

Narda Defense Technology Solutions

Narda Defense Technology Solutions is positioned as an industry leader that offers advanced integrated microwave assembly (IMA) products and subsystems to both the commercial and military markets. Every project we undertake benefits from our years of experience and world-class resources. Our strengths include:

- Custom solutions incorporating leading edge technology from DC to 40 GHz
- Advanced technology that produces cost savings, reductions in size and weight and improvement in efficiency and performance
- Highly experienced, senior engineering staff, working at the forefront of integrated microwave assembly and sub-assembly development for over 30 years
- Applications include electronic warfare, communications, radar and Satcom
- Designs which meet or exceed requirements for rugged military sea, air and land platforms
- Financial backing and resources of L-3 Communications, a \$15 billion-plus public corporation
- An experienced, dedicated senior program management staff to minimize risk and ensure efficient, successful achievement of project requirements
- 150,000 square-foot, state-of-the-art headquarters and design center, with two additional satellite locations

Facilities

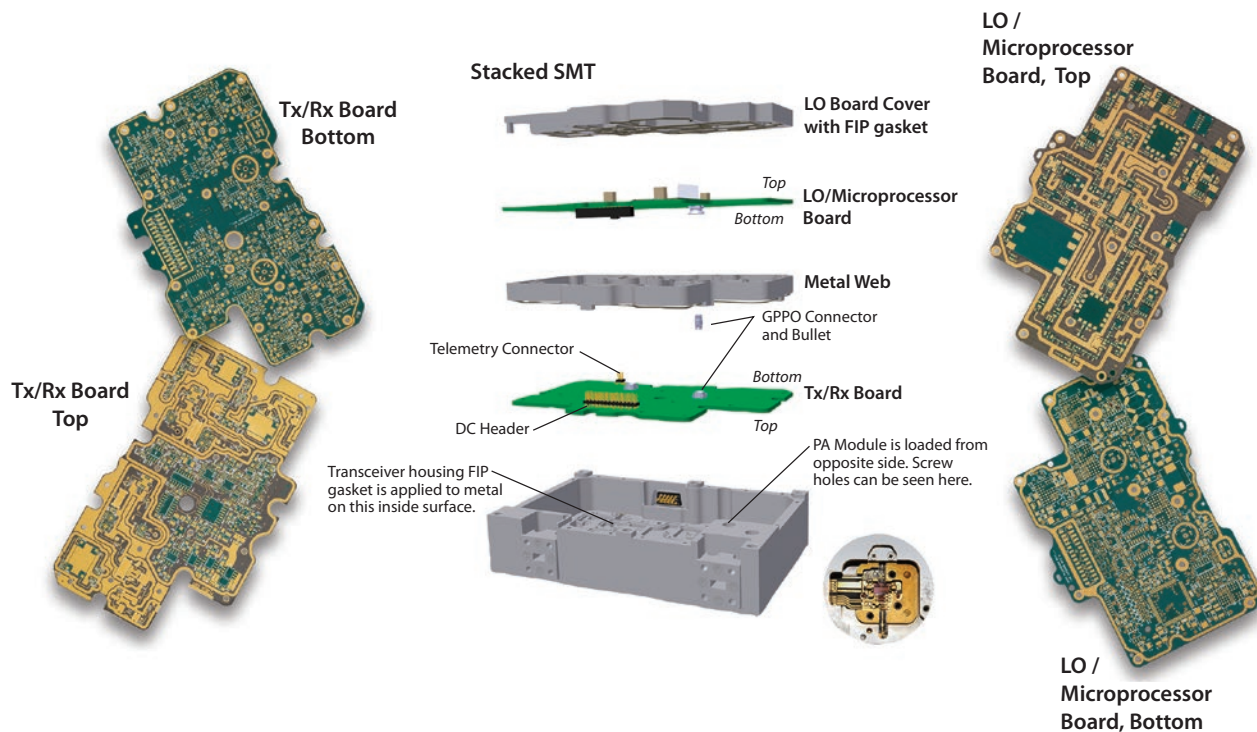
Narda has three state-of-the-art facilities dedicated to IMA products; a 150,000 sq. ft. plant in Hauppauge, NY (design, development and production); another 20,000 sq. ft. plant in Heredia, Costa Rica (production); an 8,000 sq. ft. design center in San Diego (design and development). Narda maintains two Class 100,000 clean rooms.



Evolution of IMA Developments

From Classic MICs to State-of-the-Art MMC Technology

Narda has pioneered the design and manufacture of Integrated Microwave Assemblies (IMAs) for more than 30 years. The first IMAs manufactured by Narda, referred to as classic MICs, were realized by combining several alumina-on-carrier circuits within a single machined aluminum housing. These classic MIC multifunction assemblies provided high performance and longevity, yet the constraints of higher labor/materials costs and larger footprints often became prohibitive. While enhanced versions of this technology continue to remain viable for certain applications, Narda Defense Technology Solutions has evolved new technologies to effectively eliminate the constraints of traditional chip and wire manufacture. Our new and continually evolving proprietary MMC (Multi-layer Microwave Circuitry) technology leverages commercially available multi-layer board materials with unique interconnection techniques, along with DSP/FPGA – enabled monitor/control functions, to allow for densely packaged IMA's and Subsystems in footprints previously unachievable.



