

Enable your technology

with the precision of light



Precision
Medical
Converting
Group

There are no limitations —

productivity

You're looking for a real partnership in process development.

You've found it. We are your committed contract manufacturing partner. When we begin any process development program, our Precision Medical Converting Group first works closely with you to understand your part requirements and builds a program to meet your production and quality requirements. We tailor a process to produce your parts economically and on time. We are not just an applications laboratory for proof of process. Instead, we go beyond feasibility to define and validate your entire production process. Then you can either continue the production with us or move it to your manufacturing facility. For custom material handling such as a multi-layer laminator, we supply the proven LaserSharp® Digital Converting equipment and work with your integrator to make sure the system meets all production requirements. The completed system can remain with the Precision Medical Converting Group running on a contract basis or moved to your production facility.

Your medical component features are so intricate they're impossible to produce.

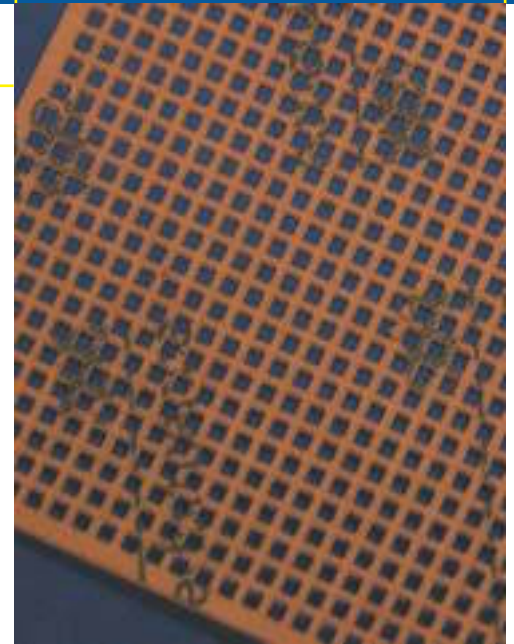
Not with LaserSharp® technology. You can create more intricate part features than you can with conventional die-cutting. Multiple converting processes such as cutting, scoring, perforating, scribing, and marking can be completed in one step with LaserSharp® technology.

Your production run has stopped again because of adhesive build-up.

This will never happen with LaserSharp® technology. LaserSharp® Digital Converting is a non-contact process ideal for converting adhesive materials that are problematic with hard tooling. LaserSharp® technology controls adhesive flow and build-up and can consistently remove slugs for better part quality and productivity. Whether your material is medical tape, adhesive laminates, conductive inks, or most other non-metallic material used in the medical device industry, you can easily process it in roll or sheet formats with LaserSharp® technology.

Conventional Tooling just doesn't cut it anymore.

As medical devices advance and become intricate, as time to market becomes shorter, the practical limits of conventional tooling are being reached. The answer? LaserSharp® Digital Converting! The Precision Medical Converting Group exclusively uses this revolutionary new manufacturing process for today's complex medical devices. Using LaserSharp® technology, hard tooling is eliminated along with all of the costs, delays, and limitations associated with traditional converting methods. Production challenges that are nearly impossible to resolve are just another day at the shop for us.

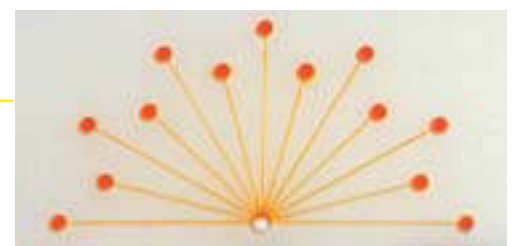


“Enable
your
technology
with the
precision
of light”

Top photo: A LaserSharp® digitally converted component produced from 467 3M adhesive with a square size of .06 inches with a ribbed area of .03 inches. The non-contact laser process eliminates adhesive build-up and part distortion.

