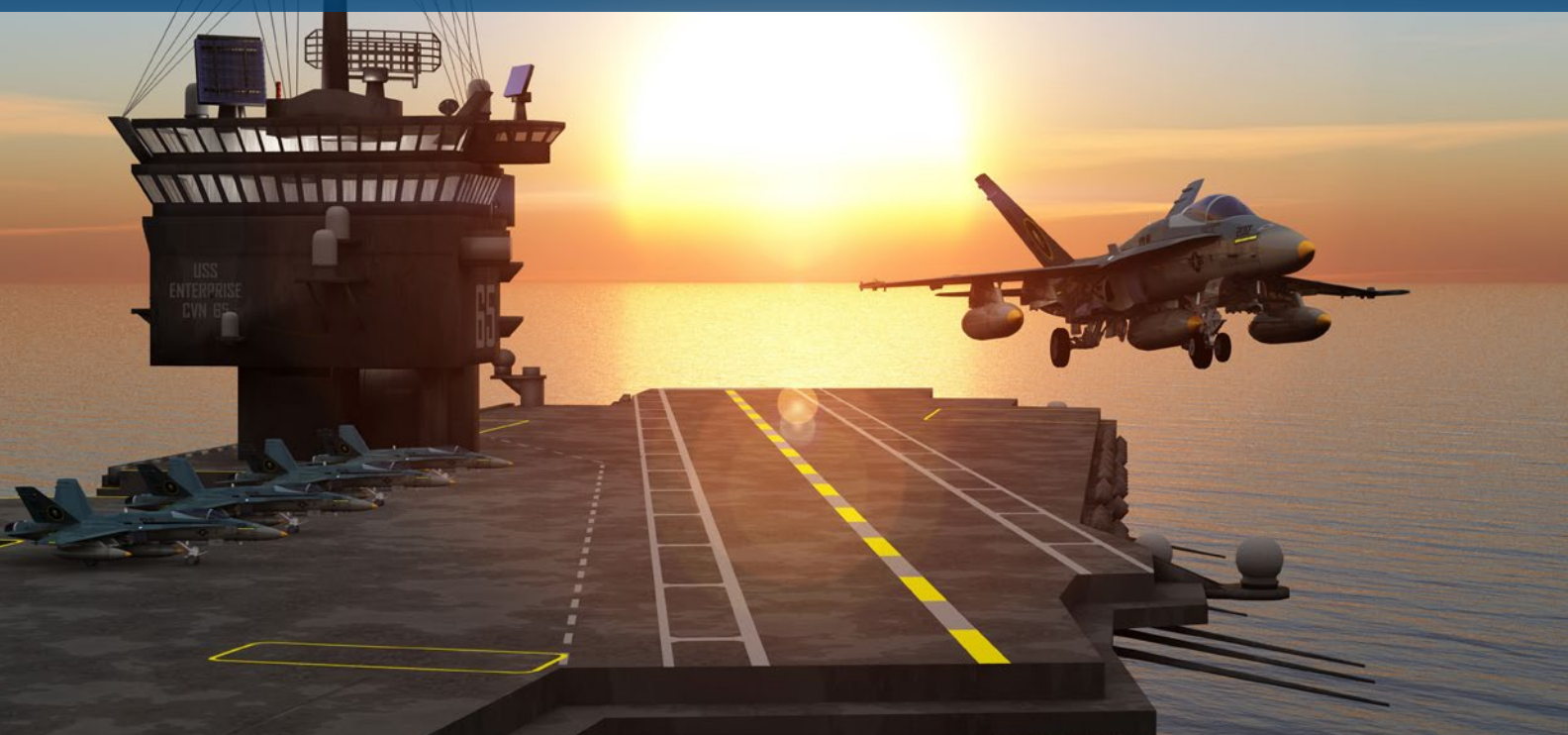


CUSTOM INTEGRATED SOLUTIONS



Application Specific Integration at Any Level MMIC to Subsystem

On-Chip



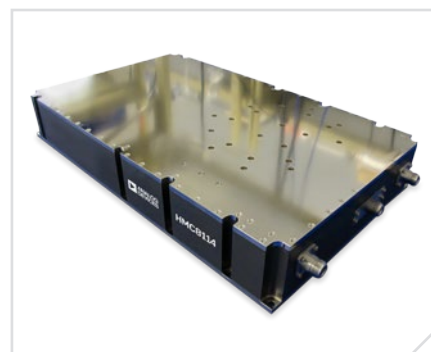
Custom MMICs/MCMs

In-Package



Multichip Components

Line Replaceable Units (LRUs)



Modules and Subsystems



