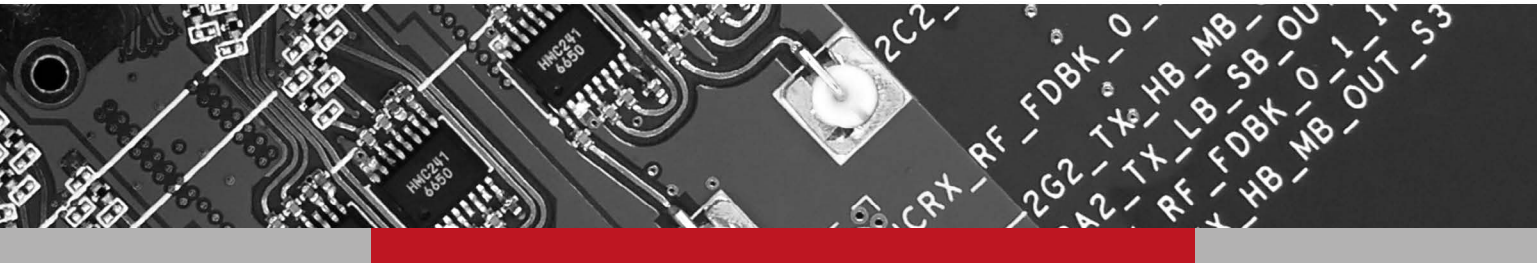


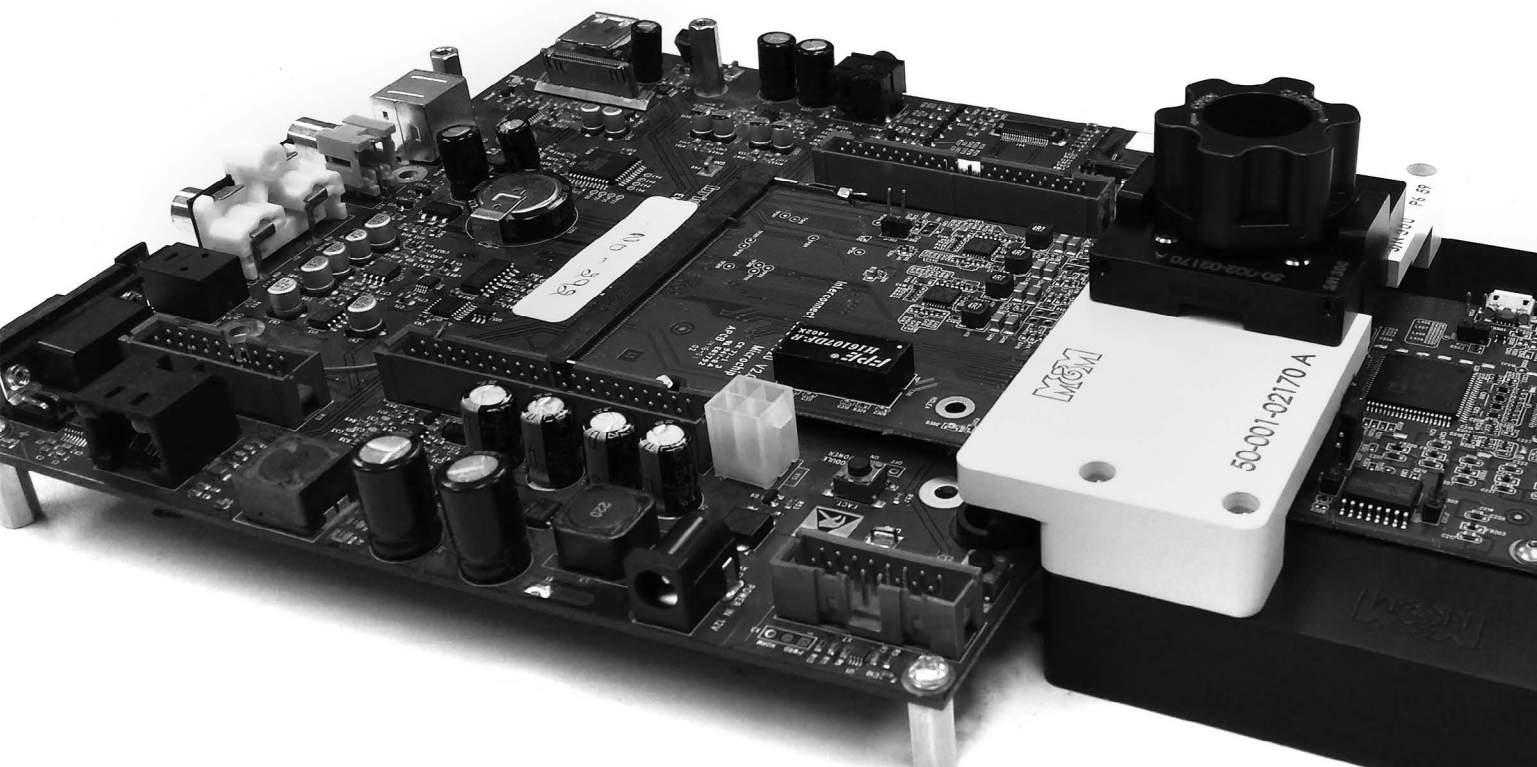
WWW.MMSPEC.COM



Specialties, Inc.



Developing Tomorrows Test Hardware Solutions



ABOUT US



Since 1975, M&M Specialties, Inc. has been a provider of quality consumables for the testing of Semiconductor devices. We are a provider of Printed Circuit Board (PCB), Mechanical Interface Hardware and CEM services for the Semiconductor Test Industry. M&M is a privately owned and operated corporation located in Tempe, Arizona USA.

EXPERIENCE

For over 40 years we have established ourselves as a leading vendor for the design and manufacturing of Semiconductor Test Hardware. Over the years, we have supplied customers with over 14000 PCBs and over 2000 Test Sockets for the use in semiconductor testing.

Our in house engineers have strong industry backgrounds, with years of experience in providing solutions. We are willing and capable of answering any questions you might have at any point in your test preparation process. At M&M we are constantly expanding our capabilities to meet the growing demand for tomorrow's semiconductor testing requirements.

