



ENGINEERED TECHNOLOGIES

# ▶ YOUR LEADING PROVIDER OF ENGINEERED SOLUTIONS FOR MEDICAL EQUIPMENT

## ▶ DELIVERING QUALITY SINCE 1952.

Epec Engineered Technologies designs and manufactures custom printed circuit boards, membrane switches, rubber keypads, flexible circuits and batteries that are used on a wide variety of medical equipment. Medical equipment demands reliability and performance. Our engineered products are manufactured to the highest quality standards and are built to withstand years of demanding use in a medical environment.

Our world-class manufacturing facilities utilize state-of-the-art production equipment and procedures to achieve outstanding product quality and value.

There are many factors that contribute to the reliability of Epec's Engineered products and all of these factors must be taken into account during the design process to ensure the finished product will function reliably. Our technical staff and many years of experience provide an unsurpassed combination for designing the best solution for your application.



## ▶ THE TRUSTED SOURCE IN ENGINEERED PRODUCTS

The very nature of medical equipment demands accuracy and reliability. For over 50 years, Epec has been a leader within the health care and medical device industry. Working in close co-operation at every stage, we work with our customers to design and supply them with products that are marked by precision and dependability.

### *Experience*

Epec's many years of accumulated experience and know-how in solving both ordinary and unusual problems in medical device design, provide an unmatched combination for solving our customer's specific problems.

### *Service*

With access to the latest in manufacturing processes, the latest systems in logistics management, and dedicated customer service, we can provide unmatched on-time delivery, quality and inventory management solutions. Multiple manufacturing facilities worldwide coupled with local engineering and sales support, ensure that you get what you need, when and where you need it.

### *Reliability*

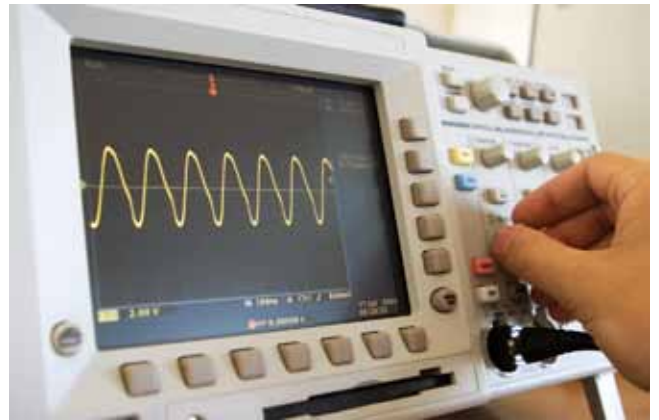
Reliability is the hallmark of all of Epec's Engineered Technology products. We have 24/7 CAD and CAM support to assist our customers in finalizing their design and ensuring that the most efficient manufacturing processes are being utilized. Detailed inspection procedures from work-in-process to final test, ensures the delivery of world class products to our demanding medical customers.

### *Quality*

Quality is the most important aspect of our production facilities as is the support of our technical staff in meeting the stringent requirements that medical device manufacturers must adhere to. We ensure the quality and consistency of our products by utilizing our worldwide technical and quality resources to protect our customers and their investment in their products.

### *Value*

Our goal is to offer our customers solutions, technologies and services that assist them in exceeding their requirements for their medical devices. From initial engineering discussions, to component selection, to final product introduction, we can bring value to our customers. From supplying quick turn samples to developing final testing procedures, we offer customized solutions to fit our specific customer needs.



## ▶ THE EPEC VALUE ADDED EXPERIENCE

### *Engineering Know How*

Our engineering team will help you in custom designing the right product to meet your application needs. We are responsive partners, eager to help you produce prototypes for new products and systems. With our experienced engineering staff and world class manufacturing capabilities, we'll work with you to develop innovative designs in the shortest possible time.

### *Understanding Cost Drivers*

Safety and quality are the number one priority when it comes to medical device manufacturing. We understand the importance for our customers to receive world class quality and safety performance from Epec, while also being cost competitive. It is our goal to exceed all of your stated requirements under budget, without any delivery, quality or safety issues. Whether it is cost effective prototype runs, to large volume inventory management programs, we have the right solution for your cost control needs.

