

Announcing JMC Design Services

JMC Design Services Newsletter Volume 1, Issue 1

From start to finish, **JMC Design Services** can assist you in achieving your electro-mechanical design goals. We'll bring a breadth of experience and the tools to assist you with nearly any electro-mechanical design task. From prototype to production, from high volume to one of a kind, from commercial to consumer to aerospace, we have one overriding goal, to work with you to determine what you need, and then, within budget and schedule, exceed those expectations.

Whatever the task, the budget or the schedule, my personal pledge to you is to fully understand your needs and requirements, and then to meet and exceed all of your expectations. Contact **JMC Design Services** to discuss your current or future project and together we'll get it done!

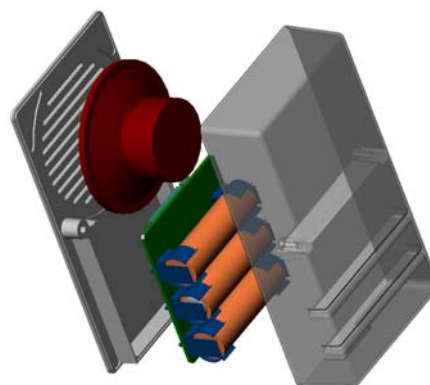
Conceptual Design

A good conceptual design or configuration study will save you significant time and money. Anything and everything that can effect your design will, and a configuration study will reveal the effects of inevitable change. A good design can graciously absorb the effects of the changes you knew might occur and most of the changes that surprise you.

A study may involve a fully parametric driven model or may be as simple as an electronic part listing mapped to a part volume listing. The breadth of issues considered may also be wide or narrow. Structural issues, such as load paths, can effect printed wiring board (pwb) form factor and support options. Thermal considerations are always paramount and need to be based on worst case scenarios. Schedule often has unimagined effects on a design from limiting product features to the type and quantity of pwb interconnects. Cost and availability of electronic components can have enormous effects (to the extent of a complete redesign).

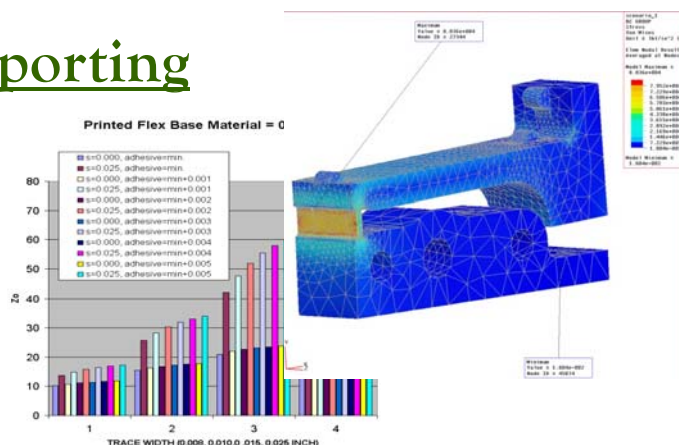
Take a few moments before committing your design dollars to focus in on a configuration which will flex as your requirements evolve. Once criteria are established there is a "best" design. There is no secret to determining your design criteria other than experience and careful consideration.

In other words don't spend your time solving problems, eliminate them by design!



Design Analysis & Reporting

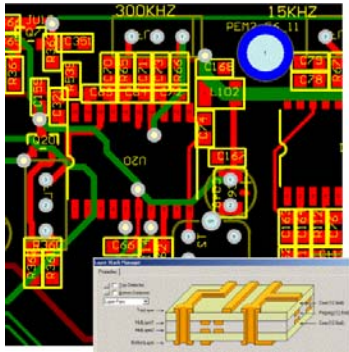
We can pull together the information you need to sell your design concept or to document its function. Be it mechanical FEM analysis, impedance prediction, low magnetic signature design, or loop resistance drops, we can provide the data you need in forms which clearly communicate the information.