SERVICE

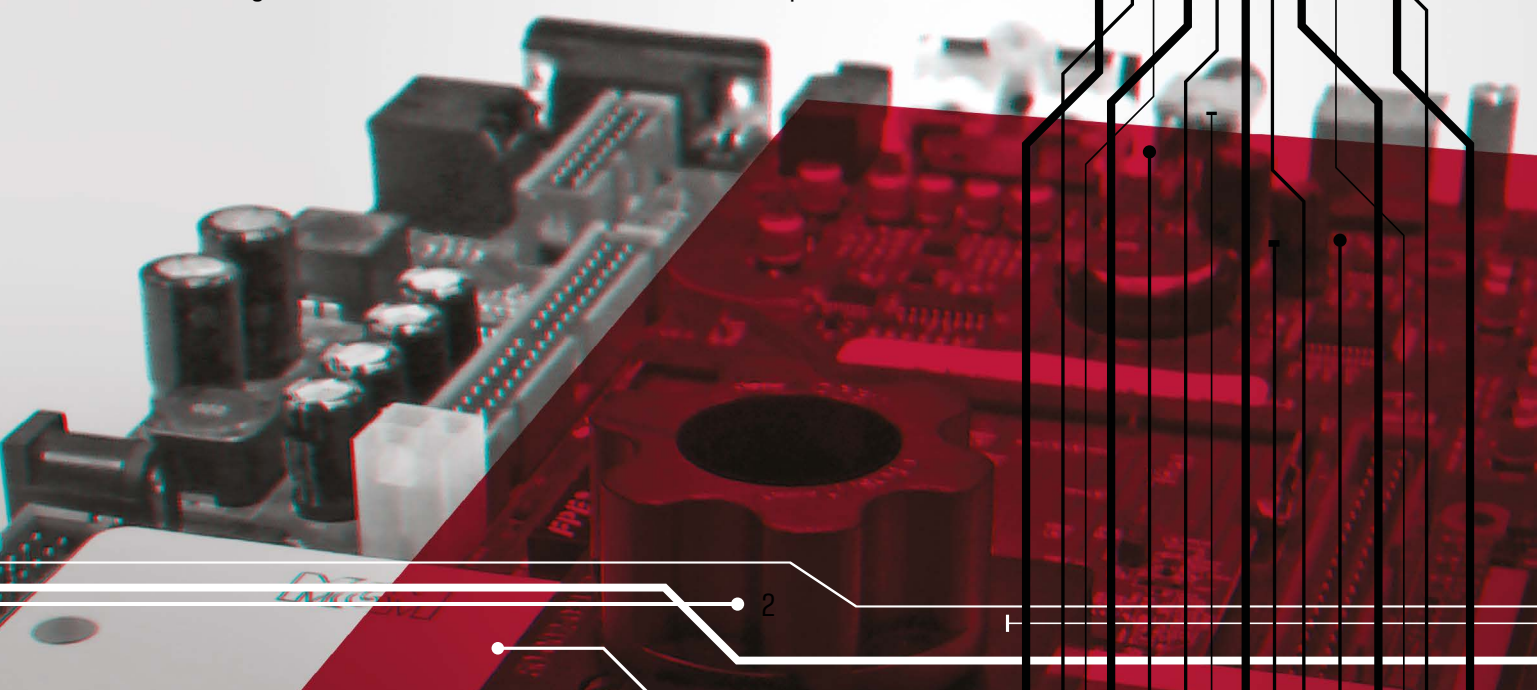
At M&M we recognize the importance and value of our customers. We believe that we are not only providing our customers with a product, but with a service as well. We make it a priority to meet our customers' deadlines as well as exceed their product requirements.

All quote requests are responded to within 24 hours after we receive them. Custom board and socket designs are completed within 5-10 working days. Manufactured boards and sockets are delivered within 1-3 weeks after being approved.

All maintenance requests are addressed promptly, and turnaround is completed quickly and efficiently from our Arizona facility.

QUALITY

M&M prides itself on being one of the only test board and socket providers who manufacture and assemble their products in-house. We are able to oversee each and every step of the process at close range and resolve any issues that might happen before shipment. We ensure that our products meet the high standards that each of our customers expect.



MECHANICAL SOLUTIONS OVERVIEW

Over the last 16 years, M&M has provided 1000's of Test contactors and fixtures for the use of testing and debugging of Semiconductor devices and boards. Utilizing the latest in 3D modeling software, machining and interconnect technologies, we will work with you to provide the best solution for your testing requirements. We can provide solutions for both engineering lab and high volume production environments.

M&M utilizes the latest in spring probe and elastomer contact solutions. We will work with you to select the best contact methodology for your application from a variety of different technologies.

- Spring probes for ≤ 0.30 mm pitch devices and above.
- Spring probes with measured bandwidth for 37 GHz at -1dB.
- Reliable Spring probes with insertions >500K cycles in most cases.
- Lead free solutions:
 - Increased yields
 - Less cleaning
 - Preserves PCB's contact surface
 - Reduces cost of test
- Conductive Elastomer for High speed lab testing available.

Our CNC milling machines have a positioning accuracy of 0.0002" and repeatability of position accuracy of ± 0.0001 " which allows us to supply Test Contactors down to 0.30 mm pitch devices.