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Custom Modules to Enable your High Reliability System

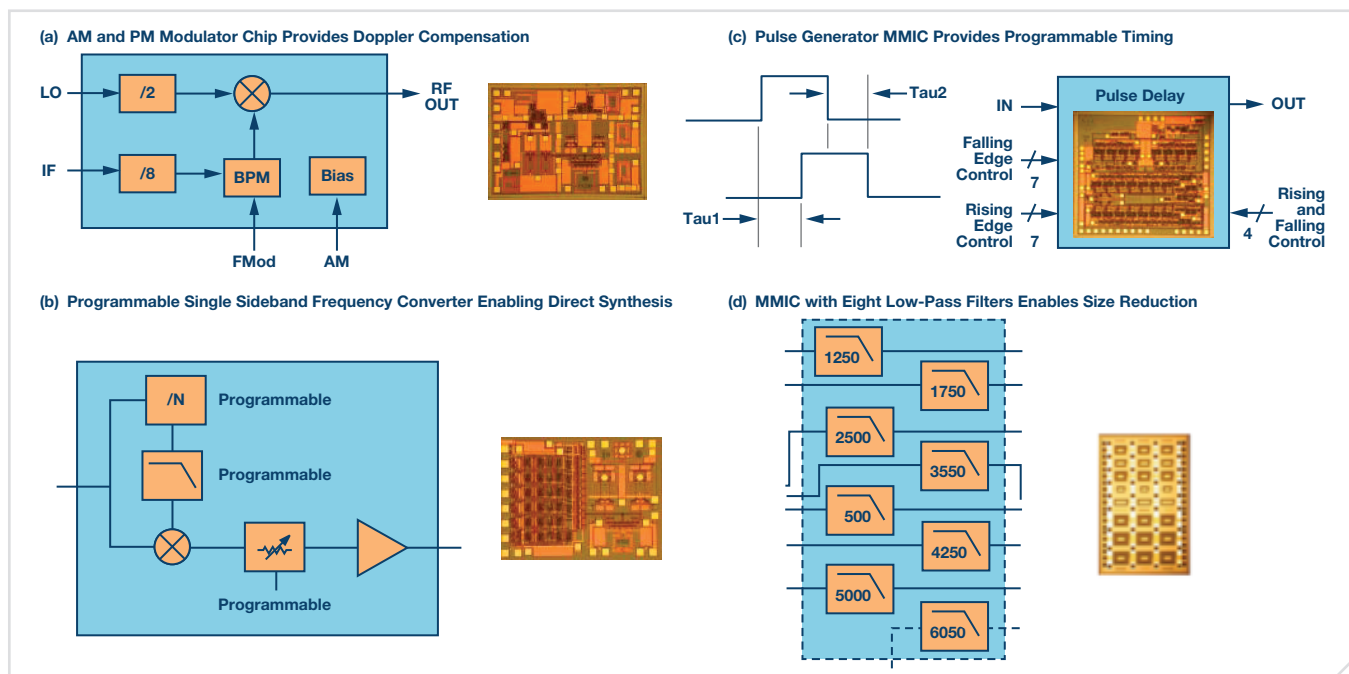
- ▶ High performance exciters and synthesizers
- ▶ RF mmW converters, tuners, and multichannel receivers
- ▶ RF mmW signal control, monitoring, and conditioning modules
- ▶ EW and radar solid-state power amplifiers including high power GaN

