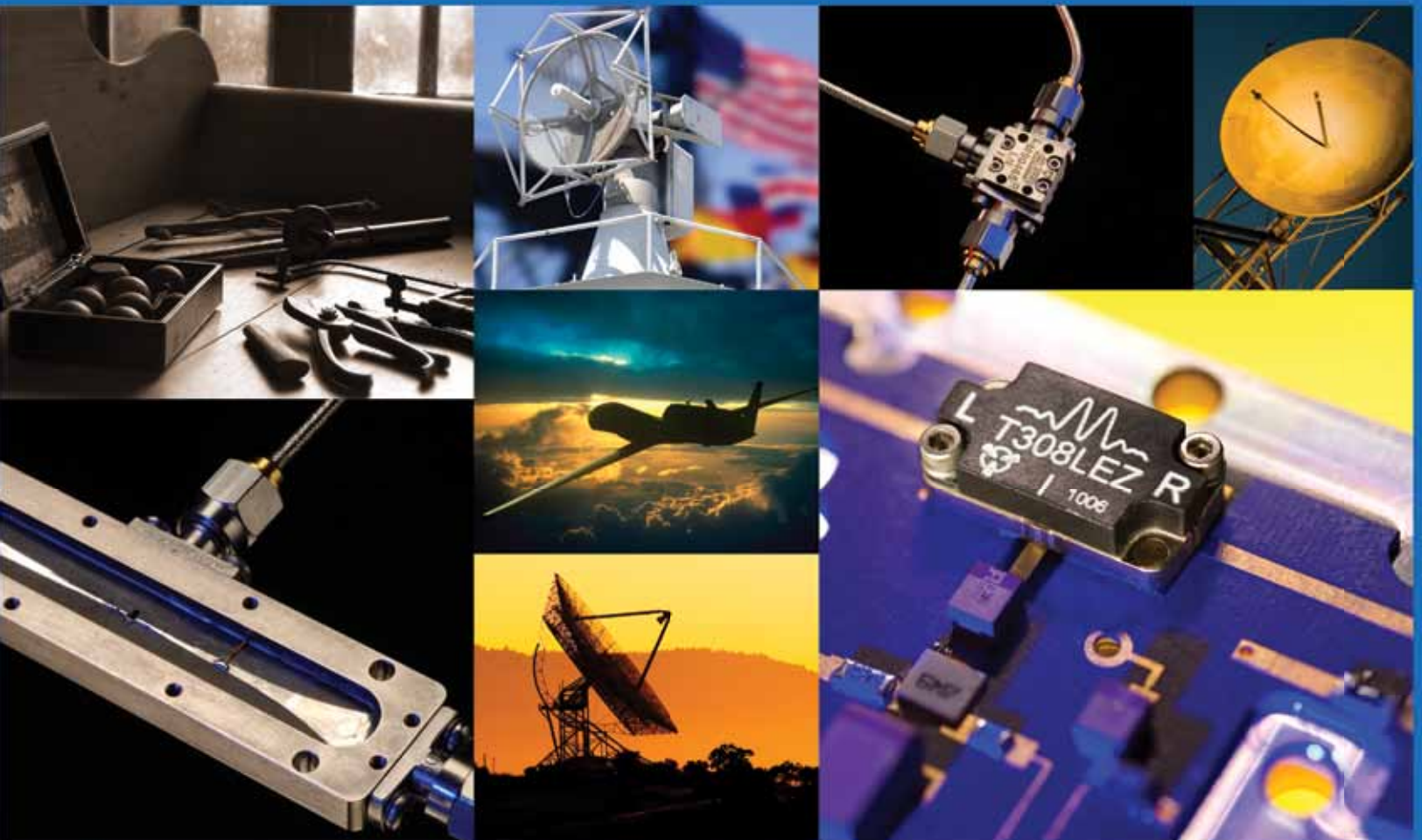


## Microwave Technology for the 21st Century



# Short Form Product Catalog

SINCE 1991– MARKI MICROWAVE COMPONENTS DELIVER SUPERIOR PERFORMANCE.



## GENERAL INFORMATION

### Company Description

For two decades, Marki Microwave, Inc., has been a leading manufacturer of microwave and millimeter wave technology. Marki Microwave is recognized as the industry's premier supplier of high-performance mixers. The company, founded by Ferenc A. Marki, combines a dedication to engineering excellence and innovation with a practical approach to manufacturing to meet the most demanding requirements of both the military and commercial markets. With his son, Christopher F. Marki, Ph.D., Mr. Marki continues to expand the Marki Microwave catalog to include product offerings in the areas of adapters, amplifiers, bias tees, couplers, DC blocks, filters, multipliers, power dividers, and more.