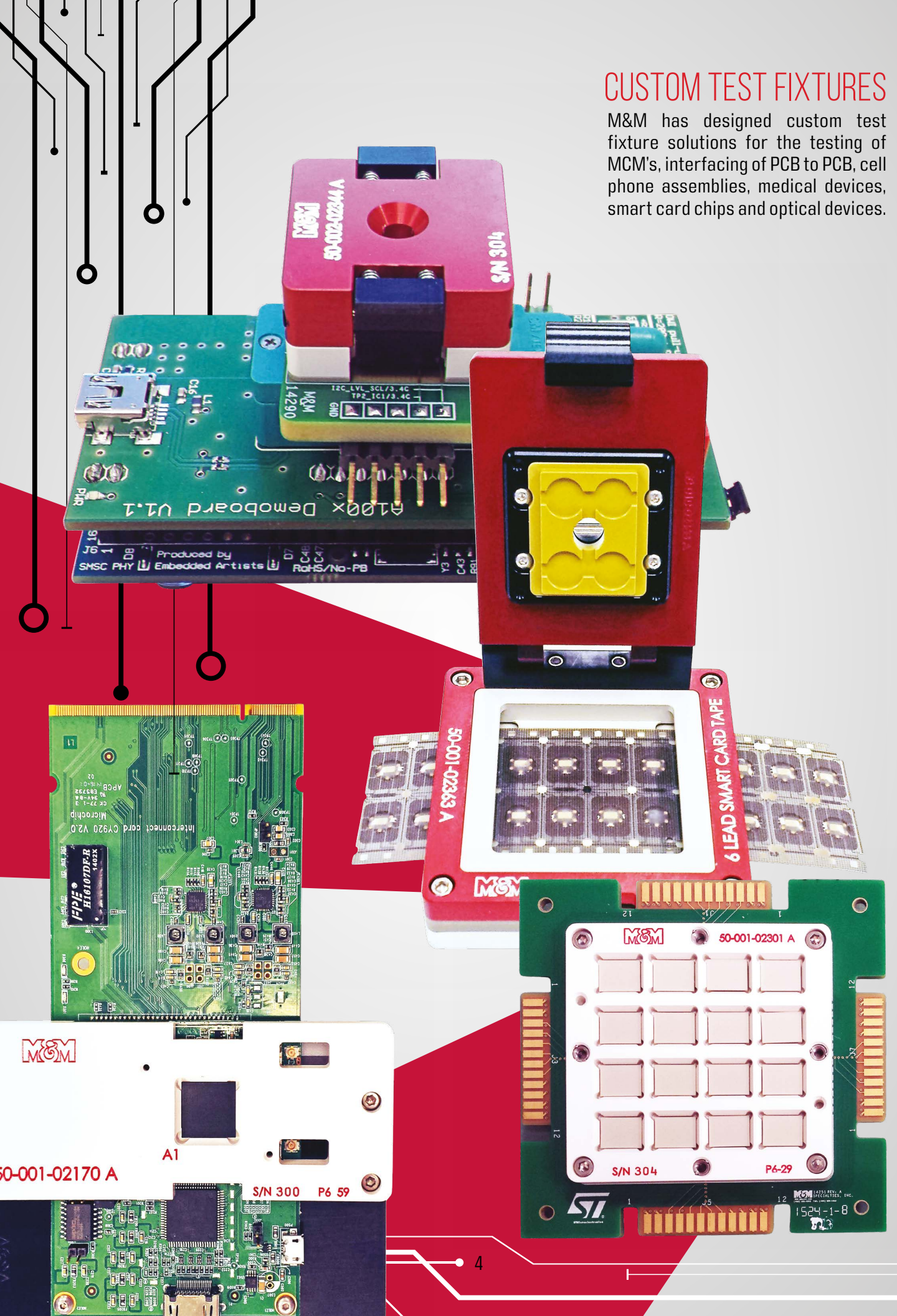
- Experience with MDS-100, Tecapeek, Vespel, Torlon, SEMITRON 480 and a variety of other materials including ESD dissipative plastics.

We provide full maintenance support services at our Arizona facility in a matter of days instead of weeks.

M&M has a cost effective and reliable solution for your testing needs, whether your application is for RF, high current, high power, low inductance, fine pitch, low resistance, or Kelvin

CUSTOM TEST FIXTURES

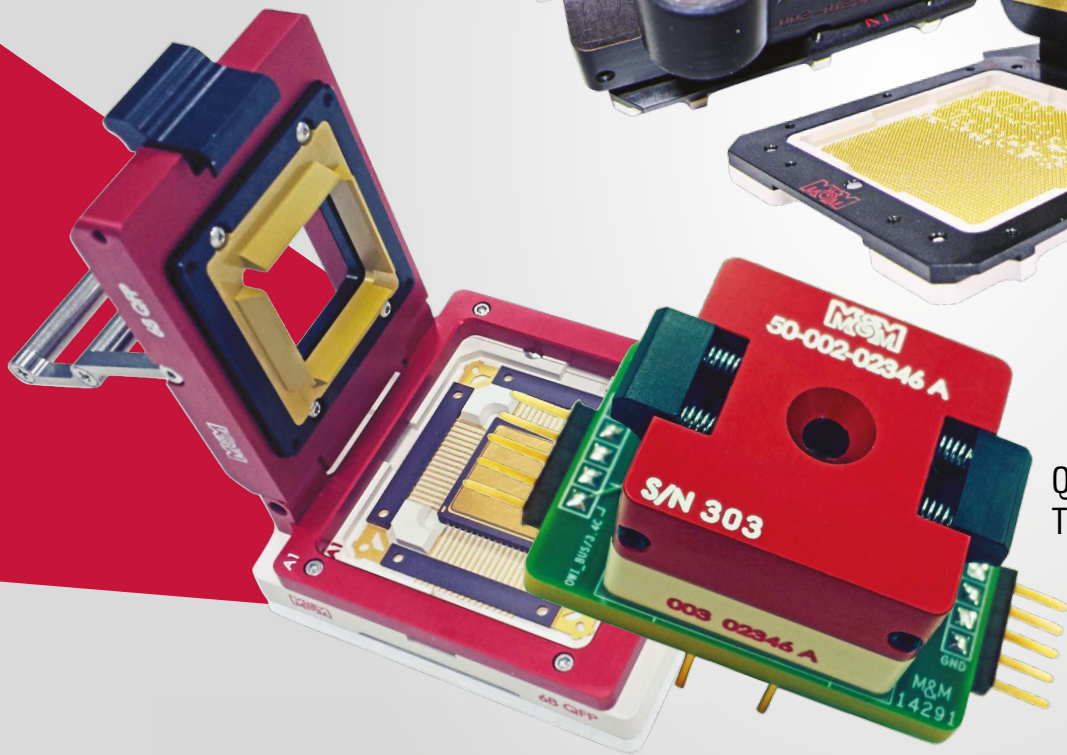
M&M has designed custom test fixture solutions for the testing of MCM's, interfacing PCB to PCB, cell phone assemblies, medical devices, smart card chips and optical devices.



