

Quick guide

COMPONENTS FOR PATIENT CARE EQUIPMENT



The Intensive Care Unit (ICU) is one of the most unnerving areas in a hospital. Most patients are extremely ill and need constant, close monitoring and support from the staff, equipment and medication to keep normal body functions going.

The medical equipment these patients need can be grouped into three main areas:

- Patient monitoring
- Life support equipment
- Diagnostic devices

These machines and devices also provide pain management, respiratory and cardiac support, life support and include resuscitation devices and diagnostic medical devices.

Medical equipment manufacturers around the world rely on Essentra Components to supply the critical items that make their devices and equipment work, from 3D ultrasound equipment to medical infusion pumps.

We've designed this guide to help you select the components you'll need for your:

- Diagnostic equipment design
- Ventilator design
- X-Ray design
- ECG design
- CT scanner design
- MRI design
- Other medical equipment

Most of the components we've recommended can be used across different devices and machines. If you're not sure which solutions will work best for your application, let us know. Chances are, we can suggest an innovative solution that you might not be aware of, which can also reduce cost and save time in manufacturing.



FREE SAMPLES AND CAD DOWNLOADS

To make your job easier, we've also made available [free samples](#) on most of our solutions, so you can try before you buy. You can also [download free CADs](#) of our solutions to help with your medical equipment development.

PATIENT MONITORING EQUIPMENT

Physiologic monitoring systems continuously measure and display a number of vital signs via electrodes and sensors that are connected to the patient.

They allow continuous monitoring of a range of parameters that include heart rate and heart electrical tracing via an electrocardiogram (ECG), apnea monitors to measure breathing/respiration, oximeters to enable monitoring the oxygen level of the patient's blood, as well as monitors for urine output, intracranial pressure, blood pressure, body temperature and the administered fluids, food and drugs.

Each patient bed in an ICU has a physiologic monitor that measures these body activities and all monitors are networked to a central nurses' station.

Here are the components of patient monitoring systems you'll need to consider, from pulse oximeter parts to components of an ECG machine:



PCB CARD GUIDES

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Horizontal plastic PCB card guides snap in to mount circuit boards in tight spaces. Two tapered ends mean a quick and easy insertion of the PCB from both sides. Side grips hold PCB in place. Hollow pin design eases insertion of the guide. Operating temperature range: -40°F to 185°F. UL94 V-2, nylon 6/6. Also available: [vertical PCB card guides](#).

Typically used: computer systems within monitors



NYLON P-CLAMPS

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P-clip cable clamps hold larger-diameter cables, tubes and pipes. Simply bend the P-clip open, place them in and refasten. Available in nylon 6/6, [aluminum](#) and [steel with a rubber cushion](#).

Typically used: to provide a strong, neat finish to keep peripheral elements tidy and secure



CABLE CLAMPS WITH ADHESIVE BASE

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D-style adhesive cable clamps are fast and easy to mount. Just press the top of the clamp under the overhang to lock cables into place. Operating temperature range: 32°F to 122°F. UL94 V-0, PVC. Be sure to check out our entire range of [plastic cable clamps](#).

Typically used: within monitoring systems' casings or enclosures



STANDARD CABLE TIES – HEAT STABILIZED

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Heat-stabilized cable ties make the most of limited space, keeping cables orderly. Ideal when heat is generated or present. Cost effective and strong. UL94 V-2, heat-stabilized nylon 6/6.

Typically used: on cable assemblies and wire harnesses within monitoring systems



FLAT CABLE CLAMPS, ADHESIVE MOUNT, TENSION

[View online](#)

Nylon cable clamp has hinged design with tension for quick access and added cable stability. Adhesive mount allows for quick install. UL94 V-2, nylon 6/6.

Typically used: running ribbon cables for computers within monitoring systems



PUSH-FIT RUBBER FEET

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Save space by breaking away the mounting tab after assembly, so that nothing extrudes inside the component. Also protects from vibration and shock. Perfect for smaller applications, where space is limited. Rubber.

Typically used: underneath monitors, casings and enclosures



SELF-ADHESIVE BUMPERS AND FEET – CYLINDRICAL

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Commonly used as feet, cabinet stoppers, door stops and surface protectors. These peel-and-stick bumpers will not tarnish, scratch, or discolor any surface. Available in clear or black. Operating temperature range: 32°F to 122°F. UL94 HB, polyurethane.