### Markets Served

Whether building catalog-off-the-shelf items or unique custom designs, Marki Microwave applies the same high standards of workmanship to ensure superior performance and customer satisfaction.

- Microwave radio transmitters and receivers
- Broadband wireless telecommunications
- Wideband digital communications
- Satellite / space systems
- Phased-array radar
- Electronic warfare
- Signals intelligence
- Test and measurement equipment
- Medical / industrial research and development
- Major U.S. and international universities

### Technologies

Marki Microwave uses state-of-the-art modeling software to aid in the seamless design and production of its products. Manufacturing employs precision micro-solder and wire-bonding assembly. Test facilities include state-of-the-art equipment for measurement from DC to 67 GHz. All assembly, inspection, and testing is done onsite to assure uniformity and repeatability of performance.

### Facilities

Marki Microwave occupies 10,000 square feet of office and R&D space in Morgan Hill, California. All sales, marketing, engineering, and manufacturing efforts are conducted at this convenient Silicon Valley location.

### Product Lines

Marki Microwave's mission has always been to provide customers with elegant and reliable solutions and

rapid lead times. Marki's constantly expanding product lines and packaging innovations reflect our commitment to addressing customers' needs with ingenuity and resourcefulness. Today our lines encompass a range of products including:

### Mixers

- High Linearity T3 Series
- Broadband
- Double Balanced
- Triple Balanced
- IQ, SSB, and Image Reject
- Integrated Amplifier-Mixer Assemblies

### Amplifiers

- Broadband Driver Amplifiers
- Positive Bias Only Driver Amplifiers
- Fiber-Optic Driver Amplifiers

### Multipliers

- Doublers and Amplified Doublers
- Amplified Triplers
- Amplified Quadruplers

### Couplers

- Directional Couplers
- Dual-Directional Couplers
- Quadrature Hybrids
- High Power Air-line Couplers

### Power Dividers/Combiners

- Wilkinson (3dB) Power Dividers
- Resistive Power Dividers
- High Isolation Power Combiners

### Filters

- Lowpass, Highpass, and Bandpass
- Diplexers

### DC Blocks & Bias Tees

- Connectorized Bias Tees
- Surface Mount Bias Tees
- Low Loss Coaxial DC Blocks

### Adapters

- "Jacket" Coaxial Adapters
- Right Angle Adapters

### Baluns, Transformers, and Pulse Inverters

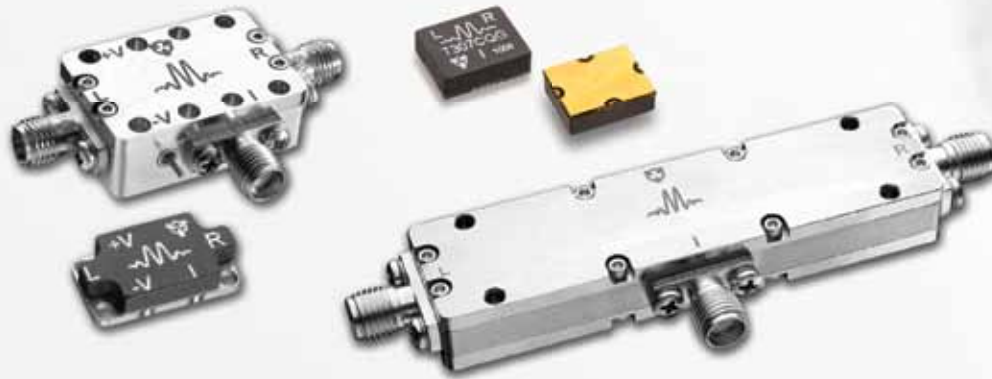
### Marki Meter

- Inline Power Monitors

MARKI MICROWAVE IS CERTIFIED TO ISO 9001:2008.

# ACTIVE COMPONENTS

## MIXERS



Marki Microwave features the largest selection of broadband, high-performance RF, microwave, and millimeter wave mixers in the world. Marki mixers are used extensively in a variety of military and commercial applications, owing to their superior performance, quality craftsmanship, and field-proven excellence. While our competitors offer 1970s technology, Marki engineers continue to push the boundaries of mixer technology with the goal of providing mixers for the 21st century.

