

January 1999

Flex Circuit news

Dynaflex to be Sold Again

It was announced on Thursday, January 7 that Hadco, the parent company of Dynaflex, had reached a preliminary agreement to sell controlling interest of its Dynaflex division to Parlex Corporation of Methuen, Mass. Parlex is paying \$1.8 million for 55% of Dynaflex. Hadco is retaining 45%, but Parlex will have an option to purchase the remainder at a later time.

I am cautiously optimistic about this news. Hadco, the largest maker of rigid circuit boards in North America, has had little interest in the flex circuit industry and Dynaflex has been receiving only token attention from Hadco management. Parlex, however, is a high volume flex circuit manufacturer, so Dynaflex should benefit from corporate managers who both know the industry and are interested in their growth. Dynaflex gives Parlex the ability to build prototypes on a quick turn basis, an ability they presently do not have, and Parlex gives Dynaflex high volume production capability for those projects that grow beyond the prototype phase.

I hope that Parlex realizes how special the people are that work at Dynaflex. Without them, Dynaflex is just some leased buildings with used equipment inside. Unlike the East coast there are several prototype flex manufacturers within 15 miles of Dynaflex and new ones are starting up. Any one of them would love to have Scott, Helen or the other key people come and join them.

Welcome... to *Flex Circuit News*, a monthly electronic magazine about all aspects of the flex circuit industry. The purpose of the magazine is to provide useful information to engineers, production managers and purchasing professionals who use or are considering using flex circuits.

Flex Circuit News will only be published electronically, in Adobe Acrobat PDF format. This way you can store copies on your hard drive for future use, easily forward the magazine to a colleague, and cut and paste text for e-mail and other purposes. If you need a hardcopy, just print it out! In addition, there are links throughout the magazine to the web pages of those companies or individuals mentioned in the articles, as well as links to advertisers web pages. Also, by staying with electronic publishing, we can be faster on our feet – if something important happens we can update the magazine right up to the moment of release.

There are links throughout the magazine to the web pages of those companies or individuals mentioned in the articles, as well as links to advertisers web pages. Look for the pointing finger.



I look forward to chatting with you monthly in these pages.

Best regards,

Tom Woznicki
Flex Circuit Design Company

Prototype Shops for Flex Circuits

Most every flex circuit maker will make prototypes for you if you plan to order millions of circuits in production. But what if you only need a couple dozen? Or what if you need protos in two or three days? Where do you go?

Fortunately, there are excellent flex circuit makers that specialize in prototypes and super quick lead times—sometimes as fast as 24 hours. These shops are lifesavers for engineers working on extremely aggressive schedules. Also they are often the only places you can go with modest production volumes.

Tom
Woznicki

This article will look at some of the better flex prototype shops in the country. It is not an exhaustive list, but they are all companies I have either worked with or heard good things about.

In Silicon Valley there are four proto shops where my customers have had many flex circuits built: Cirexx Corporation, Dynaflex Technology, Lenthor Engineering, and Tyco-Flex.

See "Prototype Shops" on page 2

"Prototype Shops" from page 1

Cirexx Corporation is exclusively prototype – they gladly build small quantities quickly but routinely no-bid any production volumes. About 30% of their sales are flex prototypes, the balance being rigid and microwave boards.

Dynaflex has been in business almost ten years. They are unique in that they only make flex circuits – no rigid boards. They are primarily a prototype shop, but have the ability to support medium-level production volumes. Dynaflex was acquired by Hadco almost one year ago and operates as a wholly owned subsidiary.

Lenthor Engineering has also been around for over ten years. About 60% of their sales volume is flex circuits, the balance being rigid boards and microwave boards. Lenthor also has the ability to support medium-level production volume and has some assembly capability.

Tyco-Flex is the flex proto division of Tyco Circuits. They used to be the stand-alone flex division of Sigma Circuits. Tyco acquired Sigma Circuits and the flex division has been absorbed into the Santa Clara rigid board proto facility. So far they have been able to handle the transition and continue to be able to provide quality flex prototypes for their customers with no significant change in customer service.

In the Los Angeles area there are two good proto shops I have worked with: Q-Flex and GC Aero. Q-Flex is located in Norwalk, California. They only make flex and rigid flex—no rigid boards. They are small but extremely versatile, in fact they just completed

an 88 layer flex circuit – must be a world's record!

GC Aero is in Torrance, California. They have been building flex circuits since 1980. They too only make flex circuits and have recently installed pick and place SMT assembly equipment so they can provide their customers a turnkey flex assembly.

How do you make flex circuits in 24 hours?

You have to use routers to cut the circuit perimeter. Usually flex circuits are punched out of panels by steel rule dies (or in high volumes, class A hard dies). These proto shops have developed the techniques to use routers instead of steel rule dies. The routing method is more accurate than steel rule dies, and saves lead time since you don't have wait for the steel rule dies to be made—you just program the router and away you go. You can still use steel rule dies to make prototypes if you can live with the few extra days of lead time. Steel rule dies do cut a cleaner edge and can be used for medium volume production to punch out thousands of circuits.