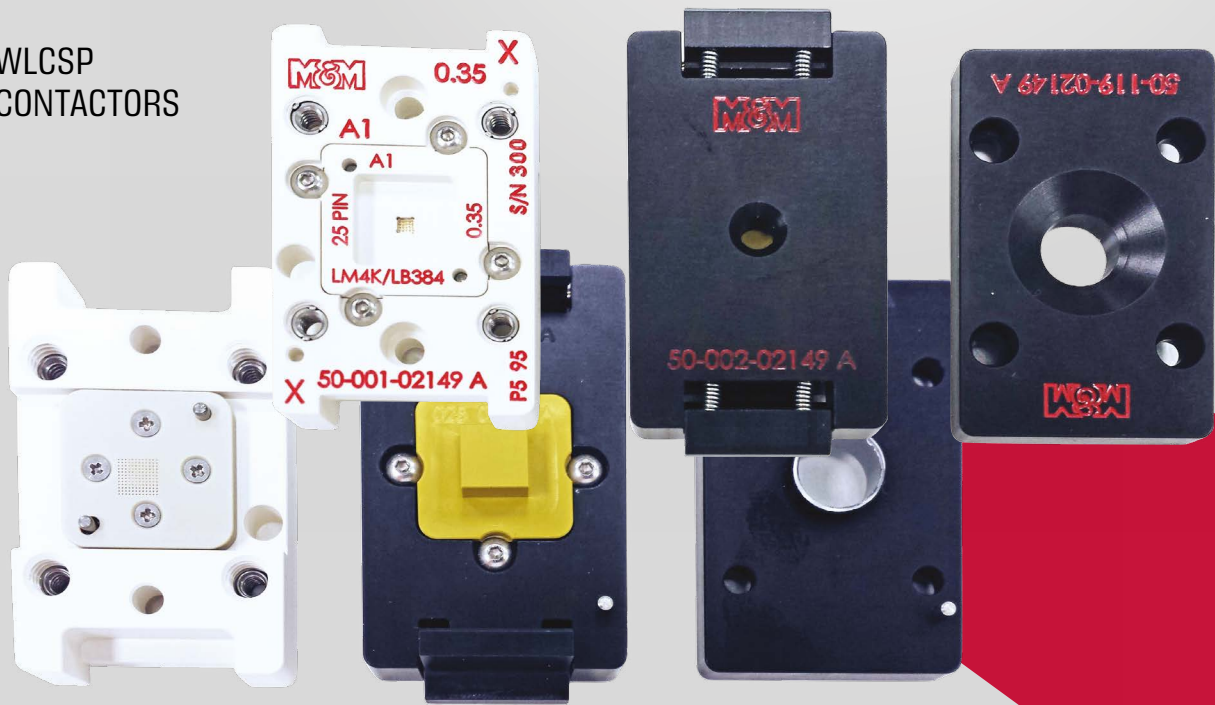
CUSTOM TEST SOCKETS
BGA TEST CONTACTORS



QFN , QFP and TSOP