Compact Ka-Band Transceiver with Stacked SMT Board MMC Technology

Narda's MMC Technology

MMC uses multi-layered printed circuit boards to interconnect microwave devices (MIC, SMT, or MMIC configurations) with bias, control and digital signal processing components. These complex IMAs and Compact Subsystems are constructed using single or stacked multi-layer boards with the microwave circuitry on the top side, and the control circuitry, conditioning, microprocessor, FPGA and DSP circuits, on the bottom. Connections from top to bottom are made with specially developed vias, as appropriate.

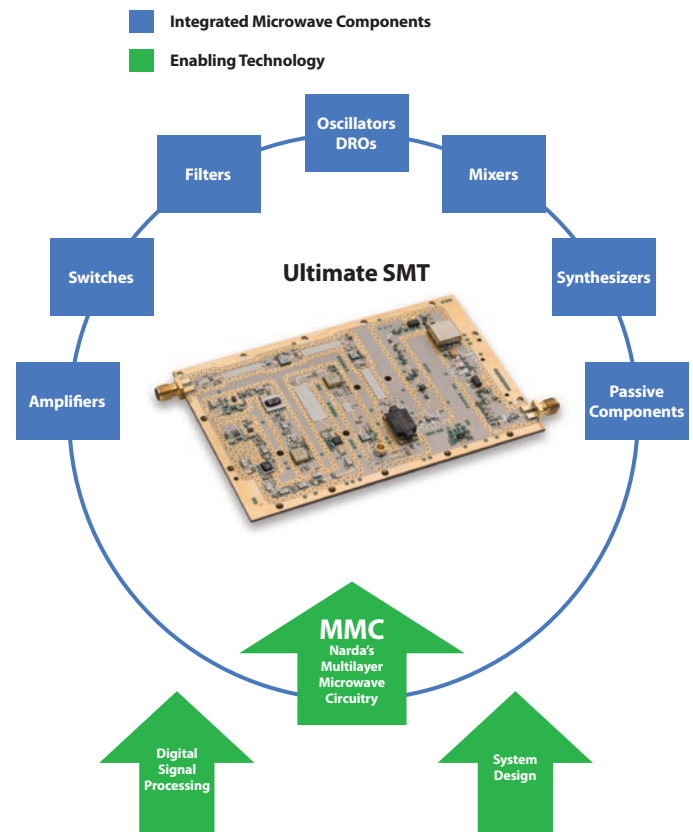
Narda's MMC technology allows the creation of highly complex IMA modules with unprecedented performance, flexibility and unusually small form factors that facilitate integration into complex next level assemblies.

Evolution of IMA Developments

The MMC technology utilized on our module and sub-system solutions consists of two major types of approaches, the **Ultimate MIC** and **Ultimate SMT**. The Ultimate MIC approach is utilized when the majority of the electrical components are bare die and chip, while Ultimate SMT technology is employed when there is a prevalence of surface mount devices. Each type of technology promotes the ability to combine traditional MIC chip and wire hybrid technology with high volume, low cost, surface mount assembly techniques. As a result our modules or compact subsystems demonstrate unrivaled and previously unachievable integration levels. The results are smaller, reduced cost, higher performance solutions that combine microwave, bias/control circuits, and DSP functions interconnected with high isolation promoting multi-layer signal routing.

Features of MMC enabled IMA modules and Subsystems:

- A single multi-layer board construction integrates the RF/Microwave functions along with supporting bias, control and DSP needs, facilitating an unmatched level of integration
- “Stacked” multi-layer board topology allows for growth in height while preserving footprint
- Allows for the marriage of traditional MIC technology with SMT as may be required
- Dense packaging, reduced weight and lowered power consumption for SWaP considerations
- Custom solutions from DC to 40 GHz



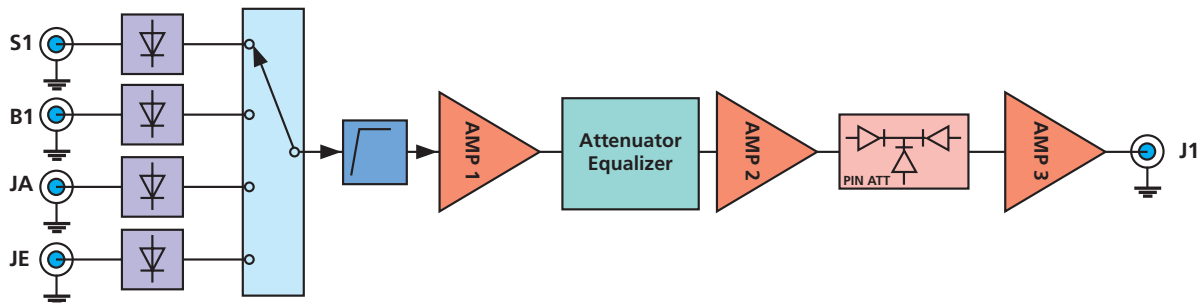
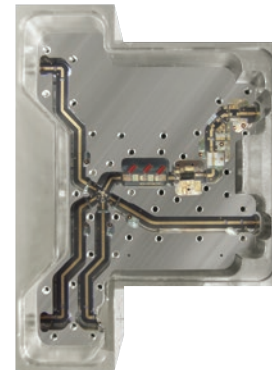
Products

