, Die size constrained (cost target)
  - ✍ 6 months design time
- ✍ Key Integrated Features
  - ✍ provides a lower cost pen driving solution
  - ✍ 48 nozzle resistor power drivers
  - ✍ 16V supply voltage
  - ✍ Temperature range: -25°C...+125°C
- ✍ Chip profile
  - ✍ 9 sqmm die
  - ✍ 0.5 µm, BCD3S process

First pass silicon success; high customer satisfaction

Scooby Thermal Ink Jet Driver IC

Complementary Expertise

✍**Customer**

- Applications expertise
- System-level specification & design
- High volume electronics manufacturing & distribution

✍**JAC**

- IC mixed-signal design
- Proven mixed-signal flow
- Architecture
- Silicon implementation services
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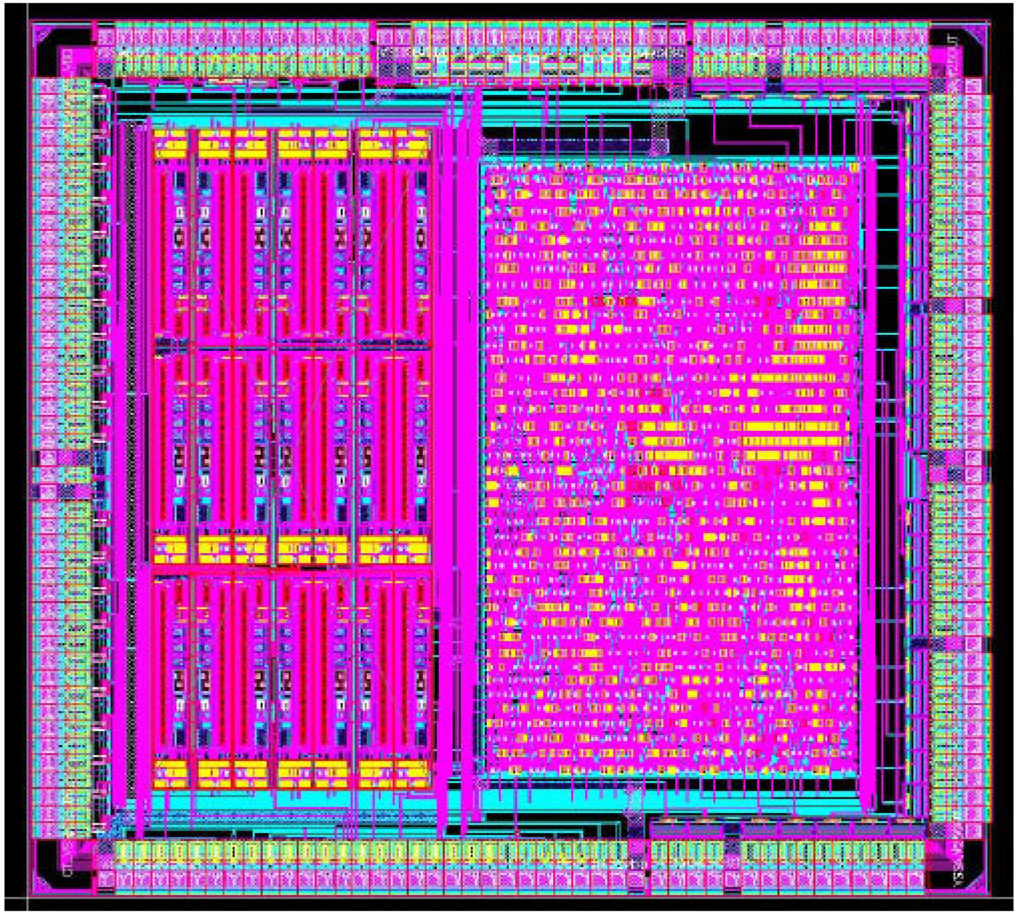
Scooby Thermal Ink Jet Driver IC

Responsibilities & Deliverables

- **Customer Responsibilities**
  - Product specifications
  - System-level IC design constraints
  - Digital protocol logic gate level net list
- **Deliverables**
  - Architecture
  - Board level and IC design constraints
  - IC design to meet specifications
  - Full-chip GDSII physical design
  - Test and Debug/Characterization
  - Program and project management

Biospace IC

General considerations



- ✍ Biospace IC
  - ✍ High performance analog design
  - ✍ First pass success required (time to market)
  - ✍ Die size constrained by #I/O
  - ✍ 3 months design time
- ✍ Key Integrated Features
  - ✍ including 20 Sigma-Delta 19bit A/D converters
  - ✍ low-noise inputs for wire chamber detectors
  - ✍ differential output drivers
  - ✍ Temperature range: 0°C...+70°C
- ✍ Chip profile
  - ✍ 35 sqmm die
  - ✍ 0.5 µm, BiCMOS process

First pass silicon success; high customer satisfaction

Biospace IC

Complementary Expertise

- **Customer**
  - Applications expertise
  - System-level specification & design
  - Architecture
- **JAC**
  - IC mixed-signal design
  - Silicon implementation services
  - Program and project management

Biospace IC

Responsibilities & Deliverables

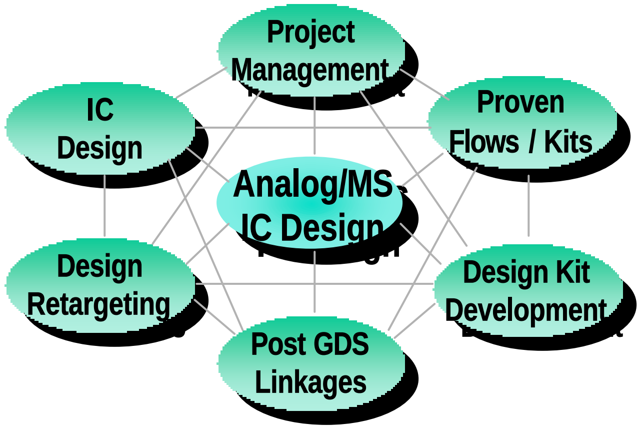
- **Customer Responsibilities**
  - Product specifications
  - System-level IC design constraints
  - Digital communication protocol specifications
- **Deliverables**
  - Architecture
  - IC design constraints
  - IC design to meet specifications
  - Full-chip GDSII physical design
  - Program and project management

Proven Process for Engagement and Delivery

Julien Ardelean Consulting provides…

- Rigorous delivery assurance and project management practices to ensure customer satisfaction
- Detailed Statement of Work and specifications
- Payments based on delivery to agreed specs and schedules
- Single focus for program management
- Established mechanisms for issue resolution

In Summary



Analog / Mixed-Signal IC Design Services

- ✍ **Broad Capabilities & Experience**
- ✍ **Growing Capacity of Rare Resources**
- ✍ **Analog/Mixed-Signal Experts**
- ✍ **Proven Track Record**
- ✍ **Customer Success Focused**

World-Class Design Capabilities to Time-to-Market Challenges