Uniquely Positioned Module Solutions

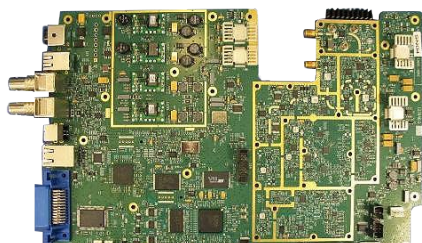
With nearly 43,000 products on the market today, Analog Devices has the broadest portfolio of semiconductor intellectual property available. Our semiconductor integrated circuits span digital, analog, RF, microwave and millimeter wave, power management, data conversion, and interface applications. Along with our market released components, ADI retains a vast array of unreleased components for use in custom modules. In addition, ADI has thousands of MMICs that are only available to ADI module designers in die form. These advantages enable the Integrated Solutions and Space (ISS) Modules Team to be uniquely positioned to reduce size and improve performance on the most complex modules and subsystems.

The figure below shows four of the hundreds of custom MMIC die that have been developed to solve specific system-level problems. These four MMICs were developed to allow for a smaller, ruggedized exciter solution. This synthesizer module was designed for a mid-volume market where the correct balance of cost and performance needed to be achieved.

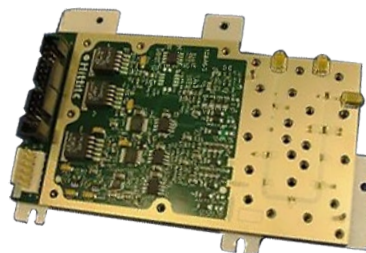
Custom MMICs Enable SWaP-C Optimization



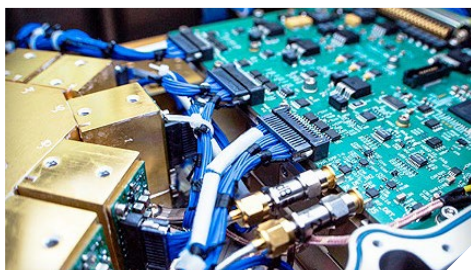
Leveraging Low Cost Surface-Mount Technology (SMT) into K_u-Band Chip and Wire Expertise to Enable Optimal Performance up to 100 GHz



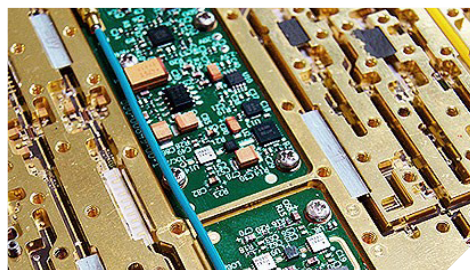
20 GHz Synthesizer



70 GHz Signal Generator



Broadband HPA



mmW Frequency Conversion

Extending Our Customer's Design and Production Resources

An Extension of Your Design Team

ADI design and applications teams are set up to work as an extension of a customer's design resources. Module designers are able to work seamlessly with our customer's system designers by leveraging a wide range of common tools and calculators to model electrical performance and physical attributes. These module-level models can be imported into system-level models to reduce integration risks and help ensure the end product interfaces seamlessly at the next higher level of assembly. This leads to faster development cycles and lower development costs.