Typically used: on contact surfaces, within doors and panels



LOBED HANDWHEELS AND KNOBS

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Scalloped edges allow for an ergonomic grip and comfort when tightening mounts holding monitors. These durable female lobed knobs are impact and chemical resistant and provide a neat appearance. Available in phenolic, nylon or duroplast, with steel thread. Also available: our full range of [male clamping knobs](#).

Typically used: on positioning elements and mounts that support monitor equipment



INDEXING PLUNGERS – THREADED, NON-LOCKING

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Allow for rapid adjustments on a variety of platforms and fixtures. Used for locating, positioning, indexing and securing a wide variety of medical applications. Available in nylon, zinc-plated die-cast zinc, burnished steel, zinc-plated steel or aluminum. [Get in touch with our expert team to order.](#)

Typically used: to ensure precise adjustment of movable elements like height and angle of a screen



LIFE SUPPORT EQUIPMENT

Intensive care equipment for life support and emergency resuscitation includes the following:

1. ICU ventilator (also called a respirator): assists with or controls pulmonary ventilation in patients unable to breathe on their own. Ventilator parts consist of:

- A flexible breathing circuit
- Gas supply
- Heating/humidification mechanism
- Monitors and alarms

They are controlled by a microprocessor and can be programmed to regulate the volume, pressure, and flow of breathing. The monitors and alarms communicate with a central monitoring or information system. The computers in sophisticated ventilator units allow patients to breathe as much as possible for themselves, with the machine helping when necessary. In some cases, the patient breathes with the help of masks, which enables them to avoid sedation and a tube in their windpipe.

2. Suction pump: airway suctioning reduces the risk of:

- Lung infections
- Prolonged hypoxia
- Pooling of secretions

Mechanically ventilated patients require frequent suctioning. This life-saving procedure must always be available for them.

3. Infusion pump: device that delivers fluids to the patient intravenously or epidurally through a catheter. Automatic, programmable pumping mechanisms provide:

- Continuous anesthesia
- Drugs
- Blood infusions

The pump is clamped to an intravenous pole, next to the patient's bed. Your infusion pump components will need to include support for hoses and tubing.

4. Dialysis machine: kidneys filter blood and remove waste products, which produces urine. If kidneys fail, this machine takes over their function, which makes the quality of dialysis machine parts critical. Components of dialysis machines also need support for hoses and tubing.

5. Crash cart: also known as a resuscitation or code cart. This is a movable cart that holds emergency resuscitation equipment for patients whose vital signs are in a dangerous range. The emergency equipment typically contains:

- Defibrillator
- Airway intubation devices
- Resuscitation bag/mask
- Medication box

Crash carts are strategically located in the ICU for immediate use when a patient experiences cardiorespiratory failure. The crash-cart components you'll need include access hardware, handles and fasteners.

6. Intra-aortic balloon pump: a device that helps reduce the heart's workload and aids blood flow to the coronary arteries for patients with:

- Unstable angina
- Myocardial infarction (heart attack)

And patients awaiting:

- Organ transplants

Intra-aortic balloon pumps use a balloon placed in the patient's aorta. The balloon is on the end of a catheter that is connected to the pump's console, which displays heart rate, pressure, and electrocardiogram (ECG) readings. The patient's ECG is used to time the inflation and deflation of the balloon.



Here are the components you'll need for high-quality life support equipment:

TWIST TIES

[View online](#)

Life support equipment relies on an abundance of hose, tubes and cables that benefit from quality twist ties to ensure they are kept tidy and in place. Simply twist the arms to secure fastening. Releasable and reusable twist ties for better value. Nylon. UL94 V-2.

Typically used: to manage cables, hoses and tubes



PLASTIC HOSE CLAMPS

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Hose clamps are designed to secure fittings over hoses, vital for preventing fluid and gas from leaking at the connection. Available in black, white or natural. Nylon.

Typically used: tubing on dialysis machines, infusion pumps, ventilators



PCB STANDOFFS – HEXAGONAL/INSULATOR

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These male-to-female hexagonal plastic standoffs ensure high performance and can be installed by hand. Ideal for use when high mechanical strength is required and provide sturdy, insulated spacing for high-power electronic applications. Nylon and brass, UL94 V-2.