### *Precision Manufacturing Capabilities*

Medical device manufacturers have come to rely on Epec's extensive experience in managing their precision manufacturing requirements. Continually investing in state of the art production equipment and technologies allows us to achieve outstanding product quality results. We have rigorous in process and final inspection procedures which are developed for the specific needs of each end-use application.

### *Trusted Dependability*

Meticulous performance is critical for any engineered product in a medical device as a patients life may depend on it. We take the performance of your equipment in the field personal which is why we work so closely with our customers to make sure that we are engineering and manufacturing the best solution to fit the application need.

### *Customer Focus*

Our investment in engineering, technical and customer service resources around the world assures that you get answers when you need them, wherever you may be. In addition to our technical resources available on our web site, field application engineers are always available to visit your site to evaluate your current challenges and provide cost effective solutions to any problem. Our dedicated inside customer service team is available 24/7 to provide quotes, order status, expedites and to answer any other questions that you may have surrounding Epec's products and services.



## ► QUALITY ENGINEERING & MANUFACTURING

**Printed Circuit Boards** are the backbone of all medical electronics. Epec has over 50 years of manufacturing experience in the medical industry and truly understand the unique requirements that go along with this industry.

Our experience in IPC Class III standards, very stringent cleanliness requirements, heavy copper and production tolerances allow us to provide our customers exactly what they need for their end product.



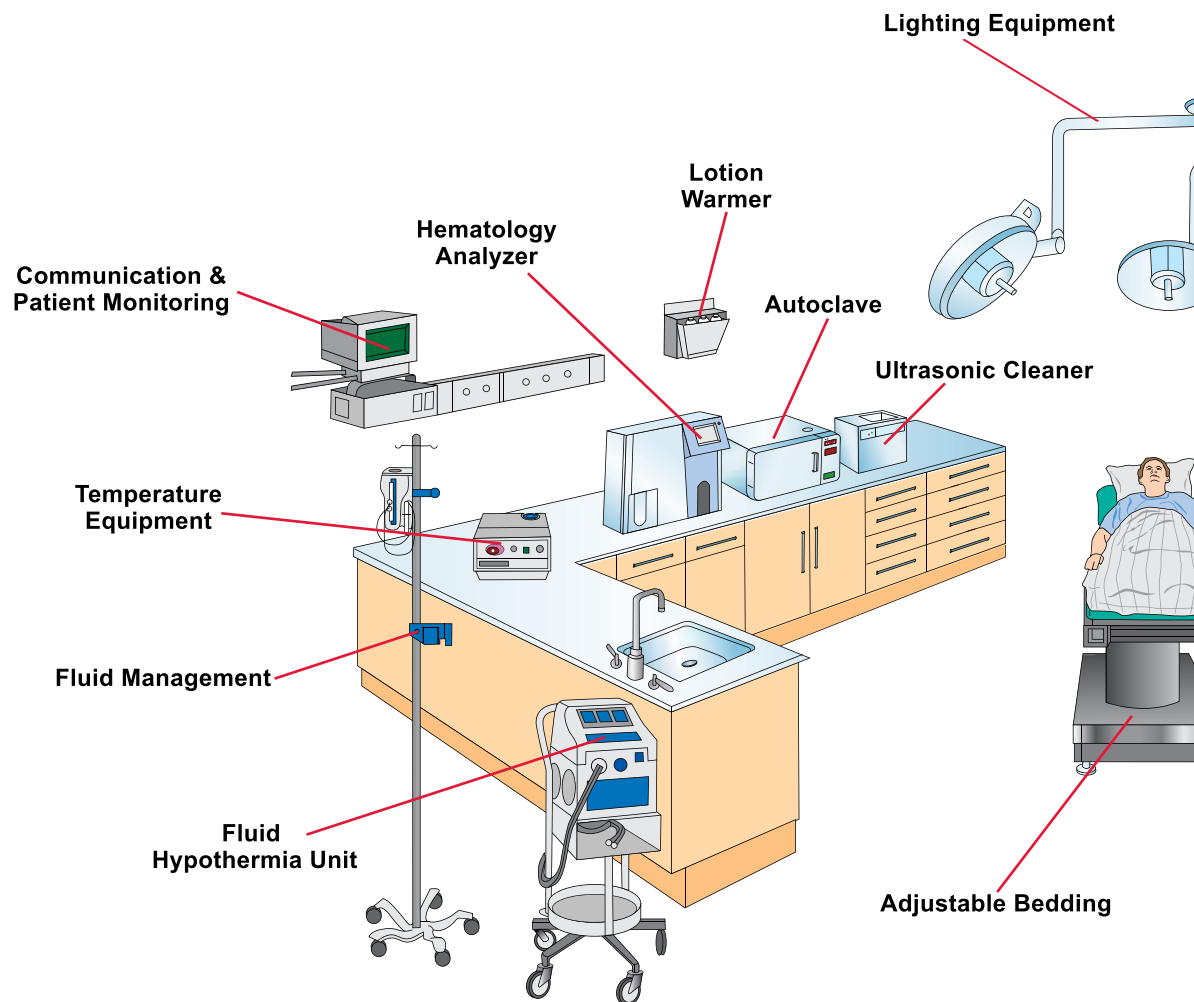
**Flexible and Rigid Flex PCB's** allow medical device designers unlimited freedom of packaging geometry while retaining the precision density and repeatability of printed circuits.

