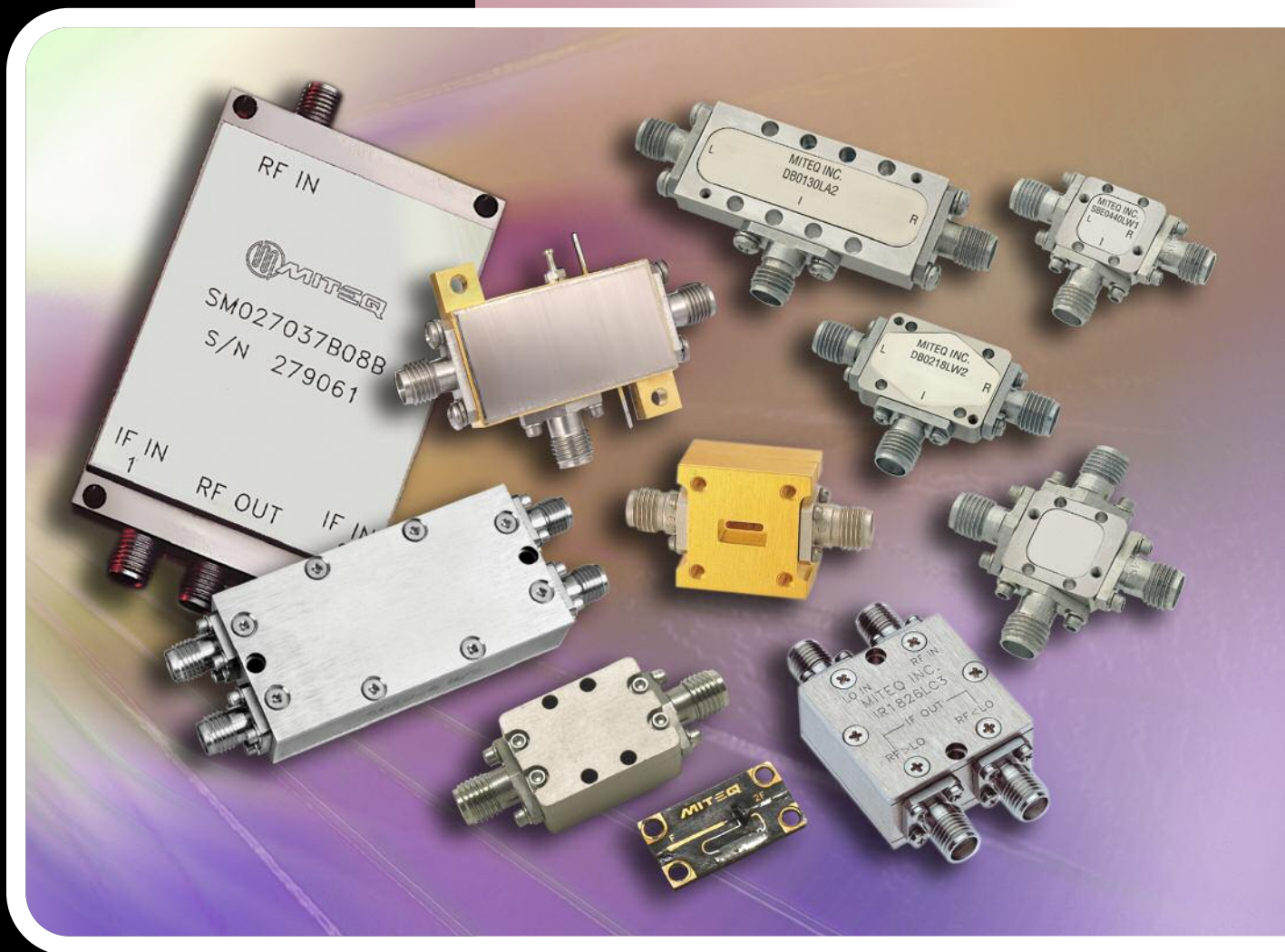


**MICROWAVE AND
MILLIMETER-WAVE
CONVERSION PRODUCTS**

Technology Overview



- **MIXERS**
- **IMAGE REJECTION MIXERS**
- **MODULATORS**
- **MULTIPLIERS**
- **CUSTOM PRODUCTS**



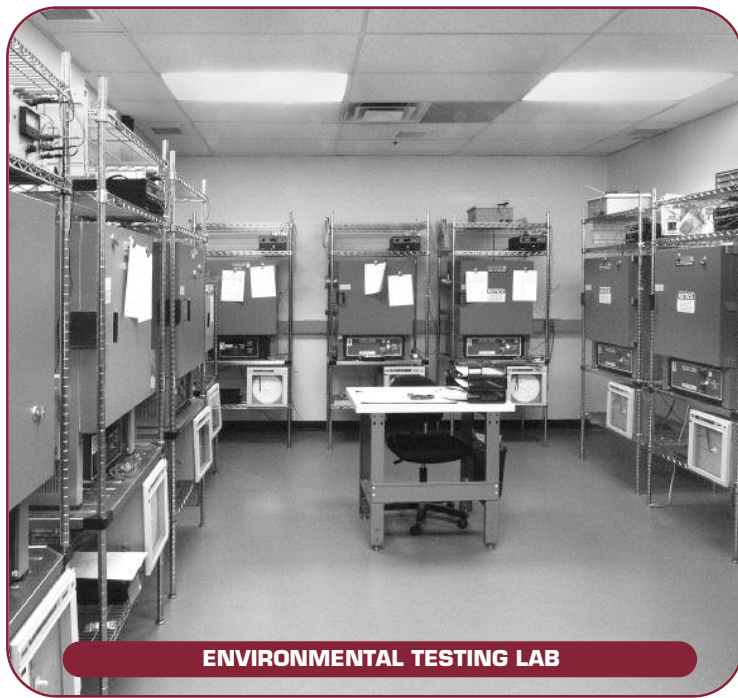
MITEQ

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• TEL: (631) 439-9220 • FAX: (631) 436-7430
www.miteq.com

MIXER TECHNOLOGY OVERVIEW

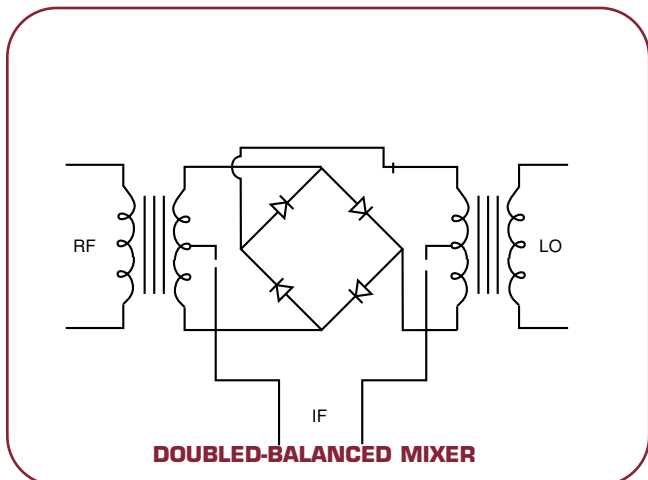
CIRCUIT DESCRIPTIONS

The double-balanced mixer circuit provides isolation of LO, RF and IF energy without filters, due to the combined properties of the ring diode circuit and wideband baluns. This results in suppression of all even order harmonic mixing products of both the LO and RF. The standard double-balanced mixer circuit often uses diplexing techniques to separate the IF signal from the LO band. As a result, a microwave double-balanced mixer cannot support widely overlapping RF and IF frequencies while maintaining a DC response at the IF port. Double-balanced mixers are most utilized in applications where there is no requirement for overlapping RF and IF frequencies. In addition, the DC-coupled output of the double balanced-mixer makes it a prime candidate as a building block for phase detection.