- High Dynamic Range Front End Assemblies
- Up and Down Converter Modules
- Waveform Generators
- LNA's and SSPA's
- Transceivers
- Pin Diode Switch Solutions
- Switched Filter Banks
- Frequency Sources

IMA Products

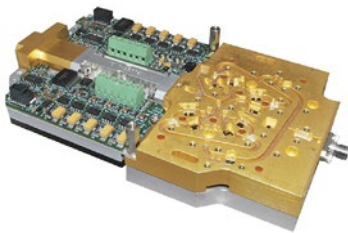
Simple IMA Modules

Simple IMA Modules integrate two or more microwave components into a functional assembly using conventional MIC technology.



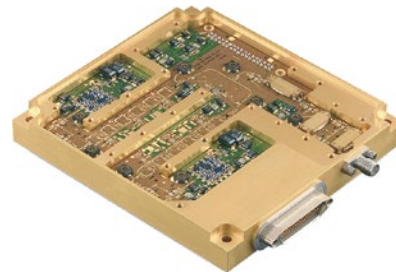
Complex IMA Modules

Complex IMA Modules use MMC technology to create a much higher level of integration. These modules typically use the Ultimate MIC or Ultimate SMT topology.



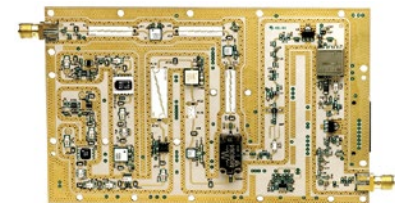
Ka-Band SSPA

Smart IMA using a microcontroller to provide maximum power output with minimum DC drive over temperature and system variations.



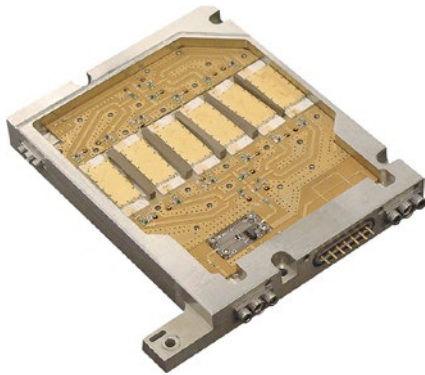
FPGA Programmable Source

This Ultimate MIC incorporates a Field Programmable Gate Array (FPGA) to provide DSP-based arbitrary waveform modulation of microwave signals.



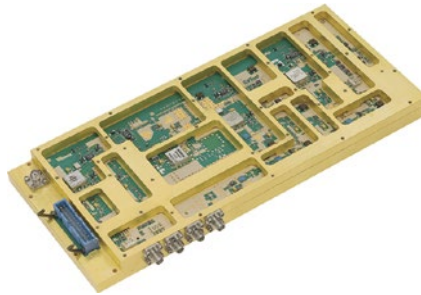
Ku-Band Block Upconverter

This IMA uses Ultimate SMT technology to provide a high performance, compact and efficient Ku-Band SATCOM block upconverter.



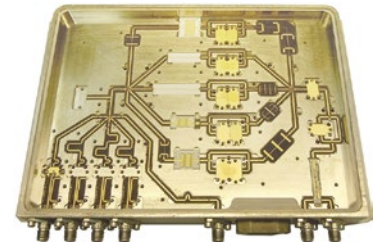
Switched Filter Bank

IMA utilizing high rejection PIN switches to select sharp cutoff channel filters.



X-Band DDS Synthesizer

Ultimate SMT X-Band synthesizer provides stable signals with precision resolution.

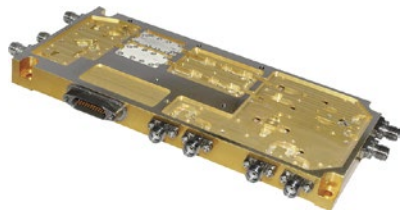


EW Antenna Interface

Complex IMA routing single input to multiple outputs with variable gain, preselection filtering and high power limiting in each path.

Compact Microwave Subsystems (CMS)

Compact Microwave Subsystems (CMS) use IMA modules and support devices to build complete functional subsystems.



EW Receiver

Compact assembly of MMC (multilayer microwave circuitry) modules containing input and output switching networks, RF filters, and dual amplifier chains in a very small package.



RF Distribution Network

Complex distribution network integrating two multiplexers with input and output switching networks.



SATCOM Transceiver

Self contained transceiver for X, Ku or Ka-Band applications. High performance, low DC power and light weight.