Electronics Packaging

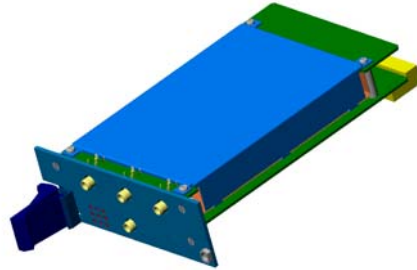
If your tasks involves any phase of electronics packaging, for nearly any environment JMC Design Services is your one stop shop.

- **Schematic entry**, hierarchically arrangement for maximum flexibility, logical and understandable. Most popular electronic input and output formats supported. Tightly coupled to the pwb design for maximum control of placement, line widths, and design rules.
- **Printed wiring board layout**, RF, digital, power, analog, or special applications such as membrane switches and panel graphics. Most popular electronic input and output formats are supported. Fast turn prototyping to fully documented production. Extensive design rule control and reporting capabilities.

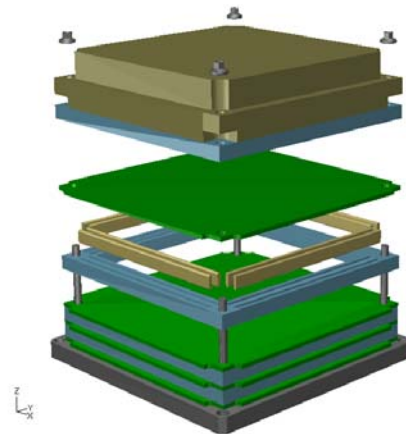


- **Special projects**, burn in fixtures, device package adaptors, potted module design, RF shielding, etching masks etc.

- **Electro-mechanical module design**, in any form factor. Complete module design from pwb design to front panel graphics or any portion thereof. Unique shielding solutions allow mixed technology, high density packages.



- **Innovative solutions to your complex packaging problems**. Innovation needn't be expensive. We'll use common tools and technology in new and unique ways to solve your design issues.

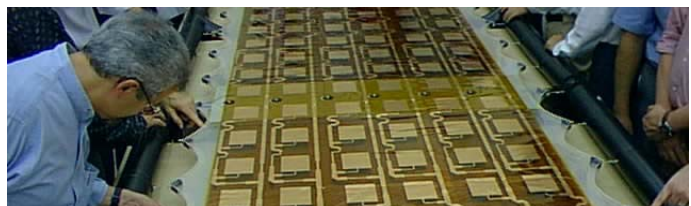


Engineering Support Services

JMC Design Services offers the following engineering support services:

- **Standard electronic library part creation** (schematic & pwb). Built to suit your processes with appropriate geometry, color scheme, layering and attributes in software neutral formats.
- **Standard mechanical library parts creation**. Built to suit your processes with appropriate geometry, color scheme, layering, attributes and material properties in a software neutral format. Table driven families of parts are incorporated as your CAD system allows saving time and money and increasing functionality.
- **Process documentation and authoring**, in preparation for ISO certification or to standardize design processes or training.

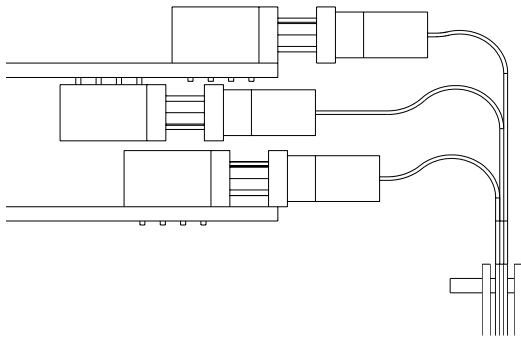
- **Mechanical piece part or assembly documentation**. CAD drawings dimensioned and annotated to ANSI Y14.5M. Drawing check also available!
- **Wire harness design & Documentation**. From rigorous shielding to wire cut lists and peg board layouts.
- **RF printed circuit board design**. From standard to large format with exacting detail to the level you require .