In Northfield, Minnesota is another good proto shop I have worked with – Allflex. Allflex only builds flex circuits. They mainly cater to the prototype market but they can support medium volume production. Allflex can provide some hand assembly of passive components on flex circuits for those customers that want a turnkey solution. Allflex is the only proto shop I know that builds polyester flex circuits – i.e. copper on polyester. Polyester is a great material for flex, especially if the circuit is large because polyester is much less expensive than polyimide. The disadvantage is that

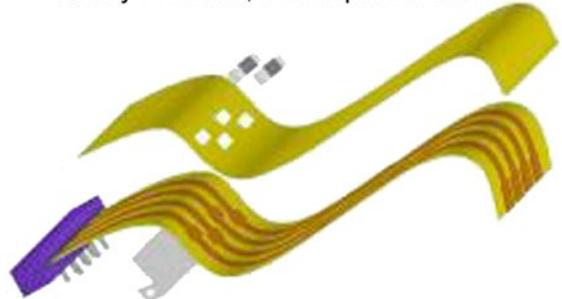
polyester cannot withstand temperatures found in most soldering operations – it melts. However Allflex has developed techniques for soldering to polyester! So if you have a large flex circuit and cost is a concern, check out Allflex.

Some other shops worth exploring – Uniflex is a new company here in San Jose, California that was started by several people who left Dynaflex to go out on their own. Their volume is small, but the people working there are very experienced. Recently one of my customers had some very challenging circuits built at Uniflex (3 mil lines and space, bondable gold) and the parts turned out great.

Brothers International has been around for a long time building rigid board protos and recently they hired an engineer from Dynaflex to help them get into the flex proto business.

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A shop on the East Coast worth exploring – American Circuits in Charlotte, North Carolina. I have never worked with them, but a customer of mine referred them to me and I gave them a call. American Circuits is a small shop and only does about 5% of their volume in flex. Their line and space capabilities are not as good as I'd like (they prefer to stay at 8 mil lines and spaces, but can do down to 5 mil lines and spaces). However, they have been in business almost nine years and my customer has been pleased with their service. They also

have the capability to provide hand assembly, so they can provide turnkey prototype service.

Finally, there is one excellent flex shop – LE Flex in Carlsbad, California. I wouldn't necessarily call them a prototype shop because their emphasis is not on quick turn prototypes. What they are fantastic at is building unusual, technically challenging flex circuits. In fact, their motto is, "When unique is what you seek." So if you have a very unusual circuit that no one seems to be able to build, give LE Flex a call.

I would be interested in your feedback, especially if you live in the Midwest or the frozen East. Let me know what proto shops you have found that deliver good quality flex circuits quickly, and if you disagree with my recommendations, let me know that too. We'll print your feedback in next month's issue.



Prototype Shops at a Glance

Allflex Inc.

1705 Cannon Lane
Northfield, Minnesota 55057
Phone: 507-663-7162
Fax: 507-663-1070
www.allflexinc.com



American Circuits

3525 Latrobe Drive
Charlotte, NC 28211
Phone: 704-442-5728
Fax: 704-442-7089
www.americancircuits.com



Brothers International

2964 Corvin Drive
Santa Clara, California 95051
Phone: 408-749-8811
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Cirexx Corporation

3391 Keller Street
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Phone: 408-988-3980
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Toll Free: 800-444-6817
www.Cirexx.com



Dynaflex Technology

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GC Aero

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Phone: 310-539-7600
Fax: 310-326-7903
www.gcaero.com



LE Flex

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www.Leflex.com



Lenthor Engineering

1506 Gladding Court
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www.Lenthor.com



Q Flex

1220 South Lyon Street
Santa Ana CA 92705
Phone: 714-835-2868
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Tyco - Flex

Santa Clara, California
Phone: 408-727-9169
Fax: 408-654-5806

Uniflex

182 Angela Street
San Jose, California 95125
Phone: 408-998-5500
Fax: 408-998-5505
hometown.aol.com/uniflexcir



New Flex Proto Shop in San Jose

Flex Interconnection Technology is now the new kid on the block here in Silicon Valley. Started by Chetan Shah, former VP of Operations/VP of Technology at Lenthor Engineering, FIT will be opening their doors later this month on Park Avenue here in San Jose. Joining Chetan is Steve Barnes, an experienced salesperson who sold supplies and equipment to the pcb industry, and two silent partners. According to Chetan, FIT will have a unique advantage because they are partnered with a rigid board company that is right next door, so they don't have to go out and purchase standard production equipment such as drills, routers, etchers, etc. They will instead concentrate on purchasing more advanced manufacturing equipment, such as lasers, to be able to make more technically challenging flex circuits. You can reach FIT at 408-288-8625.