Marki mixers are categorized into four major groups: double-balanced mixers, triple-balanced mixers, T3 mixers, and IQ and IR mixers. Each of our mixer families is characterized by a unique set of attributes to allow customers the widest range of choices for their diverse applications.

Double-balanced mixers are, historically, the workhorse mixers of the microwave industry. Marki M1, M3, M8, and M9 mixers are all double balanced and therefore offer excellent performance in terms of bandwidth (DC to 65 GHz), isolation, DC capable IF, and low required LO drive.

The M2 family of triple-balanced mixers is designed to provide flexible bandwidth coverage for all three mixer ports. By incorporating innovative construction techniques, Marki M2 mixers remain among the industry's most versatile, ultra-broadband mixers.

Until 2004, virtually all commercially available mixers were adaptations of legacy designs developed in the 1960s and 1970s. The introduction of the Marki "Two-tone Terminator" (T3) mixer marked a dramatic advance in mixer design. Marki T3 mixers provide superior performance in terms of mixer nonlinearity (i.e., 1 dB compression, IIP3, etc.), with the bandwidth flexibility of legacy triple-balanced mixers.

Available in convenient surface mount packages, T3 mixers are used in systems with challenging linearity requirements and those requiring flexible broadband frequency coverage.

Finally, Marki offers superior IQ, IR, and SSB mixers. These advanced circuits come in a variety of configurations and can be customized for many applications.



## AMPLIFIERS



Marki Microwave offers a wide selection of connectorized and surface mount amplifiers ranging in frequency from 40 kHz to 50 GHz. The A and AP (positive bias only) series of Marki amplifiers serve as broadband general purpose amplifiers from 5 MHz to 30 GHz. A and AP series amplifiers make excellent square-wave generating amplifiers and are recommended for use with T3 mixers.

Marki Microwave also offers a line of catalog and custom fiber-optic modulator drivers supporting data rates up to 43 Gb/s. These amplifiers are designed with our exclusive, ultra-broadband bias tees to provide low frequency coverage down to 40 kHz.



## MULTIPLIERS



Marki Microwave offers a complete line of doublers, triplers, and quadruplers. All multipliers are constructed using silicon Schottky diodes, resulting in intrinsically lower phase noise performance compared to noisy GaAs devices. Our doublers and quadruplers are built using highly symmetric, monolithic diode bridge quads which provide cutting edge performance in terms of broadband coverage (as much as 25:1 bandwidth ratios) and superior fundamental suppression.

Additionally, Marki offers a full selection of active multipliers that provide input/output power flexibility. Most multiplier products are available in convenient surface mount packages.

# PASSIVE COMPONENTS

## COUPLERS



By combining a proprietary design and optimization algorithm with time-honored construction techniques, Marki Microwave manufactures microwave directional couplers and quadrature hybrids with bandwidth ratios exceeding 50:1. Marki tri-plate stripline couplers and quadrature hybrids boast industry-leading directivity and coupling flatness.

For customers who require low insertion loss, Marki offers a line of compact coaxial couplers (e.g., C-0250) that exhibit extremely low loss and high directivity through 50 GHz. For customers with specific requirements not satisfied by the catalog products, we also offer coupler customization services.



## POWER DIVIDERS



Marki Microwave offers a large variety of catalog and custom Wilkinson-type 3 dB power dividers and resistive power dividers in both connectorized and surface mount packages.

Wilkinson-type power dividers provide 3 dB power division with intrinsic isolation between output ports. All our Wilkinson designs are optimized using state-of-the-art modeling software to provide outstanding isolation and VSWR performance. Popular models include the PD-0220 (2-20 GHz) power divider and the PD-0434SM (4-34 GHz) surface mount power divider. Custom models are available upon request.

For applications requiring ultra-broadband performance, we offer a full line of resistive power dividers. These power dividers operate from DC to as high as 40 GHz with excellent insertion loss and VSWR characteristics.

## FILTERS



Marki Microwave manufactures a huge selection of catalog and custom microwave filters. Filter types offered include bandpass filters, lowpass filters, high-pass filters, Wavefade™ filters, and diplexers.

Most Marki catalog filters are available from stock and can be delivered with extremely short lead times, a significant advantage for the busy engineer. All filters are designed with the intention of minimizing tedious tuning steps and reducing the overall cost without sacrificing performance. Moreover, custom designs are always available for customers with specific requirements not satisfied by the catalog options.

In addition to the standard bandpass, lowpass, and highpass filter lines, Marki also offers two types of absorptive filters.