TEST CONTACTORS

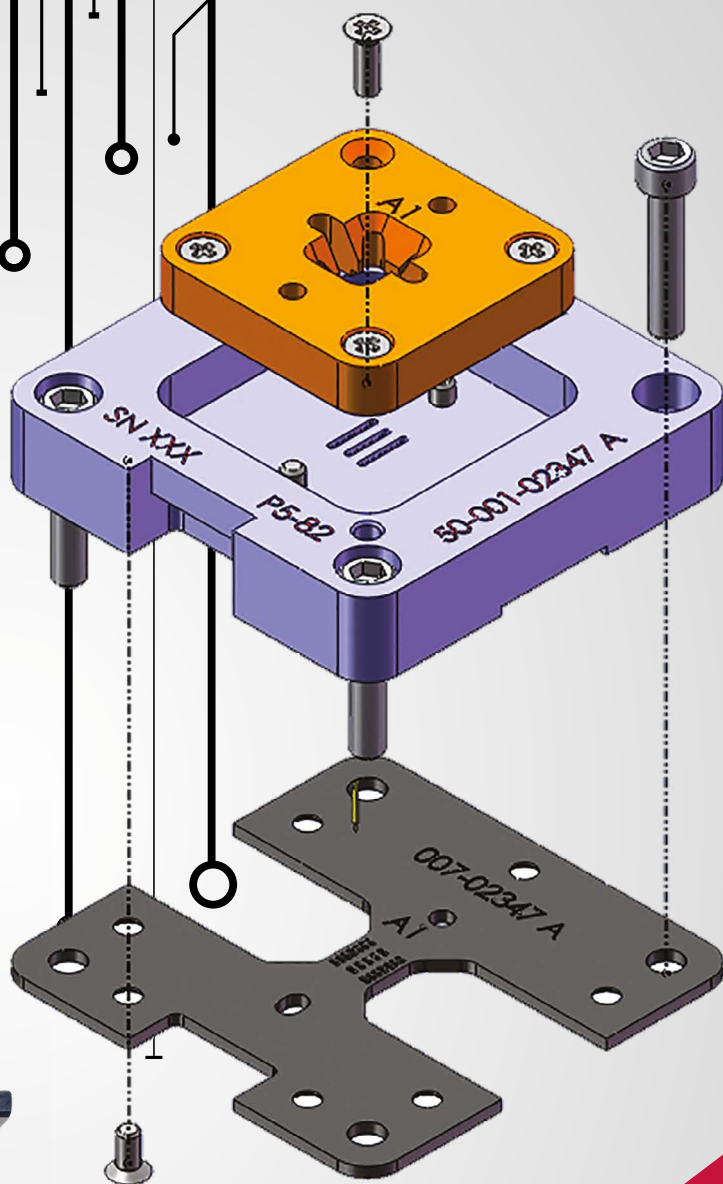
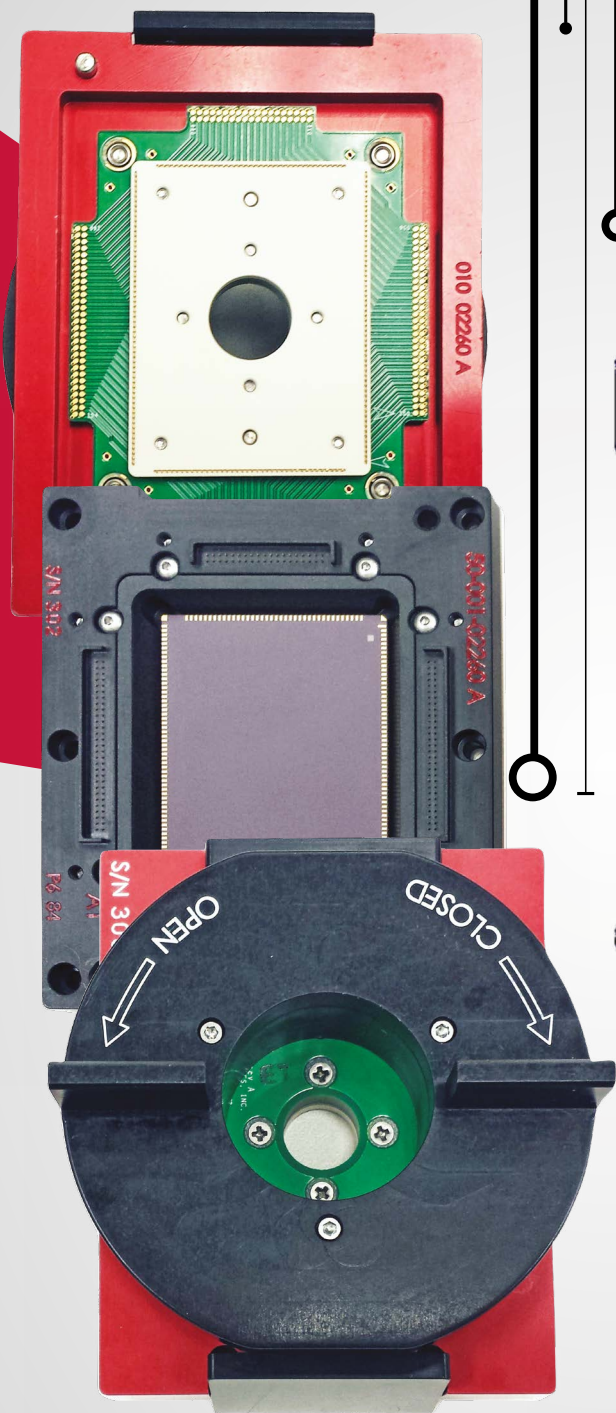


