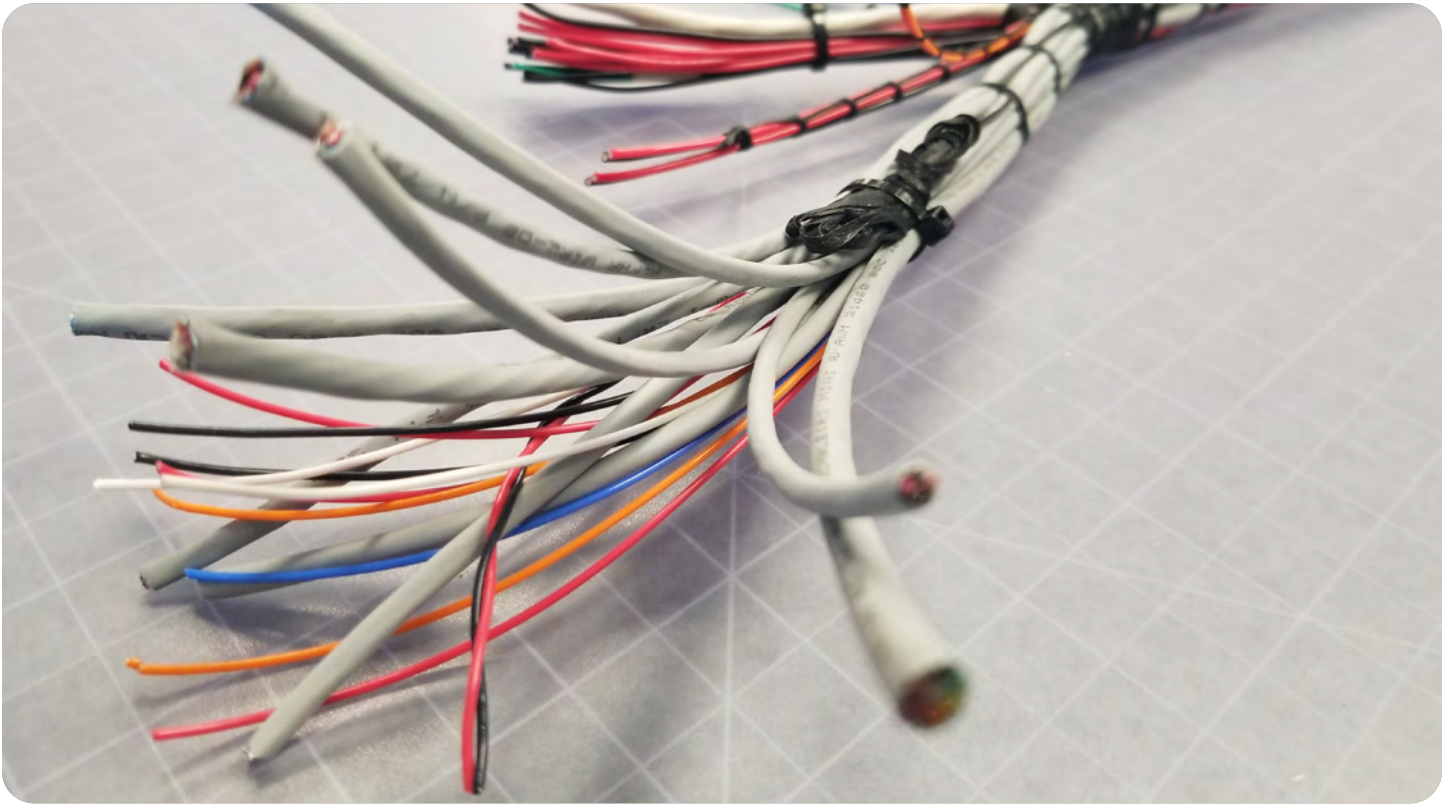


# MEDICAL CABLE ASSEMBLIES: WHAT YOU NEED TO KNOW



**ELECTRO-PREP**



# Introduction

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Whether used to diagnose a heart problem or control a surgical robot, cable assemblies are key to quality healthcare. These assemblies not only power life-saving equipment, but they also transmit vital information about patient health, giving providers what they need to manage complex conditions.

Because they are used in patient care, medical cable assemblies must be built to the most exacting standards. Health care cables are often exposed to flexion, vibration, and chemicals, all of which must be accounted for when selecting components. Wiring problems in a medical setting can put patients' lives at risk if critical equipment malfunctions, so manufacturers must use the highest-quality wire and connectors. Construction is similarly high-stakes: parts must be organized and secured properly to avoid tangles or tripping hazards.

For decades, Electro-Prep has manufactured reliable cable assemblies that keep patients safe and equipment running smoothly. Whatever your specifications or volume requirements, we will work to develop accurate and uniform assemblies that meet the most rigorous quality standards.