Bottom photo: Close-up of a micro-fluidic sample showing the intricate detail possible with high-speed LaserSharp® technology. The line width of the starburst is .003”.

LASERSHARP
DIGITAL CONVERTING



possibilities

only possibilities

design

Your medical component design has changed ten times.....in one week.

No problem with LaserSharp® technology. We can make changes faster and less expensive than mechanical tooling, with no slippage of your critical timelines. Design changes are inevitable as your design concept matures. Our patent-pending Foresight® process-control technology not only maintains precise control of the converting process, it allows you to change feature size and placement without incurring the extra costs and delays associated with hard tooling. Simply provide us with a CAD file, and we will make the design change – right at the work station on the shop floor.

You need a production run of 50 followed by 10,000.

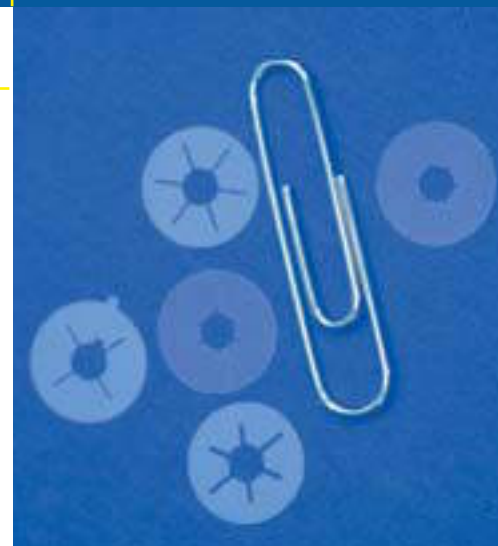
LaserSharp® Digital Converting is ideal for prototype development, clinical

trials, and long-run production.

LaserSharp® technology is the ideal solution for short production runs because the “tooling” is simply a job file that resides on any networked computer. Long runs are efficiently produced as LaserSharp® technology can match or exceed the production rates of conventional die-cutting.

Your production part bears little resemblance to your prototype part.

Again, this won't happen to you when you work with our Precision Medical Converting Group. We use the same process and equipment for both prototype and production. This eliminates the often difficult transition that typically occurs with conventional methods.



Top photo: 5 variations of a digitally converted polyester mesh filter that were produced with no tooling costs. The laser fused the mesh periphery to eliminate fraying.

Bottom photo: The Quality Department features a separate climate controlled room with optical metrology equipment for precise component measurement.

Your greatest concern is part quality.

A key asset of the Precision Medical Converting Group is our Quality Management System. As a contract converter of high value medical components, we understand that quality must be a fully integrated business philosophy and not just a department. A key element of our Quality Management System is our ability to implement a quality program that is tailored for your project. We recognize the need to address not only your production requirements, but also your quality expectations. Part inspection is accomplished using off-line optical metrology equipment. For high volume, process critical production, in-line inspection equipment can be integrated to our LaserSharp® systems. An added benefit of combining in-line inspection

with LaserSharp® technology is the ability to use dimensional information from in-line inspection to dynamically correct for dimensional process variations.

You just can't hold the required tolerances in production.

But LaserSharp® technology can. We readily convert medical components with critical features held to $\pm 125\mu\text{m}$ (± 0.005 inch) at a standard deviation of 0.0003 and cpk greater than 1.5. LasX is also involved with programs that require tighter tolerances (± 0.002 inch), which is achievable using the LaserSharp® technology. Not only can LaserSharp® technology achieve higher precision than conventional methods, part tolerances are also more controlled because LaserSharp® Digital Converting is a non-contact, computer-driven process.