WLCSP
CONTACTORS



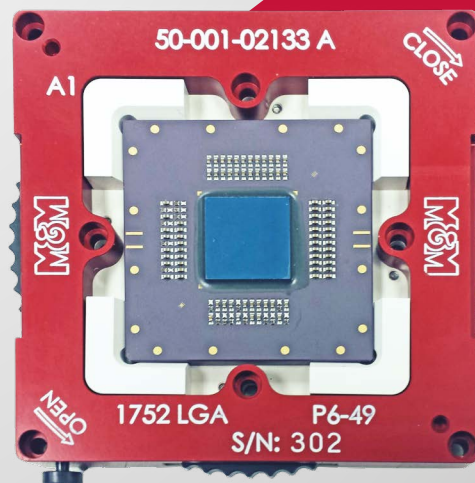
POP TEST CONTACTORS

KELVIN TEST CONTACTORS



CUSTOM FEATURES

Our engineering team will work directly with you to include specific testing features into your socket or lid to accommodate for board component placement and or increased air flow to the top of the IC device.



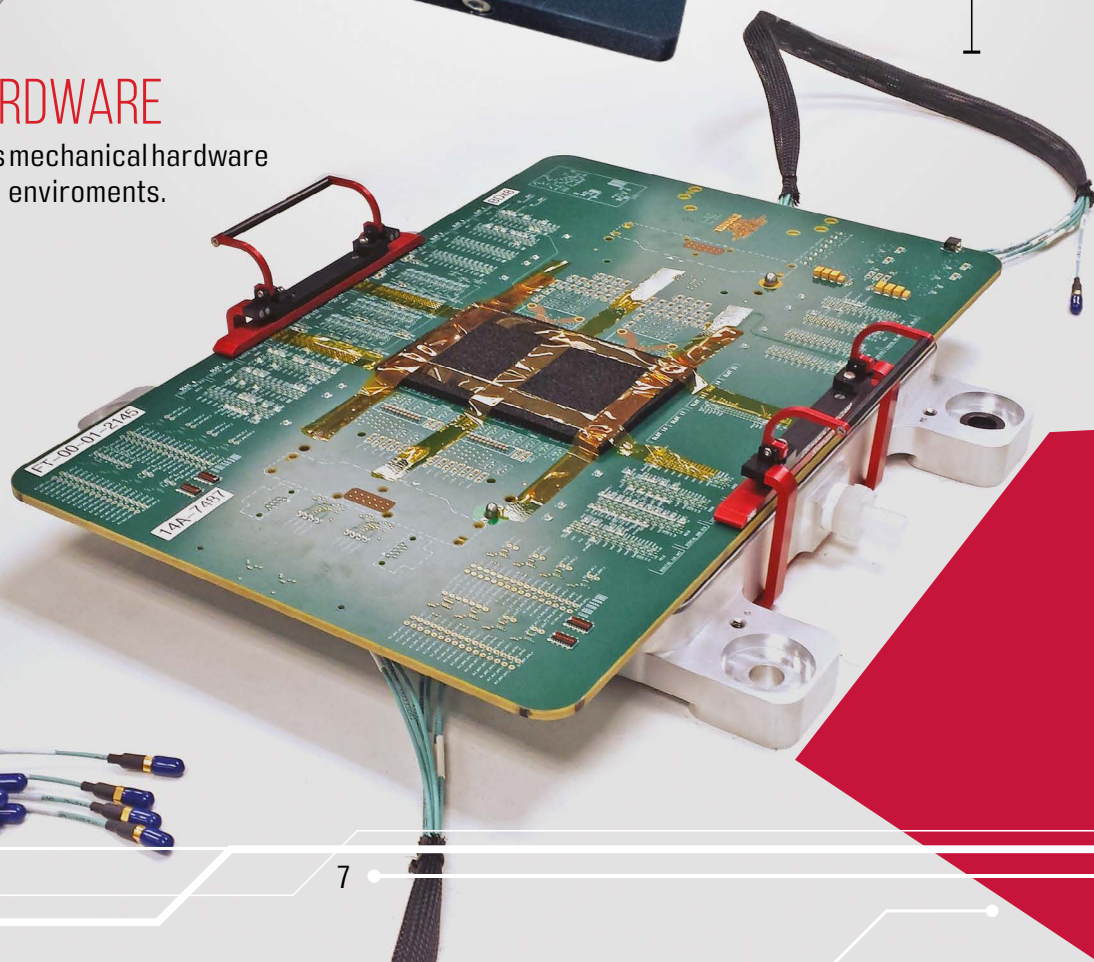
LID STYLES

M&M offers a variety of hand test lids, depending on your application and engineering requirements. All of our lids can easily be removed from the Test Contactors base, to allow for a quick change from manual test to use on a handler for production.



MECHANICAL HARDWARE

M&M has designed various mechanical hardware for use in Burn In and Lab environments.



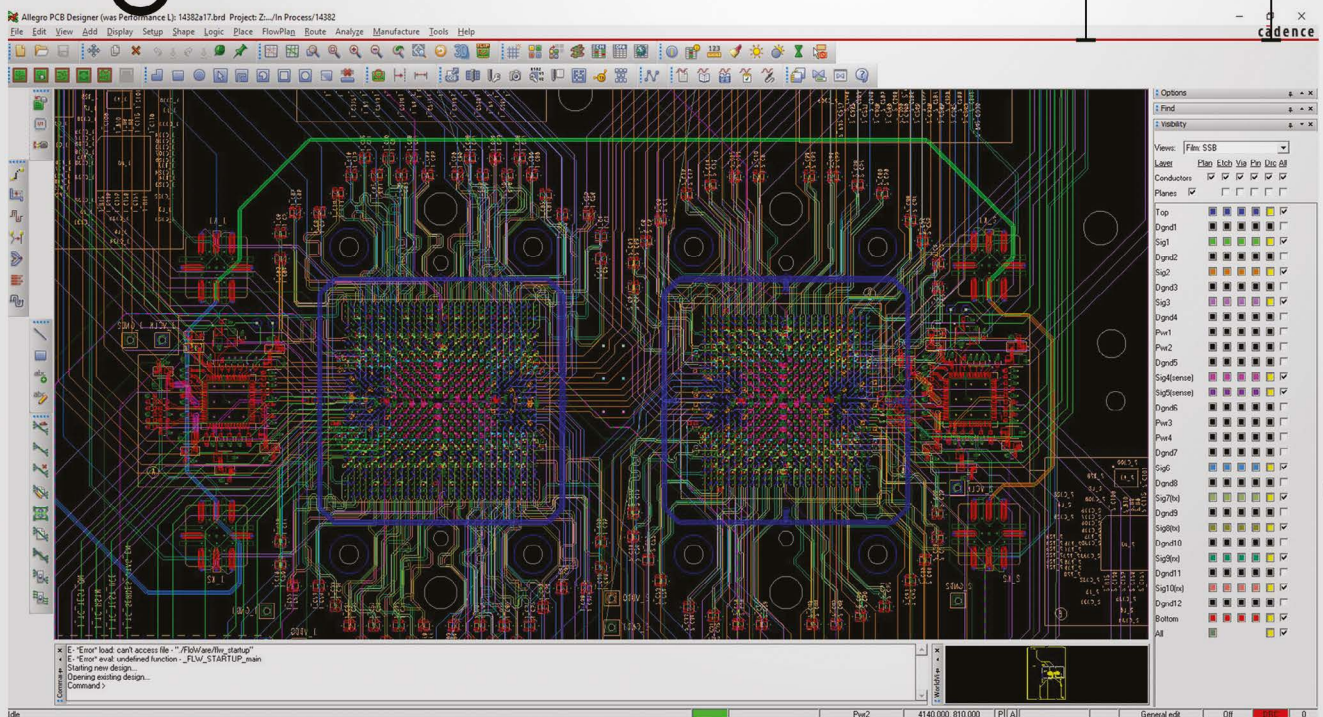
PCB DESIGN SOLUTIONS

For over 40 years, M&M has been providing PCB design, Manufacture and Assembly services for the semiconductor Test Industry. We have experienced designers in house that understand the design requirements for Mixed-signal, High Speed Digital, Low Power and RF applications up to 30g.

SOFTWARE

We use the latest in CAD software tools from Cadence Allegro and Mentor Graphics for design and layout of boards.

- Design & Layout
 - o Cadence Allegro
 - o Mentor Graphics Powerpcb
- Schematic Entry
 - o Orcad
 - o Concept HDL
 - o Power Logic

