

# Microwave Systems Solutions

## Frequency Management

- **Design to Manufacturing of Components & Subsystems in RF/IF to Millimeterwave**
- **Control Components**
- **Mixers**
- **Detectors, Limiters & Comb Generators**
- **Oscillators**
- **Active Signal Detection**
- **Frequency Synthesizers, Tranceivers, and Converters**

Microwave Systems Solutions, part of Crane Aerospace & Electronics, specializes in the design and manufacture of high performance millimeter wave, microwave, RF and IF components, subsystems, and systems for government, industrial, and military end-use customers. We are a total support solution enterprise offering our customers solution sets including electronic manufacturing services, engineering support services, product development, and production in world class manufacturing operations. Our main focus is complete customer satisfaction through variation elimination throughout the enterprise processes.

## Product Capability

Our engineering team's expertise ranges from our components architectures through full system engineering especially for complex designs in severe environments. We can bring your internally developed product to full production providing assembly, tune, and test in the IF, RF, microwave, and millimeters wave spectrums. Typical contract manufacturers lack the technology and expertise to support these products.

Our facilities offer both small lot and high volume manufacturing. Close contact and communication with our customers is maintained to consistently meet the manufacturing needs of their programs. Lean manufacturing techniques to optimize manufacturing efficiency and accuracy are employed on all product lines.

We excel at subsystem manufacturing. With our large existing design library of circuits, components, and subsystems, coupled with our years of experience in designing and manufacturing our breadth of products, Microwave Systems Solutions is the logical partner for design and manufacture of your critical subsystems.



## Product Lines

**Ferrite Based Components:** We offer isolators and circulators emphasizing miniature, broadband drop-in units which include medium and high power requirements.

**Control Components:** Our line includes power dividers, directional couplers, hybrids, modulators, phase shifters, filters (fixed and tunable) and other control devices.

**Mixer Products 0.5 MHz. to 26.5 GHz:** We offer a broad line of double balanced and triple balanced mixers with RF/LO frequencies from 0.5 MHz to 26.5 GHz.

**Detectors, Limiters and Comb Generators:** Our detectors, limiters, and comb generators offer a broad spectrum of frequencies. Microwave integrated circuit module packaging provides small, reliable products.

**Crystal, Dielectric and Coaxial Resonator Oscillators (DRO, CRO) 0.3-26.0 GHz:** Our DRO's feature high stability and low phase noise performance. Our compact units have ultra stable frequency, low phase noise, reduced spurious performance and they work well in harsh environments, including vibration.

**Voltage Controlled Oscillators (VCO) 0.5 to 20.0 GHz:** Products include VCO's with removable SMA connectors suitable for either coaxial or microstrip interface and package styles suitable for surface mount technology (SMT) applications.

**Active Signal Detection Products:** Our Detector Log Video Amplifiers (DLVA) are based on a set of proprietary integrated circuits to unit performance very repeatable with a high level of integration. Our small packages cover multi-octave bandwidths with fast rise and fall times and advanced pulse-on-pulse capabilities.

**Solid State Amplifiers 0.5 to 40.0 GHz:** These products are focused on high performance HMIC/MMIC integration technology with up to 10 watts of output power. Low noise and limiting amplifiers in temperature compensated and uncompensated versions are available.

### Phase Locked Oscillators (PLO) 0.6 to 26.0 GHz:

CRO's are used from 0.6-3.0 GHz while DRO's cover frequencies above 3.0 GHz. A number of designs use a sampling down converter as an analog phase detector to lock the low noise DRO or CRO to an external or internal reference in the 10-200 MHz range.

### Digitally Tuned Oscillators (DTO) 0.5 to 20.0 GHz:

Each DTO consists of broadband, low noise; HMIC VCO's compensated for low frequency drift. Frequency selection is made by using a 12 bit digital tuning word.

### Frequency Synthesizer 100 MHz. to 20 GHz:

These designs vary from single loop configurations for low cost industrial applications to multiple loops for high performance requirements. Multiple loop designs provide the greatest flexibility and allow for independent selection of step size, phase noise performance, and tuning speed parameters.

### Frequency Modulated Continuous Wave (FMCW) Transceivers:

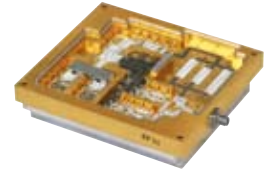
We offer FMCW transceivers for highly accurate, non-contact measurement of altitude, range, length, and levels of liquids and solids in a variety of applications. We integrate multiple microwave components into a single assembly consisting of a HMIC VCO, followed by GaAs FET amplifiers that simultaneously drive the LO port of a double-balanced mixer and antenna duplexer.

**Frequency Converter Assemblies:** We design and produce an outstanding line of frequency converter assemblies. We use a variety of media (soft-board and ceramic substrates) and topologies (microstrip, stripline, suspended substrate) to offer the best performance and lowest cost solutions to commercial and military markets.

**Signal Routing and Control Systems:** We design and manufacture complex signal routing and control systems for applications such as intercept, satellite ground station, and telecommunication. Switch matrices covering audio through microwave are available from a simple 1 input/8 output to complex 128 in/out architectures. These incorporate full fan-out, non-blocking configurations.



Components



2 - 18 GHz. RF Source



6 - 18 GHz. RF High-Speed Amplitude-Phase Modulator



Switch Matrices



Crane Aerospace & Electronics—Microwave Systems Solutions [www.cranae.com/mw](http://www.cranae.com/mw)

ELDEC • General Technology • Hydro-Aire • Interpoint • Lear Romec • P.L. Porter • Signal Technology

340 North Roosevelt Ave. • Chandler, Arizona 85226 • phone 480.961.6269 • fax 480.961.6297 • [infomw@cranae.com](mailto:infomw@cranae.com)