As a high reliability replacement for wire and wire harness assemblies, flex circuits provide a significant cost savings with no reduction in performance.



**Membrane Switches** in medical electronics can incorporate tactile or non tactile domes, LEDs, integrated displays or other SMT mounted components.

Antimicrobial product films can be used in the production of a membrane switch which have been extensively tested and proven to inhibit the growth of a wide range of mold, bacteria and mildew that can cause odors, stains and degradation of the membrane switch surface.



**Graphic Overlays or Nameplates** can be used to efficiently customize and identify your product. A broad range of materials and processes can be incorporated to meet the requirements of the most demanding medical environments.

Graphic overlays are commonly used to identify or instruct users on the product features or to depict keypad locations when used in conjunction with mechanical switches.



**Rubber Keypads** are another great human-machine interface alternative and they can be supplied alone or can be designed to interface with a membrane switch or another circuit technology.

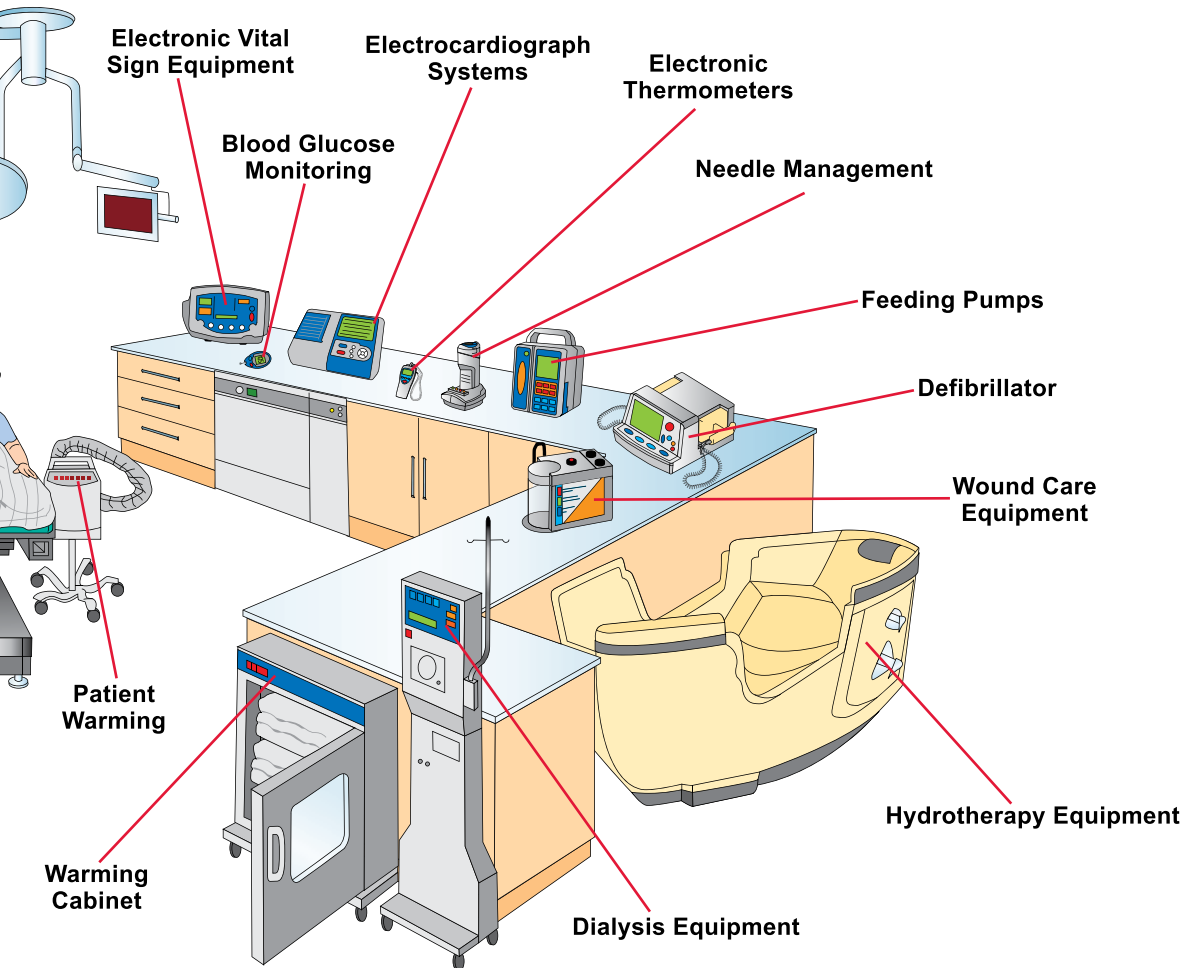
Rubber keypads are durable and offer excellent performance in the demanding environmental conditions that medical electronics must operate in. Being moisture, chemical, oil & solvent resistant allows the most flexibility for the medical designer.