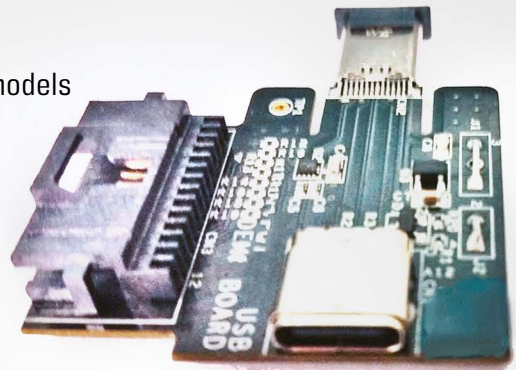


DESIGN CAPABILITIES

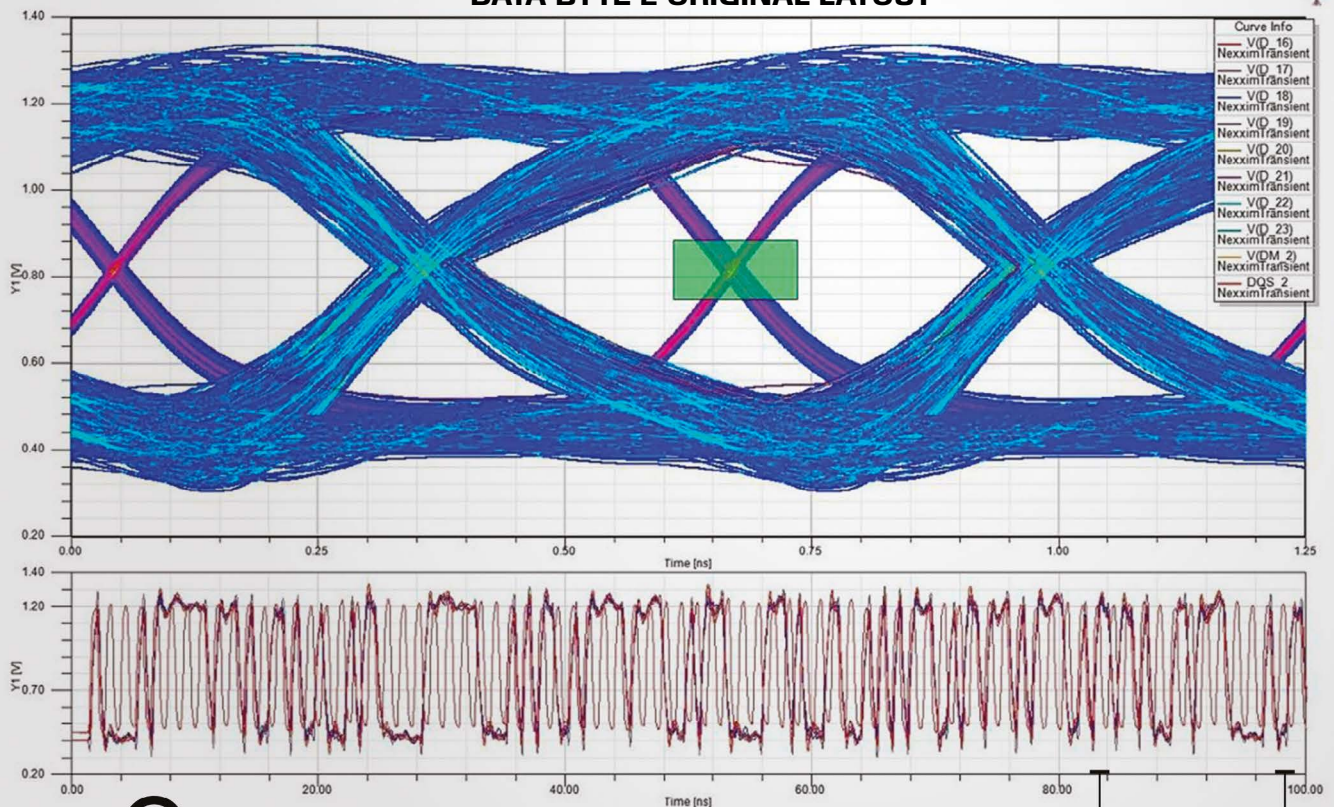
- .003 trace widths with .003 drill to trace spacing
- Pin to pin spacing as low as .35mm on multi-site designs.
- Drill aspect ratio >30:1
- Blind, Buried and back drills to alleviate stubs
- Stacked Vias using HDI technology with 4 lamination cycles.
- 4% impedance tolerance available upon request
- Experience with 44 layers at .290" thickness
- Proper selection of dielectric material (ex. Fr-4, Nelco, Rogers, GeTeK etc.).

PCB SIMULATION CAPABILITIES

- Ansoft HFSS, Sigroty and Hyperlynx with IBIS and HSPICE models
- Return loss and Insertion Loss simulation
- Crosstalk analysis
- Eye Diagrams for critical nets.
- EMC/EMI analysis.
- Via impedance measurement.
- Decoupling solution for PDN.
- Pre and Post Layout measurements



DATA BYTE 2 ORIGINAL LAYOUT

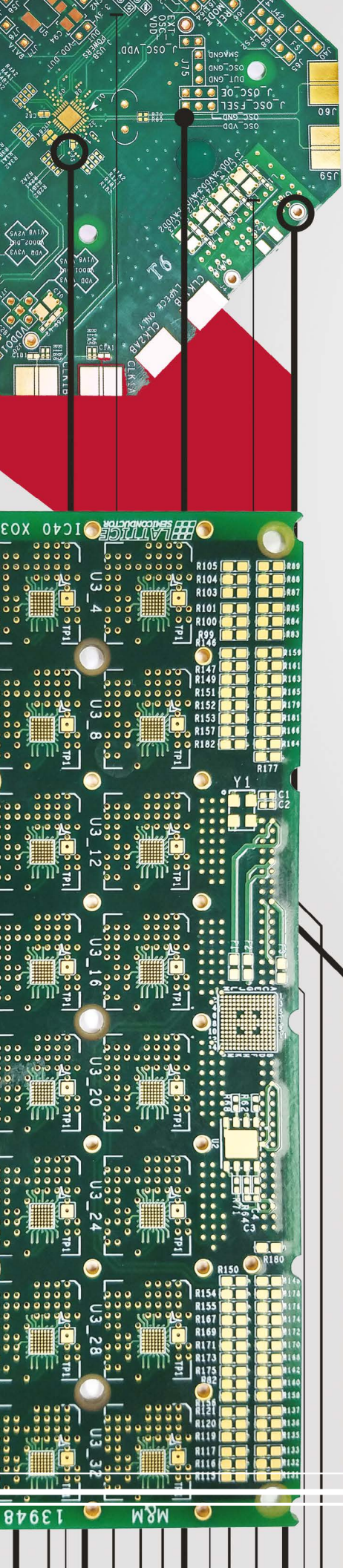


MANUFACTURING CAPABILITIES

- 100% matching of LVS and Gerbers using IPC netlist.
- 2 Phase QC process to verify DRC and DFM.
- Experience with most advanced materials (Arlon, Nelco, Rogers, Getek, etc.).
- TDR reports to show controlled impedance matching.
- Quick turns up to 24 hours on some builds.
- High volume support

ASSEMBLY CAPABILITIES

- Huge Library with trusted Footprints of discretes and ICs
- We keep In house inventory of frequently used parts & components.
- Fully automated BOM and Assembly drawing.
- Pick & Place, Re-flow
- 3-D xray available



SEMICONDUCTOR TEST INTERFACE BOARDS

Semiconductor Test boards from M&M Specialties are made using the latest proven design techniques and materials. They are engineered to meet the ever growing demands for higher speeds – reduced signal reflections, cross talk, and noise for applications into the Giga-Hertz range.