Typically used: internal circuit boards



PEEK® SCREW

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Perfect for electronics with demanding applications. PEEK® socket-head cap screws give you outstanding mechanical properties and high-temperature stability. This is especially helpful for electronics used in healthcare and hospital environments that endure high-temperature sterilization cycles.

Typically used: for areas exposed to harsh cleaning and sterilization



GASKETS AND SEALS

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A wide range of foam materials, used for environmental sealing, vibration isolation, sound dampening and shock resistance. Custom shapes, sizes and configurations are available for your specific design requirements. Available in EPDM or PVC.

Typically used: doors, panels and for diverting fluids to avoid contact with critical areas



PULL HANDLE – ONE PIECE, STAINLESS STEEL

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Easy to clean, chemically resistant, 3-A standard range of products are ideal for hygienic equipment design. This set of feet, handles and knobs all incorporate polished 304 stainless steel, silicone gaskets and smooth surfaces to reduce dust and dirt build up. Polished 304 stainless steel nuts prevent air, dust and liquid ingress by obscuring threads. Also available in 303 stainless steel and chrome-plated steel. View in our [online catalog](#) and [contact our experts](#) to order.

Typically used: mobile equipment where cleanliness is essential





CATCH PLATE

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Door latch/striker is perfect for applications with a push-open and close feature, providing a lifecycle of 50,000 operations. Operating temperature range: -58°F to 203°F. Glass-filled nylon 6/6.

Typically used: crash carts and infusion pump doors



ROTARY DAMPER

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Simple to install, our rotary damper controls the speed and acceleration of movement in parts such as doors or buttons. Self-contained or can be fitted as part of an assembly. Available in a range of torques and gear profiles. Operating temperature range: -40°F to 212°F. Polycarbonate or acetal. UL94 HB.

Typically used: inside ventilators and infusion pumps



TUBE FITTINGS

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Premium grade barbed fittings are made with critical use applications in mind and designed to accommodate most types of flexible tubing. Available in white nylon, polypropylene, clear polycarbonate, and kynar (PVDF). Non-standard materials are available on special order. [Get in touch with our team of experts to order.](#)

Typically used: to connect tubing used on fluid management equipment



HIGH-TEMPERATURE MASKING

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Our extensive range includes tapered plugs, available as solid or hollow core to fit threaded or unthreaded holes. Our push-fit caps are available in numerous thread sizes. Reusable masking pull plugs are available as premium high-temp silicone tapered plugs or in economical reduced-temp EPDM. To mask irregular shapes, try our [masking tapes](#) and [discs](#).

Typically used: finishing process in manufacturing and fabrication



DIAGNOSTIC EQUIPMENT

The use of diagnostic imaging equipment – and non-imaging devices – is an increasingly common and essential requirement in the ICU.

1. Scans: Some ICU patients may need further investigation in terms of a computerised tomography scan (CT or CAT scan) or an MRI (Magnetic Resonance Imaging machine) of their head, chest or abdomen. These investigations give detailed radiological pictures which are not possible with a plain x-ray film. Components of CT scan machines and MRI components include fan hardware, cable management, fasteners, PCB and electronics hardware.

2. Ultrasound: increasingly used to assess and guide the management of critically ill patients due to more compact, portable, higher quality and less expensive equipment.

The ability to carry out quick examinations by the bedside is a clear advantage in an acute care setting. The ultrasound machine is used to assist the doctor in inserting lines, and also forms an easy and safe investigative tool. A probe is placed on the part of the body to be examined and images are obtained based on the density of the organ such as bone, muscle or a blood vessel. Ultrasound machine parts range from cable management to fasteners.

3. Echocardiography (ECG): a scan of the heart to look how it is functioning and guide treatment of the patient using the same principle as an ultrasound. Just a few of the ECG components you'll need include feet and PCB hardware.

4. Mobile x-ray units: used for bedside radiography, particularly of the chest. Mobile x-ray units use a battery-operated generator that powers an x-ray tube. X-ray machine components range from cable management and fasteners to access solutions.

5. Point-of-care testing: handheld, portable clinical laboratory devices, or point-of-care analyzers, are used for blood analysis at the bedside. A small amount of whole blood is required, and blood chemistry parameters can be provided much faster than if samples were sent to the central laboratory. The components you'll need range from PCB hardware to fasteners.