quality

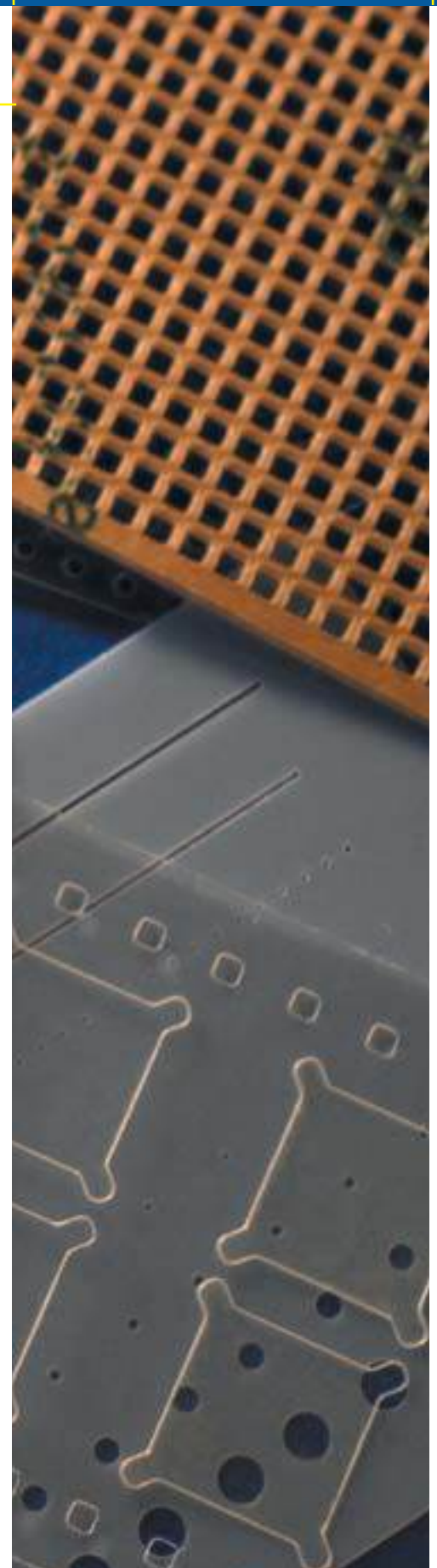
Precision Medical Converting Group Mission Statement

The Precision Medical Converting Group of LasX Industries, Inc. is the leader in contract manufacturing services for the production of medical devices and related components using LaserSharp® Digital Converting technology.

Our leadership role in offering a comprehensive set of services anchored by LaserSharp® Digital Converting will enable our customers to efficiently produce precise medical components not possible using conventional manufacturing techniques in addition to offering reduced time to market.

The Precision Medical Converting Group will continue to build relationships with our customers, employees, and suppliers based on continuous improvement of our ISO-registered medical device manufacturing services. Fundamental to our core values are strong project management principles that rely on customer service, team building, and project flexibility.

Front cover photo and photo to right: Various digitally converted samples that show the range of capabilities using LaserSharp® technology. No hard tooling was required to produce these components at production speeds.





LasX Industries, Inc.
4817 White Bear Parkway
White Bear Lake, MN 55110

voice: 651-407-0011
fax: 651-407-0110

info@laskindustries.com
www.laskindustries.com



Top photo: LasX Industries, Inc. modern 13,000 sq.ft. facility in suburban St. Paul, MN.

LaserSharp® Processing of Flexible Circuits

LaserSharp® Digital Converting offers unique process capabilities for the production of high performance polyester flexible circuits for the medical diagnostics market. Whether it's high-speed drilling of via holes for double-sided circuits or through-cutting of unique or complex shapes, the Precision Medical Converting Group can make your design goals a reality. The Precision Medical Converting Group has assisted in commercializing numerous flexible circuit programs for our customers, which otherwise would have resulted in product redesigns and performance concessions.