**Custom Battery Packs**

Health care providers are becoming more and more dependent on portable medical devices. Safety and reliability of the medical batteries for these devices is ensured by careful design and stringent manufacturing controls.

It is necessary to look carefully at the demands the portable medical device places on the custom battery pack during real world use, and quantify how those demands will affect the battery pack's capacity, cycle life, reliability, safety and durability.



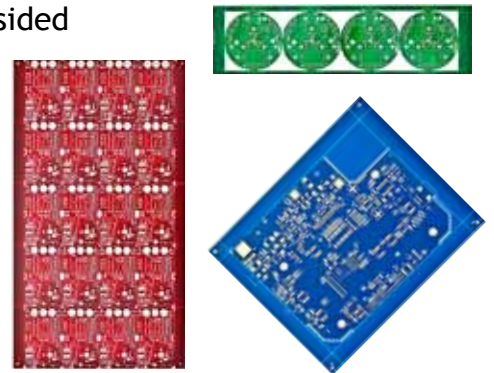
## ▶ PERFORMANCE-CRITICAL PRODUCTS

### Printed Circuit Boards

For more than 50 years, Epec has continued its tradition of perfection in engineering and manufacturing printed circuit boards for the most discerning customers. Our years of manufacturing experience provide us with a competitive edge when it comes to PCB layout and design.

From a simple single sided board to a complex multi-layer, double sided surface mount design, our goal is to provide you a design that meets your requirements and is the most cost effective to manufacture.

We pride ourselves on providing high quality design and layout services, but it is equally important that our customers can manufacturer their parts in the most cost effective manner. Our goal is to reduce the overall cost of our customer's product by designing a circuit board that can be easily manufactured by Epec or anyone else in our industry.



### Flexible and Rigid Flex PCB's

Epec has over 52 years of experience in building Printed Circuit Boards. Let our expertise in engineering and manufacturing assist you in meeting your Flexible Circuit Board needs.

Flex circuits can be shaped to fit where no other design can. They are a hybrid of ordinary printed circuit boards and round wire, exhibiting benefits of each. In essence, flex circuits give you unlimited freedom of packaging geometry while retaining the precision density and repeatability of printed circuits.

There are a variety of terminations for flex circuits and we can provide all of these as standard manufacturing process.

Adding connectors and other minor component assembly is a common practice when producing flex circuits.



### Membrane Switches

Epec is a custom manufacturer of membrane switches.

Our capabilities include digital printing, automatic and semi-automatic screen printing, prototyping, inspection, production assembly, in circuit and functional testing, RF/EMI shielding, embossing, texturing, hard coating, graphic design and development assistance, top and sub surface printing.

Tactile, non-tactile, poly dome, embedded LED's, and backlit graphics are available along with multiple termination options.

Materials include polycarbonate, polyester, aluminum and all various types of adhesives for different membrane switches and overlay constructions.