## BIAS TEES



The Wavefade™ lowpass filter is assembled using proprietary techniques that enable us to achieve the extremely flat group delay seen only in Bessel filters. Wavefade™ filters are based on a unique quasi-infinite element technique resulting in superior performance and design flexibility up to and even beyond 30 GHz. Wavefade™ filters are ideal for pulsed and digital applications.

A comprehensive line of connectorized and surface mount diplexers is also available. These versatile devices are commonly used in signal multiplexing applications and applications requiring non-reflective lowpass or highpass filtering.

As any experienced engineer knows, the simple bias tee circuit is surprisingly complex to build at microwave frequencies. To solve this perplexing design problem, Marki Microwave offers a complete line of connectorized and surface mount bias tees from 40 kHz to 50 GHz.

Connectorized bias tees exhibit extremely low insertion loss, flat group delay (critical for pulsed and digital applications), and high current handling capability. The compact surface mount bias tees are unique in the industry and offer broadband frequency capability running from 500 kHz to greater than 30 GHz. Both leaded and lead-free surface mount bias tees are available to satisfy both the RoHS compliant and military markets.

## ADAPTERS



Marki Microwave offers several coaxial adapter options including right angle adapters and “jacket” coaxial adapters. Our RA series of right angle adapters is constructed using a single coaxial cable to provide excellent insertion loss and VSWR performance through 50 GHz. Moreover, all right angle adapters can be custom configured to satisfy any combination of 2.92 mm and 2.4 mm connectors requested by the customer.

Marki jacket adapters are convenient, high performance 50 Ω coaxial adapters designed specifically for ease of use. With their rugged steel outer jacket, these adapters can be loosened effortlessly even when components are overtightened. All jacket adapters come in user-specified combinations of 2.92 mm and 2.4 mm connectors.





## Microwave Technology for the 21st Century

### PERFORMANCE

Marki Microwave's mission is to exceed our customers' expectations by providing industry leading performance, reliability, and customer support. By combining time-honored fabrication and assembly techniques with a modern design approach, we are able to push the technological boundaries of broadband RF and microwave components into the 21st century. With proprietary innovations such as our T3 mixer line and our directivity-optimized directional couplers, we seek to provide the most comprehensive selection of high-performance microwave components in the world.

### RELIABILITY

Our strength lies in our stability and adherence to proven manufacturing practices. In this modern world of outsourcing and commodity pricing, Marki Microwave has prospered by retaining all design, manufacturing, and sales in the same Morgan Hill, California facility since 2000. In this manner our products are maintained at the highest level of performance and workmanship.

### SUPPORT

Our primary goal is to make our customers successful. Going forward, we will continue to expand our product lines to offer more components in surface mount and ROHS compliant packaging. We will also continue to expand our Passive Component offerings and high IP3 mixer lines. As always, our design staff is eager to help our customers solve their most difficult challenges. Your impossible challenge today leads to tomorrow's innovations.

Ferenc A. Marki, President and Founder

[WWW.MARKIMICROWAVE.COM](http://WWW.MARKIMICROWAVE.COM)

MARKIMICROWAVE, INC. | 215 VINEYARD COURT | MORGAN HILL, CA 95037 USA  
PH 408.778.4200 | FAX 408.778.4300 | [INFO@MARKIMICROWAVE.COM](mailto:INFO@MARKIMICROWAVE.COM)



**2012**  
Marki Meter

**2011**  
Baluns & Inverters

**2010**  
Power Dividers

**2009**  
Couplers & Diplexers

**2008**  
Filters



**2007**  
Dr. Christopher Marki joins the company, introduces new product lines.



**2006**  
ISO 9001:2000 certification  
(current certification ISO 9001:2008)

**2005**  
Volume production of  
Surface Mount Bias Tees



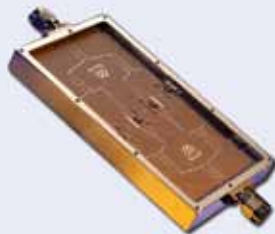
**2004**  
The T3 - the Mixer for the 21st Century!



**2003**  
Revolution in microwave surface mount  
packaging with the "EZ" package



**2002**  
4-lag correlator for ASIAA to  
detect "big bang" radiation



**2000**  
Purchase of 10K ft<sup>2</sup> space for new  
headquarters in Morgan Hill, CA



**1998**  
Support for U.S. Army Longbow Missile  
Program with high-performance  
carrier mixer

**1993**  
Entrance into microwave telecom  
market with unique image reject  
converter design



**1991**  
The founding of Marki Microwave  
by Ferenc A. Marki