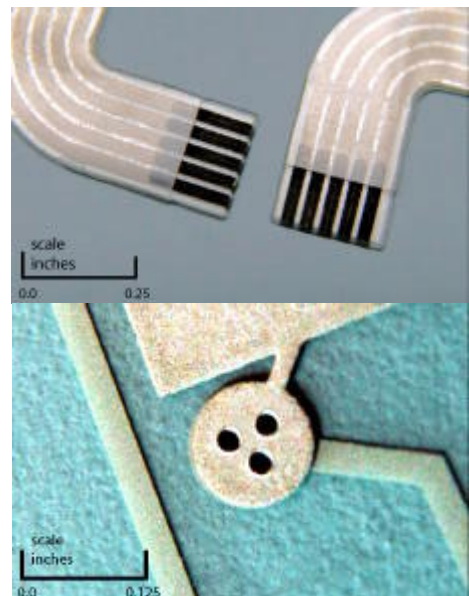
Our **LaserSharp®** capable workstations can digitally convert flexible circuits in web and sheet printed formats. Two-camera vision systems will accurately locate printed registration marks and adjust the cut-line placement in the X, Y and Z axis for precise print to cut registration. The vision system is invaluable for accurate registration of close pitch connector tails found in today's high performance flexible circuits.

The Precision Medical Converting Group has extensive knowledge in producing precision drilled micro-via's used for interconnects in double-sided flexible circuits. Our **LaserSharp®** capable systems incorporate proprietary via drilling software for accurate placement and consistent profile of the via holes for trouble-free printing of conductive inks. Since via holes are produced before screen-printing, it is also necessary to place registration marks during the digital converting process. Our **LaserSharp®** technology produces registration marks that are consistently located by the screen-printing registration sensors.

Our **LaserSharp®** capable systems can process both sheet and web fed materials to meet your specific requirements.

*Fine pitched tails are a production headache using hard tooling. **LaserSharp®** technology, with vision registration, excises the tails on these medical flex circuits. The tail size and location are accurate to ± 0.002 ".*

Our exclusive via drilling software produces consistent via holes for use in double-sided flexible circuits. The 3 hole via configuration as shown, produces 0.010" via holes resulting in problem free interconnects when screen printed.



LaserSharp® Digital Converting for Micro-fluidic Components

LaserSharp® Digital Converting is an ideal process for the production of micro-fluidic channels. The Precision Medical Converting Group at LasX Industries, Inc. can produce channels and features not possible using conventional techniques and when compared to other laser processes, **LaserSharp®** Digital Converting is over 20 times faster allowing you to cost effectively use this process in high volume production. Additionally, we can process your material on a web or sheet fed basis to meet your production requirements.

LaserSharp® Digital Converting is capable of producing micro-fluidic channels as narrow as 0.005" on a production basis. These channels can be positioned within a tolerance band of ± 0.003 ". While intricate features can be produced, a major advantage is the ability to process pre-laminated structures

The Precision Medical Converting Group has a proven track record of developing production solutions for our customers for applications that were impossible using conventional techniques. Call the Precision Medical Converting Group at LasX Industries, Inc. today to discuss how **LaserSharp®** Digital Converting can make your complex designs a reality.



*This photograph shows a **LaserSharp®** produced fluid flow channel. The orange channels are 0.005" wide and the black channels are 0.015" wide. The fill holes and channels can be optimized for your specific process and fluid utilization requirements.*

LaserSharp® Digital Converting for In-vitro Diagnostic Components

The Precision Medical Converting Group at LasX Industries, Inc. is capable of making your complex precision diagnostic test strip and multilayer designs a reality.

LaserSharp® high-speed non-contact processing technology allows you to produce repeatable intricate features in materials where expensive hard tooling is problematic. Working with the Precision Medical Converting Group from your design conception will allow you to capitalize on the processing advantages inherent with **LaserSharp®** technology. Our Process Development Group works closely with your design team to efficiently produce your components while maintaining a robust process window. By using the **LaserSharp®** process from proto-type through pre-production and ultimately in production you eliminate the problems associated with using different process technologies during your design development.

LaserSharp® Digital Converting will offer you the following process advantages when compared to hard tooling:

- Repeatable features due to non-contact processing.
- Intricate shape which are not possible or expensive to produce with hard tooling.
- Consistent processing of laminations that include adhesive layers.
- Consistent removal of slugs from the web.
- Rapid design changes using **LaserSharp®** digital technology.