IPC Flex Conference set for June in Denver—Call for Papers

The IPC announced the Fifth Annual IPC National Conference on Flex Circuits will be held June 8th through 10th

in Denver, Colorado. It will be held at the Holiday Inn at the Denver International Airport.

This is a great opportunity for OEM engineers and flex circuit folks to come learn about what's new in the flex circuit industry. It's also a

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It's non-stop information for designers, manufacturers, and customers of flex circuits and flex based products. Attend a flex focused workshop on June 8. Visit the table top exhibition and the comprehensive technical conference June 9-10. Attend IPC technical committee meetings on flex circuit and materials standards.

Technical Conference and Table Top Exhibits - June 9 & 10
Workshops - June 8

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Denver International Airport
Denver, Colorado



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For information on the table top exhibits or the technical conference, please contact John Riley at 847/790-5308 or e-mail at: JohnRiley@ipc.org. For information on the technical committee meetings, contact Chris Jorgensen at 847/790-5328 or e-mail jorgch@ipc.org.

great opportunity to give papers! Papers are being sought in all areas including:

- New Product Applications
- National and World Market Trends
- Design Strategies for Flex
- Material Alternatives
- Processing Innovations
- Fine Line Flex - Increasing Circuit Density
- Flex Assembly
- Fine Pitch and High Density Packaging for Flex
- Reliability and Testing Data

Presentations can be between 30 minutes and one hour in length. To be considered, submit an abstract of 200-300 words along with a brief biography to John Riley at johnriley@ipc.org.

The conference is \$395.00 for IPC members and \$495.00 for non-members. Presenters receive full conference admission at no charge. There will also be tabletop exhibits. For info on the exhibits contact John Riley by e-mail or call him at 847-790-5308.

Upcoming Courses on Flex Circuits

In March there will be two conferences with opportunities to learn more about flex circuit technology.

The IPC's PCB Expo will be held in Long Beach, California on March 14th through 18th. On Sunday March 14th there are two all-day tutorials offered.

- T-10 Flex Circuit Technology – tutorial offered by two industry gurus, Tom Stearns, and Bill Jacobi. It is a very thorough course that covers flex application, design and manufacturing.
- T-11 Design for Flex – by Russ Griffith from Tyco. This is a new workshop that will focus on design for flex, though it will touch on other areas such as applications,

manufacturing, etc. Russ is a sales application engineer for Tyco.

On Monday, March 15th from 2:00 to 5:00 Joe Fjelstadt, another industry guru, will offer a workshop for rigidboard shops: W-30 – Stepping up

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to Flex: Bringing Flexible Circuitry to Your PWB Facility.

You can get more information on these and other presentations at www.ipc.org/html/framesetexpocov.html and click on tutorials/workshops.

Printed Circuit Design Magazine has it's PCB Design Conference West on March 22nd through 26th at the Santa Clara Convention Center in Santa Clara, California.

Joe Fjelstadt will be teaching two courses on design: 051- The Design of Flexible Circuits I and 071 - The Design of Flexible Circuits II. Both will be held in the afternoon on Wednesday March 24th. As the titles imply, the first course is an introductory session, and the second course picks up where the other one leaves off.

There is a third course about flex in the morning on Thursday, March 25th: 082 - A New Approach to Flex PCB Design. This course will be taught by Anthony Cutler of Zuken-Redac. On reading the description, it sounds as if it will just be a presentation on the advantages of Zuken-Redac software for designing flex.

For more information on these courses and the rest of the conference go to www.pcbdcon.com/pcbwest

In Future Issues...

In addition to industry news and vintage Dilbert, we are planning articles on the following subjects:

- Hot bar soldering of flex circuits—when is it appropriate, how to do it, who sells the equipment
- CAD systems for flex—what do people use, what works best, what does each system cost
- Overseas flex production—who is making flex in the Far East and Europe
- Book Reviews—what to read if you want to learn more about flex
- Applications—how other OEMs have used flex circuits to make their products better
- Fine Line Flex Circuits—who builds circuits below 3mil lines and spaces
- Rigid Flex—how to use rigid flex in commercial applications, and who makes it

Flex Circuit News is a monthly newsletter published by Tom Woznicki and Flex Circuit Design Company in San Jose, California. It is dedicated to providing information about all aspects of and promoting the use of flexible printed circuits in interconnection and electronic packaging.

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To submit a story for *Flex Circuit News*, send an abstract along with the author's credentials to: Twoznicki@AOL.com, or to the mail address below. For information on advertising in *Flex Circuit News*, contact Tom Woznicki at: Twoznicki@AOL.com or call 1.408.629.8343.

Flex Circuit Design Company is a consulting company that specializes in designing flexible printed circuits for OEMs and flex circuit manufacturers.

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