M&M has compiled a wide variety of templates over the last 40 years. We design our boards to be 100% compliant with each tester manufacturers guidelines. All of our templates are created from the manufacturer's specifications.

TYPES OF BOARDS

- ATE Loadboards
- Bench and Characterization boards
- Probe Cards
- Probe Interface Boards
- Custom Mother and Daughtercard configurations
- Reliability, Burn-In, FA Boards

ATE SYSTEMS SUPPORTED

Advantest	Teradyne	LTX/ Credence	Verigy (Agilent)	Others
T5334	CATALYST	Diamond	82000	MCT 2000
T5381	INTEGRAFLEX	LT1101	83000	MCT 3100
T3340	MICROFLEX	LT1001	93000	Mosaid 34
T5581	TIGER	VISTALOGIC	9400	Mosaid 41
T5591	ULTRAFLEX	VISTAVISION	95000	Sentry
T3381	A500	Vanguard	VERSATEST 3300	
T5335	J937	Quartet		
T5592	J750	Octet		
T5593	J971	SC212/312		
	J973	ASL1000/3000		
	J993/5/7	Fusion		
	J994	Delta Master		
	J996	Synch Master		
	ets-364	Array Master		
	ets-800	Delta 50		

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MACHINING SERVICES

M&M provides a wide range of precision machining services to meet your unique parts requirements. We specialize in single-part prototyping, short to medium production runs, and special blanket order arrangements with periodic scheduled releases. We provide precision machining solutions for a wide range of clients, including those in the medical, government, energy, aerospace and manufacturing industries. (insert machine shop pics)

CNC PRECISION MACHINING

M&M features a wide range of precision machining capabilities, including a full complement of computerized and manual milling and turning centers. Our CNC machining department, equipped with CAD/CAM software, has the ability to download customer drawing files from anywhere in the world, greatly streamlining our machining processes. This has given us the ability to provide our customers with shorter turnaround times and a lower cost-per-piece than was possible with previous technology.

Our machines allow our customers to obtain parts with complex shapes and geometries at a competitive price point. This type of precision machining is also incredibly accurate, and provides a smooth surface finish when it is needed most.

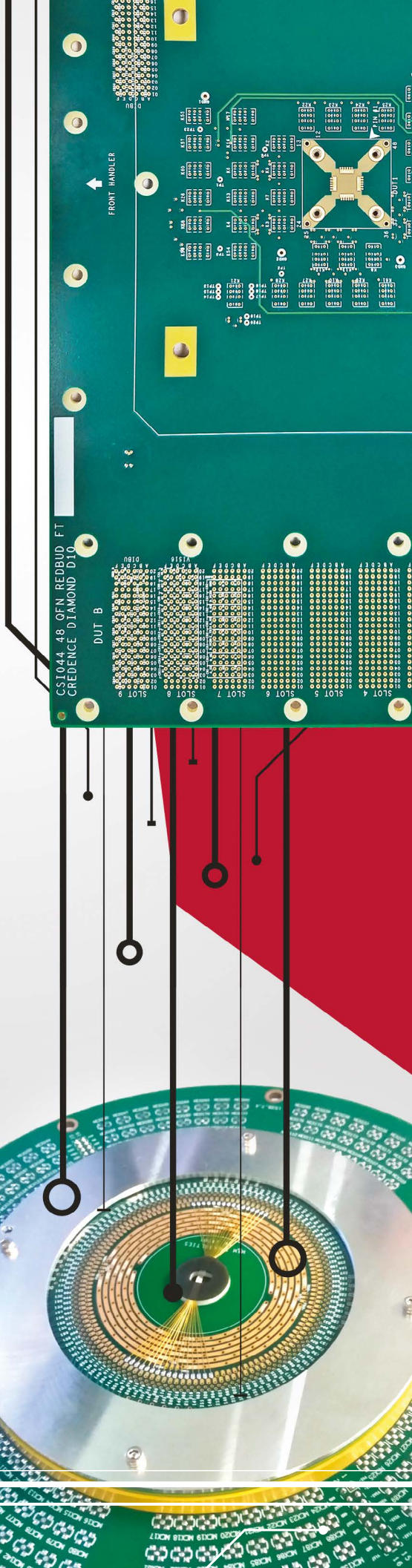
M&M has added automated CMM dimensional inspection services utilizing the latest metrology practices through mutli-sensor inspection. With both touch probe and optical inspection, our CMM measures your product with top precision. From small batch prototyping, or utilizing the automated process for high volume production runs, our inspection services are virtually limitless.

EQUIPMENT LIST

- SOLIDWORKS
- MASTERCAM
- 9 HAAS 3-AXIS CNC VERTICAL MILLING STATIONS
- 1 FANUC ROBODRILL
- 1 BROWN & SHARPE CMM
- 2 RAM OPTICS VISUAL INSPECTION STATIONS.

MACHINING CAPABILITIES

- Positioning .0002"
- Repeatability .0001"
- Hole and cavity tolerances of +/- .0003"



GET IN TOUCH

Thank you for your interest in M&M Specialties, a leading provider of Test Interface Hardware. Feel free to contact us today with any questions you might have, or for more information. We look forward to working with you.

NORTH AMERICA

Printed Circuit Boards (PCB)

Sean Murray

General Manager

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EUROPE & MIDDLE EAST SALES

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