Design Tools Enable Collaboration

| Microwave Simulation Tools | |
|----------------------------|--------------------------|
| Linear Simulation | Microwave Office |
| | ADS |
| 2.5D Simulation | AXIEM |
| | Momentum |
| | Sonnet |
| 3D Simulation | HFSS |
| | CST |
| Filter Synthesis | Genesys |
| | Ansys |
| System Analysis Tools | |
| Cascade Analysis | Virtual System Simulator |
| | Genesys Spectrasys |
| | Custom In-House |
| Statistical Analysis | Virtual System Simulator |

| Digital/Firmware Tools | |
|-----------------------------|--------------------------|
| FPGA Tools | Xilinx® ISE Design Suite |
| | Xilinx Vivado |
| | Modelism |
| Signal Integrity | HyperLynx |
| Analog Design Tools | |
| PSPICE | Microcap |
| | LTSPICE |
| | ADIsimPE |
| | PSPICE |
| HSPICE | Cadence |
| Reliability Prediction Tool | |
| MBTF/FITS Prediction | PTC Windchill |

| Mechanical Design Tools | |
|--------------------------------|-----------------------------|
| 3D Solid Modeling | Inventor |
| | SpaceClaim |
| 2D Modeling | AutoCAD |
| Physical Analysis Tools | |
| Structural FEA | Ansys Mechanical Enterprise |
| Thermal FEA Linear and Dynamic | TAS—Gate Level |
| | Ansys—Gate to System |
| Thermal CFD | Qfin |
| Layout Tools | |
| Routing | PADS Layout 9.5 |
| | Cadence/Allegro |
| Schematics | DXDesigner |

Our module design team consists of engineers with expertise in the design and implementation of:

- ▶ RF/microwave/millimeter wave from 1 kHz through 100 GHz
- ▶ Mixed-signal for high speed DAC/ADC and transceiver implementations
- ▶ Digital control
- ▶ FPGA firmware (Verilog/VHDL)
- ▶ Embedded software
- ▶ Power supply/regulation and sequencing
- ▶ Mechanical/thermal design
- ▶ 3D/solids models
- ▶ Reliability/stress
- ▶ FMEA
- ▶ Automated test software

Module Production, Reliability, and Quality Assurance

We maintain Class 100000 clean rooms for assembly and testing, as well as several Class 100 work areas devoted to the testing and inspection of S-level products.

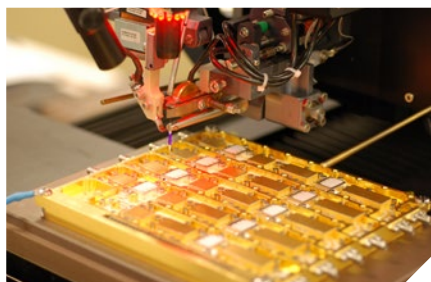
Our module testing personnel are trained and equipped to accurately characterize digital and microwave modules for all parameters, and for bands up to 110 GHz. We also maintain a complete environmental testing facility for acceleration, shock, vibration, gross and fine leak testing, temperature cycling, burn-in, and other factors.

ADI's state-of-the-art ISO9001 and AS9100 manufacturing facilities meet the demands for highly integrated, cost-effective chip and wire and surface-mount assemblies. Our manufacturing and screening standards conform to MIL-PRF-38534/5 and MIL-STD-883.

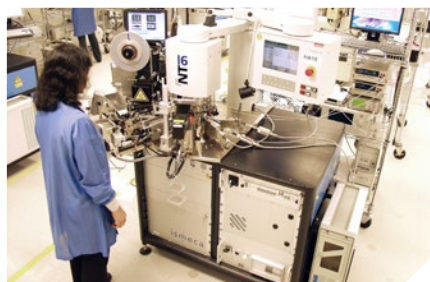
ADI Manufacturing and Test Abilities Include

- ▶ ISO 9001:2008 and AS9100:2009 certified X automatic hybrid assembly equipment; includes
 - Die inspect/pick
 - Die/substrate attach
 - Wire bond
- ▶ IR reflow equipment for PCB-based assemblies
- ▶ Automated digital product test to 40 Gbps
- ▶ Automated RF, microwave, and millimeter wave product tests to 110 GHz

Pick and Place/Wire Bonding



Automated Test RF—mmW



Automated Visual Inspection



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