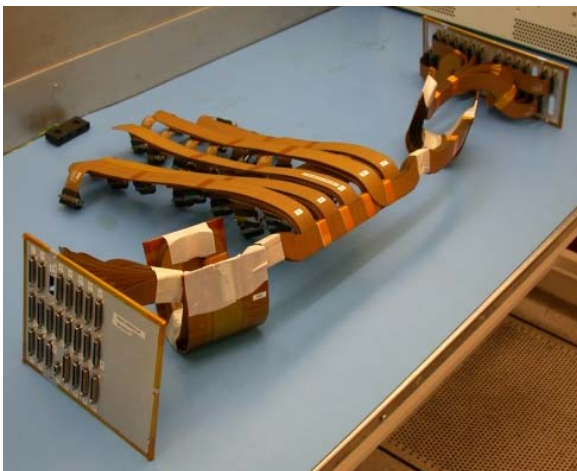
Printed Flex, Rigid-Flex & Flex Cabling

If you require printed flex cabling or rigid-flex printed wiring boards we can fit an appropriate solution to your design needs. With knowledge of both mechanical design, electronic packaging and the tools to bring the two together our flex designs have the form, fit and function to work the first time.

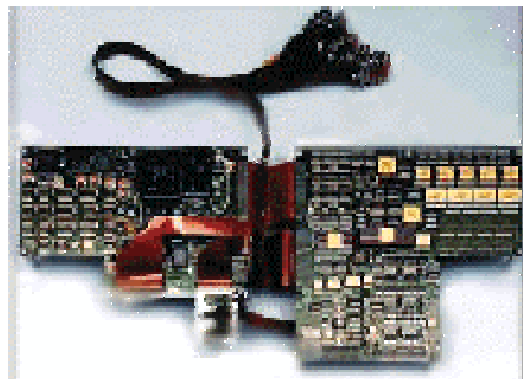
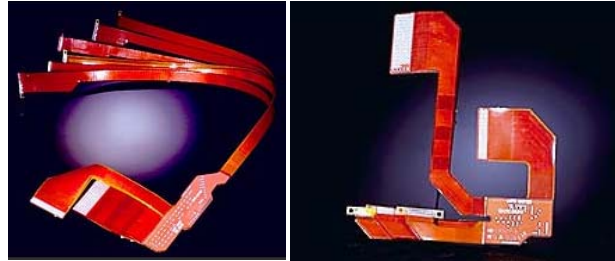
We can either fully develop the flex's form using 3 dimensional solid modeling tools or work with your designer to incorporate printed flex in your CAD model.



- Front panel flex cabling. Save miles of wire, simplify assembly, reduce cost and mass.
- Point to point flex cabling. We can incorporate varied shielding configurations, optimized trace widths, controlled impedance, thermal chokes, live flexing sections, rigid sections, robust connector interfaces, cryogenic materials and virtually unlimited length.



- Rigid/flex cabling. When available space and mass are a premium rigid/flex cabling may provide the answer. The two cables shown to the right provided all the interconnect requirements on the Mars Pathfinder rover. At 30 layers they were the highest layer count produced by our fabricator at the time, but through the use of tried and true design guidelines they achieved normal yields.



- Book binder printed flex pwb
- Flex inter-board jumper cables
- Custom twist capsules
- Membrane switch flex pwbs

I've been designing printed flex boards and cables for over 25 years. From commercial to aerospace, from 1 layer to 30 layers. Find out today how JMC Design Services can help with your design?

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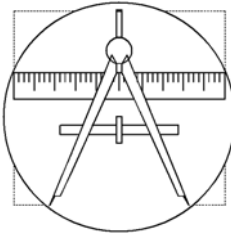
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...together we'll get it done!

We're on the web
www.jmcdesignservices.com

About JMC Design Services



JMC Design Services is the DBA for John M. Cardone, a mechanical engineer with over 25 years of experience in mechanical design and electronics packaging. He has a B.S. degree in Mechanical Engineering as well as extensive experience in numerous CAD tools (including ProE, Solidworks, Computervision, Unigraphics NX, Autocad, Protel, Orcad, Pads). Formerly a senior engineer in the Electro-Mechanical Design Engineering Group at the Jet Propulsion Laboratory, for over 20 years, his tasks there included Electronics and optics packaging, mechanical design and

analysis, design process authoring and spacecraft configuration control. When not working he enjoys ranch life in the Shasta Valley near the northern California town of Grenada.

If you have questions or comments contact me via e-mail at jmc@jmcdesignservices.com .

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