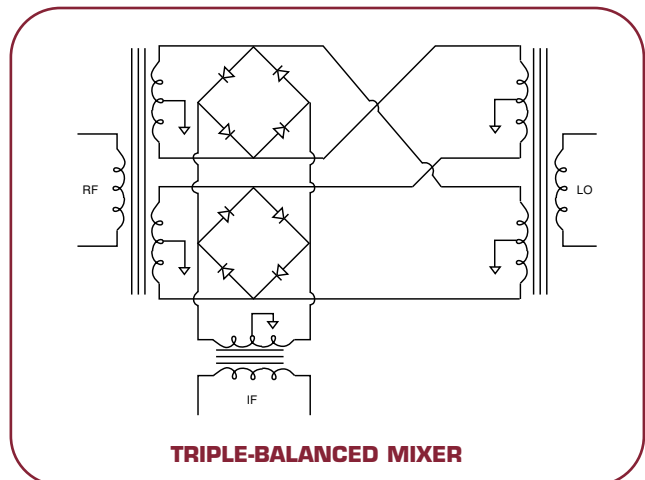


ENVIRONMENTAL TESTING LAB

The triple-balanced mixer employs two diode quads fed by two power splitters at the LO and RF microwave baluns. This architecture allows both ring diode quads to be coupled together with LO-to-RF isolation. The most significant advantage of this circuit is the IF signal is available at separate balanced and isolated terminals. The IF signal is isolated from both the RF and LO ports, thus allowing for overlapping frequencies at all three ports. A disadvantage of this circuit is that it will not yield a DC IF. For applications where translating large bandwidth segments from one frequency range to another with low intermodulation distortions, triple-balanced mixers are ideally suited. The high IF to LO and IF-to-RF isolation of this class of mixer makes the conversion loss flatness much less dependent on IF frequency mismatches.



DOUBLE-BALANCED MIXER



TRIPLE-BALANCED MIXER

MIXER TECHNOLOGY OVERVIEW (CONT.)

MIXER TECHNOLOGY

MITEQ offers a wealth of catalog mixer designs; the majority of the requirements are in supplying mixers to custom applications. To meet this demand our engineers combine all available mixer related circuits in a variety of combinations to achieve desired performance.

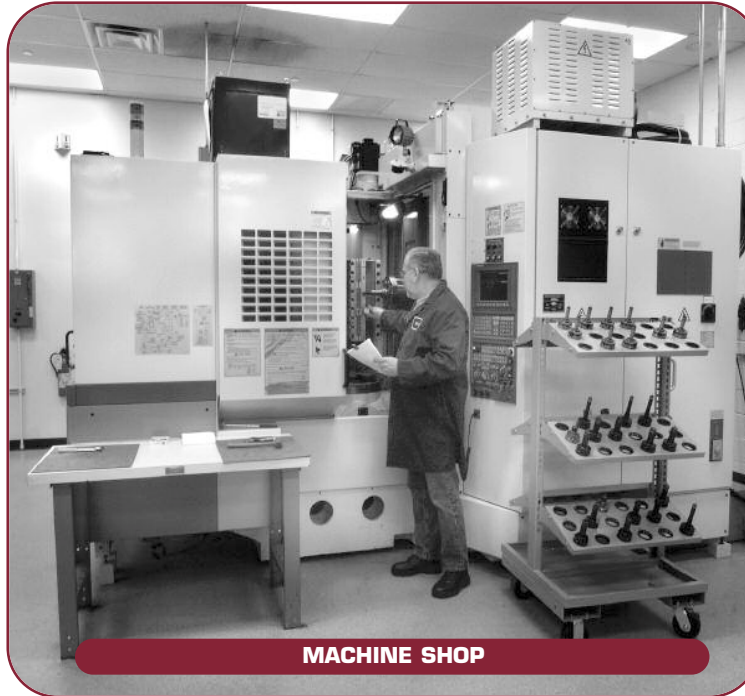
CONSTRUCTION

MITEQ's mixers are manufactured with our internal thin-film hybrid manufacturing process and microwave PC board lab. Our expertise in both the thin film and microwave PC lab has allowed us to achieve truly state-of-the-art broadband performances. The use of MIC construction techniques are used for many applications in the millimeter-wave band, whereas microwave PC boards are used at microwave frequencies.

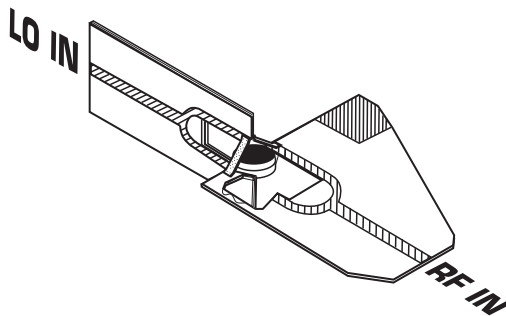
Through the use of our in-house capability of our world class machine shop and glass to metal foundry, we are able to offer tight tolerances for consistent performance.

PACKAGING

MITEQ's mixers are available in various outlines. The hermetic outlines are Kovar chassis with glass fired 50 ohm pins. The connectors are attached directly to the housing thus making it extremely versatile in adapting to coaxial or microstrip applications. Along with coaxial packages, there are a variety of application specific mechanical designs which are offered as standard catalog items, including surface mount, microstrip drop-in, waveguide and desktop.



MACHINE SHOP



TRIPLE-BALANCED MIXER ASSEMBLY

