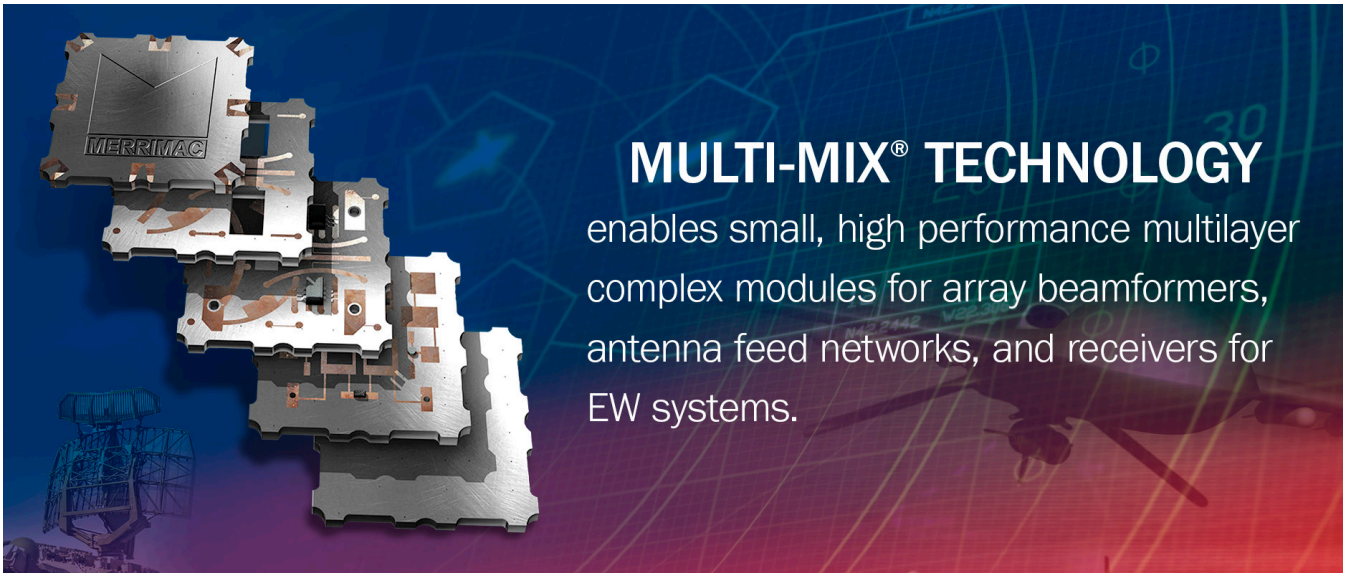


MULTI-MIX® TECHNOLOGY

enables small, high performance multilayer complex modules for array beamformers, antenna feed networks, and receivers for EW systems.

What is Multi-Mix?

Multi-Mix is a multi-layer RF substrate manufacturing process using Rogers RO3000 and RO6000 boards. The layers are fusion-bonded under high temperature and pressure to form a homogeneous structure without the need for Prepreg bonding film. Multi-Mix Technology combines the integration density of LTCC with the design flexibility of PCBs.

Multi-Mix Advantages Versus PCBs

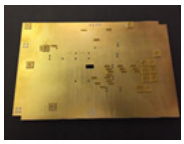
- Unlimited number of true blind and buried vias
- Complex high frequency (Ka-band) designs up to 30 dielectric layers / 60 metal layers
- Can embed copper coins for surface mounting of high-power devices
- Eliminating Prepreg improves power and RF performance
- Extremely tight registration provides excellent phase and amplitude match between RF paths

High & Low Volume Production Lines Available

- Low volume line for quick turn prototypes and high volume line for large production jobs
- Both lines use same technology and equipment to enable quick transition from prototype to product

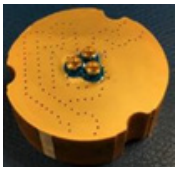
Beamformers & Feed Networks

Applications



- Analog or Hybrid phased array architectures
- Tile or Slat architectures
- RF TRMs for digital phased arrays

Advantages



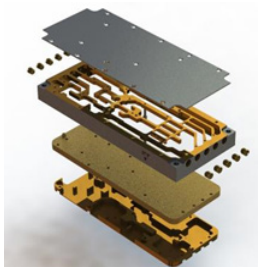
- Compact, high yield, low loss
- HI-REL, space qualified
- Extremely tight phase and amplitude match between RF paths

Examples

- 26-layer Ka-band beamformer with over 500,000 blind vias
- 1x3 BFN 15 layers 1.2” dia x 0.7” thick, space qualified, -100C to + 100C operation

Wideband Low Noise Receivers

Applications

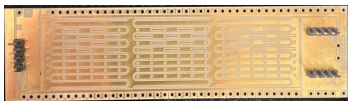
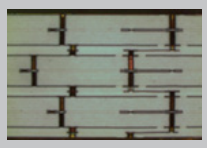
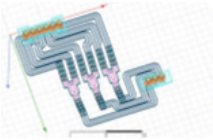
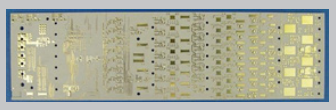


- Compact EW/ELINT receivers for use in UAV and small satellite platforms

Examples

- Four integrated coherent wideband synthesizers in 5” x 2” x 0.5” package
- 10-layer Multi-Mix motherboard with top-to-bottom RF and DC transitions

CRANE®
AEROSPACE & ELECTRONICS

	FEATURES	BENEFITS
	True blind and buried vias, without the need to backdrill and backfill.	Dense, compact structures, well suited to high frequency (e.g., Ka-band) designs for mobile applications.
	Structure can integrate copper coins for improved cooling.	Standard PCBs require wire bonding of high power devices around embedded copper cooling coins. With Multi-Mix, copper coins are fusion bonded to the substrate allowing surface mount attachment.
	Fusion bonding creates modules with excellent structural integrity.	Excellent plated through hole (PTH) interconnect reliability. A 30 layer Multi-Mix structure has passed IPC-650 interconnect stress testing including 1500 cycles at 150C.
	Fusion bonding eliminates need for Prepreg bonding layers.	Multi-Mix fusion process provides a homogeneous dielectric medium for superior electrical performance at microwave frequencies, including lower RF losses and better embedded waveguide performance.
	Extremely tight registration with high frequency designs up to 30 dielectric layers / 60 metal layers.	Form factor flexibility to grow in Z-dimension compared to standard PCBs. Higher product yields for complex, high frequency designs compared with standard PCBs.
	Active devices can be embedded in cover layer cavities.	Active devices including amplifiers, oscillators, and beamformer chips can be integrated in this manner. High isolation is maintained between parallel conductors and between adjacent multi-layers.