RF SYSTEM IN PACKAGE?

COMPLETE 3D RF SYSTEM INCLUDING

- **Multiple Semiconductors Dies**, Systems-on-Chip (SOC), Analog Functions, Digital & RF Functions, Passive Functions, Clocking, Power Management, Interface to Application on PCB, ...
- **Made of Heterogeneous Technologies** – CMOS, RF-CMOS, GaAs, SiGe, Quartz, Advanced Packaging Techniques, 3D packaging, IPD, Passive SMD, Organo-Metallic Substrates, Multilayer Ceramic Substrates, ...

PROMISE OF SiP

- **More Function in Less Space**
- **Optimized Cost and Reduced Design Cycles**
COMPANY

• ESTABLISHED IN 2005
• FABLESS RF SYSTEM-IN-PACKAGE (SiP) COMPANY
• PROVIDING TURN-KEY DESIGN SERVICES AND CREATIVE PACKAGING SOLUTIONS
• DESIGN TEAM – 9 PERMANENTS - 5 PHD & 4 MSc
• EXPERTS IN RF SYSTEM-IN-PACKAGE DESIGN
• FRANCE – TECHNICAL TEAM AT SOPHIA-ANTIPOLIS
• NORTH AMERICA – SUBSIDIARY IN DENVER SINCE 2008
• ASIA – SALES OFFICE IN TOKYO SINCE 2008

GOAL

• BECOME A KEY PLAYER IN MINIATURIZED WIRELESS TECHNOLOGY
• BECOME A LEADING SUPPLIER OF HIGHLY INTEGRATED CUSTOM SOLUTIONS FOR WIRELESS COMMUNICATIONS USING SYSTEM-IN-PACKAGE (SiP) APPROACH
READY-TO-USE RF MODULES / ANTENNA DESIGN IPs

DESIGN IN-HOUSE

PRODUCTION WITH MODULE MAKER / ASSEMBLY PARTNER

2.4 GHZ MODULES (PROPRIETARY, BLUETOOTH LOW ENERGY, ...), ...

HD VIDEO (WHDI), ...

DESIGN SERVICES

FEASIBILITY STUDY

DETAILED DESIGN

TEST AND DEBUG

SYSTEM-IN-PACKAGE

COMBINATION MODULES

ANTENNA-IN-PACKAGE
READY-TO-USE RF MODULES

TO BRING RAPIDLY INNOVATIVE PRODUCTS TO MARKET

MODULE DESIGN ADAPTED TO YOUR MANUFACTURING PROCESS

EASIER CERTIFICATION PROCESS (FCC/IC, Telec, ETSI, ...)

FULL SUPPORT DURING YOUR QUALIFICATION & PRE-PRODUCTION PHASES
BLE MODULE  ISP091201x

- Single Mode Bluetooth® Low Energy v4.0 Slave
- Based on Nordic Semiconductor nRF800x Family
- Includes Transceiver, Baseband and Software Stack
- Fully Integrated RF Matching and Antenna
- Ultra Low Power Consumption
- Single 1.9V to 3.6V Supply
- Smallest BLE Module on the Market
- 12mm x 8mm x 1.5mm
- Temperature -40°C to 85°C

Market

- All Devices Requiring Low Power Wireless Connectivity
NEED TO REPLACE HDMI CABLE?

- **Solution for High Definition Video Transmission**
- **Miniature RX and TX Modules**
- **Any Source to Any Display Device**
- **No Video/Audio Compression-Decompression**
- **No Latency**
- **Transmission with 30 Meter Range**
- **Baseband Chip - Amimon (Israel)**
- **5GHz Radio Chip - Maxim (US)**

**WHDI Transmitter Display Mini Card**
ISP091204 - 44.4 x 26.8 x 5 mm

**WHDI Receiver Module**
ISP100903 - 47 x 41 x 4.5 mm
CORE COMPETENCIES

- Any Wireless Connectivity to Fit Any Device Space
- System-in-Package (SIP) Design Approach
- Highly Integrated Antenna Design Expertise
- Unique Methods to Estimate Package Size and Performance
- Optimization Size/Cost/Time to Market
- Multiple Technologies: BT, FR4, LTCC, HTCC, Thick Film, PCB, IPD,...
- Multiple Assembly Methods: SMT, Wirebond, Flipchip, Embedded Dies...

TECHNICAL SUCCESSES

3G, ANT, BLE, Bluetooth®, GSM/W-CDMA, GPS, ISM, LTE, NFC, RFID, UMTS, UWB, WHDI™, WiFi, WLAN, Zigbee®...
THE STANDARD SiP DESIGN APPROACH

• BASED ON TRIAL AND ERROR ➔ TIME CONSUMING AND UNCERTAIN

• BASED ON CLASSICAL LAY-OUT METHODOLOGY COMING FROM LOW END PCB DESIGNS ➔ NOT USABLE FOR COMPLEX RF SiP DESIGN

“MOST SiP DESIGNS ARE JUST SMALL SURFACE MOUNT ASSEMBLIES USING CHIP AND WIRE FOR ICs AND CONVENTIONAL PASSIVES”

(DR LEONARD SCHAPPER - UNIVERSITY OF ARKANSAS – IEEE WORKSHOP COMO, JAN. 2007)

INSIGHT SiP HAS A UNIQUE DESIGN METHODOLOGY
FROM A REFERENCE DESIGN TO A HIGHLY INTEGRATED CUSTOM (RF) MODULE:

• PROPRIETARY SOFTWARE BRIDGES : CAD LAYOUT VS CAD RF SIMULATORS

• PROPRIETARY EMBEDDED COMPONENT MODELLING Routines

• EXTENSIVE 2.5D AND 3D RF SIMULATION

• SUBSTRATE DESIGN WITH COUPLING/MATCHING ANALYSIS

• MANUFACTURING AND SUPPLY CHAIN IMPLEMENTATION

• RF TEST, SYSTEM TEST, DEBUG AND CHARACTERIZATION
**Antenna In Package (AiP)**

- Laminate Substrate
- MCU & RF Transceiver
- Embedded Antenna
- 8x12 mm² QFN

**Application:**
- Wireless USB

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**Highly Integrated SiP**

**4 Chip SiP:**
- 12 x 12 mm
- 2 Memories
- 1 RF IC
- 1 Digital & Analog ASIC
- 3 Wirebonded Chips
- 1 Flip-chip Device