In addition to the above benefits, our **LaserSharp®** capable systems can also be configured for in-line inspection of quality critical features.

*This collage features complex digitally converted features produced using **LaserSharp®** technology - no tooling was required to produce these samples. The samples highlight; kiss-cutting, through-cutting, scoring, micro-perforating, and precision laminating for multilayer components of web-fed PSA materials typically found in in-vitro diagnostic components.*



A Full Range of Production Capabilities

The Precision Medical Converting Group at LasX Industries, Inc. is built on the business philosophy that we are your **process, production, and quality resource** for the contract production of your medical components. This approach allows you to focus your energy on core competencies critical to the growth of your company. The primary focus of the Precision Medical Converting Group at LasX Industries, Inc. is to develop processes which maximize the advantages and capabilities of **LaserSharp® Digital Converting** technology for your component production. However, we also recognize the importance of offering other production technologies in order to supply a complete assembly or sub-assembly component to meet your outsourcing requirements. The Precision Medical Converting Group has developed internal production capabilities along with a partnership infrastructure with leading companies in the Minneapolis, MN metro area that allow us to offer **printing, FDA registered assembly, and FDA registered packaging**. This infrastructure allows the Precision Medical Converting Group to offer you a single source program management solution.

The Precision Medical Converting Group offers high speed precision **LaserSharp® Digital Converting** capabilities for intricate high tolerance components. Servo driven equipment and optical technology allow us to produce precisely aligned **multilayer assemblies**. Manufacturing is done in either roll to roll or sheet formats in our climate controlled facility. Along with this enabling technology, the Precision Medical Converting Group offers precision laminating and laser slitting of your web and sheet materials. The Precision Medical Converting Group also offers **material purchasing, material management and inventory control** to help manage your production needs. These processes are incorporated into our Quality Management System (QMS). **ISO 9001:2000 certification** is proof that quality is an integrated business philosophy at LasX.

When your project requirements fall outside our core competencies, the Precision Medical Converting Group has established partnerships for:

- **Screen-printing conductive and non-conductive inks in sheet or web formats.**
- **Product assembly, including gel insertion, at FDA registered facilities.**
- **Product packaging at FDA registered facilities.**

These capabilities allow the Precision Medical Converting Group to offer a wide range of services to the in-vitro diagnostic, micro-fluidic and medical flex-circuit markets. By offering a full range of production capabilities, you can determine the extent of services for your specific project.

Contact the Precision Medical Converting Group at LasX Industries, Inc. to discuss your particular project requirements today.

ISO 9001: 2000 Certified

LasX Industries Inc. employees are passionate about the quality of product they produce. Because of this the Contract Services Group of LasX became ISO 9001:2000 certified to show their commitment to quality by getting involved in an international quality certified program. The format of this program enables us to communicate better with our customers on quality related topics. Our Quality Management System allows our customers to achieve and maintain FDA approvals and related documentation easier.



SPC – LasX understands the process for repeatable high tolerance accuracy needed in the manufacturing of layers and alignment of layers for laminate structured fluidic devices as well as single layer components. LasX uses vision metrology equipment to monitor the converting process for startup, in process and post run analysis. This data can then be entered into SPC software that will provide results in an easy to review format. The format includes Histogram analysis along with data for C_p , C_{pk} and graphs.

Clean Room Operations – LasX understands the critical importance of getting accurate results for IVD and assay tests. We also understand the issues that debris and contamination can create in the outcome of these tests. Because of this LasX operates its Precision Medical Converting in a Certified Class 100,000 clean room with the capability of going to class 10,000 if necessary. This allows LasX employees to maintain a high level of cleanliness during processing to go along with attention to detail and process control to insure our customers are receiving world class quality components for their IVD and micro-fluidic devices.