RIVETS AND PANEL FASTENERS

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Name the size and fastening method you need. Our solutions are vast, from heat-resistant snap rivets, to push rivets, removable plastic rivets and quarter-turn panel fasteners. Available in nylon 6/6, nylon 6, acetal, polycarbonate, polypropylene and acetal, and steel and nylon.

Typically used: machine fabrication



FAN FILTER SETS

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Keep your PCB cool by preventing obstruction to your fan. This set includes one fan guard, fan filter cover, fan filter mesh sheet, and felt filter. Rated IP30 to protect against small objects from falling in. Materials: fan guard and filter cover, 40% GF nylon 6/6. Filter, polyester. Mesh sheet, 304 stainless steel.

Typically used: internal circuit boards



HEAT-RESISTANT SNAP PUSH RIVETS

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Nylon rivets push in and stand up to the heat generated by diagnostic medical devices and advanced medical equipment, withstanding temperatures of up to 266°F. Quicker to install than screws, our snap rivets are also ideal for awkward spaces. Aesthetically pleasing from the outside, helping the finished product look stylish. Nylon 4/6.

Typically used: enclosure and casing fabrication



SCREWS, NUTS AND WASHERS

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Find the perfect solutions for specialist, light-to heavy-duty medical equipment, from flat washers to pan-head machine screws. Easy to install and available in a variety of materials, including nylon 6/6, polycarbonate, PEEK®, and glass-filled polyurethane.

Typically used: machine fabrication



CABLE GROMMETS

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Ideal for restricted spaces. Simply mount onto a panel and slide wires into the grommet. Operating temperature range: -40°F to 176°F. Polypropylene and TPE.

Typically used: wherever wires and cables protrude from machines



CABLE CLAMPS – FIR-TREE MOUNT

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Black hinged locking clamp opens and closes while securely mounting cables or wires. Offers the same advantages of our [cable clips](#) with the added benefit of providing strain relief, protecting wires and cables, and ultimately your medical equipment products. Operating temperature range: -40°F to 257°F. Nylon 6/6, UL94 V-2.

Typically used: inside or outside the enclosure or casing



BARBED FASTENERS – PUSH RIVETS, FIR-TREE

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Fast, tool-free assembly. This barbed rivet gives you a reliable fitting in bore holes with larger tolerances. Its qualities work for blind holes or holes with or without screw threads. Nylon 6/6.

Typically used: machine fabrication



MOUNTING CABLE TIES – PUSH IN, TENSION WINGS, SPACER

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Simply push into your pre-drilled hole. The arrowhead fixes itself onto your panel, with no need for a separate cable holder. Flexible enough to accommodate bundles before or after mounting. Push-mount cable ties available in different dimensions and with different tensile strengths. Nylon 6/6, UL94 V-2.

Typically used: within or outside of machines where cables need to be neat and organized



CABLE WRAPS – SPIRAL

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Organize your wires in a single bundle with a more permanent solution than standard cable ties. Our rapid spiral cable wraps give you durable protection from wear and tear. This flexible cable wrap is easy to install, enabling you to route cables through the wrap's slits at any point. Polyethylene.

Typically used: cables running from machines



SHOULDER WASHERS

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When electric and heat insulation is critical in assemblies, such as those found inside MRI machines, use our self-lubricating and corrosion- and abrasion-resistant shoulder washers, ensuring improved safety, a longer life and more value from your application. Available in natural nylon 6/6.

Typically used: portable X-ray machine components, MRI system components and CT scan machine parts



STUD-MOUNT LEVELING FEET

[View online](#)

This rigid base stud mount leveling foot has a rigid base for securely and safely mounting your ECG machine design and ultrasound equipment. Made of PP.

Typically used: underneath floor or bench-mounted equipment



HYGIENIC COMPRESSION LOCKS

[View online](#)

Specially designed for hygiene requirements and cabinets that require tighter sealing under vibrating conditions. Typically used on access panels and hatches where cleanliness and security are required. Rated IP65 for protection against dust and liquid ingress. Latch made of 316 stainless steel for higher resistance against corrosion.

Typically used: MRI machines, CT scan machines



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