## ▶ PERFORMANCE-CRITICAL PRODUCTS

### Graphic Overlays or Nameplates

Epec supplies graphic overlays and labels on a broad array of materials and substrates, including polyesters and polycarbonates, made via a number of different printing processes. Our expansive domestic commercial screen and digital printing capabilities, coupled with our Asian factories, ensure that Epec can be competitive for virtually any type of label and overlay applications.

Epec is your best choice when QS-9000 and/or ISO 9001 certification is required, as well.

Our facilities are models of productivity and efficiency; automated color matching systems are in place to duplicate colors and formulate custom colors for your current labeling needs and new projects alike.



Overlays and labels can be provided with a variety of adhesives, embossed keys, matte or gloss finishes, and protective coatings to reduce the likelihood of color fade.

### Rubber Keypads

Epec Engineered technologies designs and manufactures all types and configurations of silicone rubber keypads for a wide range of industries and applications. For both large and small customers we provide engineering and design assistance to make sure that your keypads exceeds all of your specifications.

Silicone Rubber keypads are used extensively in both consumer and industrial electronic products as a low cost and reliable switching solution. The technology uses the compression molding properties of silicone rubber to which upon depression of the switch, the webbing uniformly deforms to produce a tactile response. When pressure is removed from the switch the webbing returns to its neutral position with positive feedback. In order to make an electronic switch a carbon or gold pill is placed on the base of the switch center which contacts onto a PCB when the web has been deformed.



### Custom Battery Packs

Epec is a full service custom battery pack manufacturer, with extensive experience with Lithium ion, Lithium polymer, Nickel metal hydride, Nickel cadmium, Sealed lead-acid, lithium primary and alkaline battery packs and assemblies.

We are a full service custom battery manufacturer with full design and engineering capabilities. Epec offers the latest in battery technologies including the ability to label, shrink wrap, custom terminate or enclose in plastic.



Epec focuses on helping our customers design the best custom battery pack products that are the most cost effective, environmentally safe and exceed all of their specifications. Our offering of batteries and custom battery packs allows us to work with our customers and their engineering teams to manage the power needs of their end products. Our goal is to exceed your specifications while keeping you under budget.

## ▶ MEMBRANE SWITCHES

Membrane switches are commonly utilized in medical equipment. With a variety of graphic overlay materials and tough, long-lasting hard coats, these switches will hold up to years of hard use and frequent cleanings.

- Gasket adhesive to seal out liquids
- EMI shielding
- Sub assemblies including rigid PCBs, electroluminescent, fiber optic or LED backlighting
- Anti-bacterial materials

## ▶ SILICONE RUBBER KEYPADS

The silicone rubber material, which can be cleaned easily and is not harmed by frequent use of common hospital cleaning solutions.

- Environmental sealing
- Several coatings that increase durability and are resistant to cleaning solutions
- Sub assemblies and backlighting available

## ▶ FLEXIBLE CIRCUITS

Medical equipment OEMs are designing smaller and lighter products. Flex Circuits reduce weight and increase functionality in a smaller electronic footprint. Their ability to bend and flex allows for increased functionality without jeopardizing reliability.

- Reduces space and weight.
- Bends and flexes without jeopardizing reliability.
- Eliminates connectors and soldered wires.
- Simplify and reduce assembly costs

## ▶ BATTERIES & BATTERY PACKS

Nearly all electronic equipment used in medical facilities is either directly powered by batteries or depends on battery backup. Medical equipment require high-reliability and accurate state of charge and remaining useful cycle life.

- Lithium Ion
- Lithium Polymer
- Nickel Metal Hydride
- Nickel Cadmium

## ▶ PRINTED CIRCUIT BOARDS

Epec has vast experience in manufacturing the PCB product characteristics that are common in the medical market. It is our goal to exceed the requirements of our customers and to provide them with a world class manufacturing experience.

- Heavy Copper Weights
- High Layer Counts
- Non-Standard Materials
- IPC Class III Manufacturing Standards

Epec's diverse and growing base of more than 2500 customers represents a wide range of markets including electronics, medical, industrial, communications, access controls, automotive, computing, military, and includes leading OEM's, contract manufacturers, and electronics manufacturing services (EMS) providers..

Contact us today, to experience why Epec has become one of the fastest growing Engineered Electronic Product providers in North America!

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[www.epectec.com](http://www.epectec.com)