# Medical Cable Assemblies

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Cable assemblies are organized collections of cables and connectors grouped to efficiently transmit power or information. Most medical assemblies consist of multiple bundled cables with connectors on one or more ends. These connectors vary depending on the specific application. For instance, in patient monitoring applications, cables commonly snap or clip onto patient-worn sensors like electrodes, pulse oximeters, or blood pressure cuffs. The selection, arrangement, and jacketing of cables are similarly customized to suit specific medical environments.

Medical cable assemblies feature several characteristics that differentiate them from standard cable assemblies. To meet the exacting standards of medical OEMs, cable assemblies must typically be constructed from high-quality, bio-compatible materials. This ensures that the cables are safe for use with patients and can withstand the rigors of a clinical environment. For the same reason, most medical cables are covered with abrasion-resistant jackets, especially those that will be subjected to frequent sanitization.



# Materials Used in Medical Cable Assemblies

Cable assemblies typically combine metal and plastic components. Metals like copper and aluminum are used in the conductors themselves, while the connectors may feature other metals. Metal may be used more extensively in cables that are designed for long-term use. Plastic and rubber polymers are used to insulate individual conductors, to jacket the overall cables, and in the connectors, especially for disposable assemblies.

Although not all medical cables come in contact with the patient's body, many do, so assemblies are designed with biocompatibility in mind. Biocompatible materials are those that will not irritate or harm the body, ensuring patient comfort and safety. These materials are most important for diagnostic, therapeutic, and patient monitoring applications.

Other material considerations are based on how the assembly will be used. Some cables are designed to be used once and discarded. This includes some assemblies used in surgery and emergency medicine. These cables will typically be made from lighter, more cost-effective materials, as they do not need to tolerate the wear of repeated use or frequent cleaning. Assemblies designed for longer-term use will feature thicker jackets made from polymers that resist abrasion, heat, and chemical exposure. They are also tested to endure a greater degree of flexion and vibration.



# Components of Medical Cable Assemblies

Medical cable assemblies feature the following components:



## Conductors

The conductors are the wires and cables that transmit power or information signals. Although it's possible to have an assembly with just one cable, most assemblies organize multiple wires and cables into a useful configuration.



## Insulation

Each conductor must be insulated with a polymer, both to contain the current and to protect wires from damage.



## Connectors

Connectors allow cables to interface with other equipment and transmit power or data. Connectors might resemble clips, plugs, or snaps in male or female configurations. Oftentimes, an assembly incorporates many different connectors of different types. An ECG assembly, for instance, can have as many as 12 different lead wires, each of which connects to a separate electrode. At the other end, these cables converge into a single trunk that plugs into the ECG monitor.



## Shielding Material

Electrical monitors like EEGs and ECGs are often shielded to prevent interference with their signal. Shielding can be incorporated in multiple ways, but it usually wraps around the assembly's outermost jacket.

Additional components may be necessary to organize or separate the cables, depending on the application.

# Types of Medical Cable Assemblies

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Although they are used in a wide variety of settings, cable assemblies can be broadly categorized based on their use:

- **Communication interfaces.** Medical facilities rely on complex communication systems that allow patients to call nurses, providers to call for backup, and more. Call buttons, PA systems, and computer networks all require cable assemblies to function reliably and facilitate rapid communication. These assemblies pass signals through fiber-optic, serial, or modular LAN cables.
- **Patient interfaces.** Patient interfaces is a broad category that encompasses any diagnostic or therapeutic system that contacts a patient. Because they are used in direct patient care, these assemblies come with the most rigorous design challenges. Examples include catheters, ultrasounds, and blood pressure monitors. Patient interfaces can be further split based on their longevity:
  - **Single-use interfaces** are sterilized before shipping and are designed to be used only once. Surgical cables are often single-use, as are catheters and other more invasive monitoring equipment.
  - **Limited-use interfaces** are reusable, but they have a short expected lifespan. This includes some reusable diagnostic leads and cables used in high-wear environments like the ICU.
  - **Long-life interfaces** are used with diagnostic and imaging equipment such as ultrasounds. These cables are easily sterilized between patients and offer reliable, lasting performance.
- **Equipment interfaces.** Assemblies used within medical equipment are known as equipment interfaces. They are rarely replaced, so they must be durable and highly reliable.



# Benefits of Medical Cable Assemblies

Medical cable assemblies feature important benefits that help them perform in a healthcare setting:

- Flexible and kink-free
- Temperature and chemical resistance (ideal for autoclave or chemical sanitization)
- Hydrophobic
- Non-magnetic
- Sterile and disposable (for single-use interfaces)
- EMI shielded

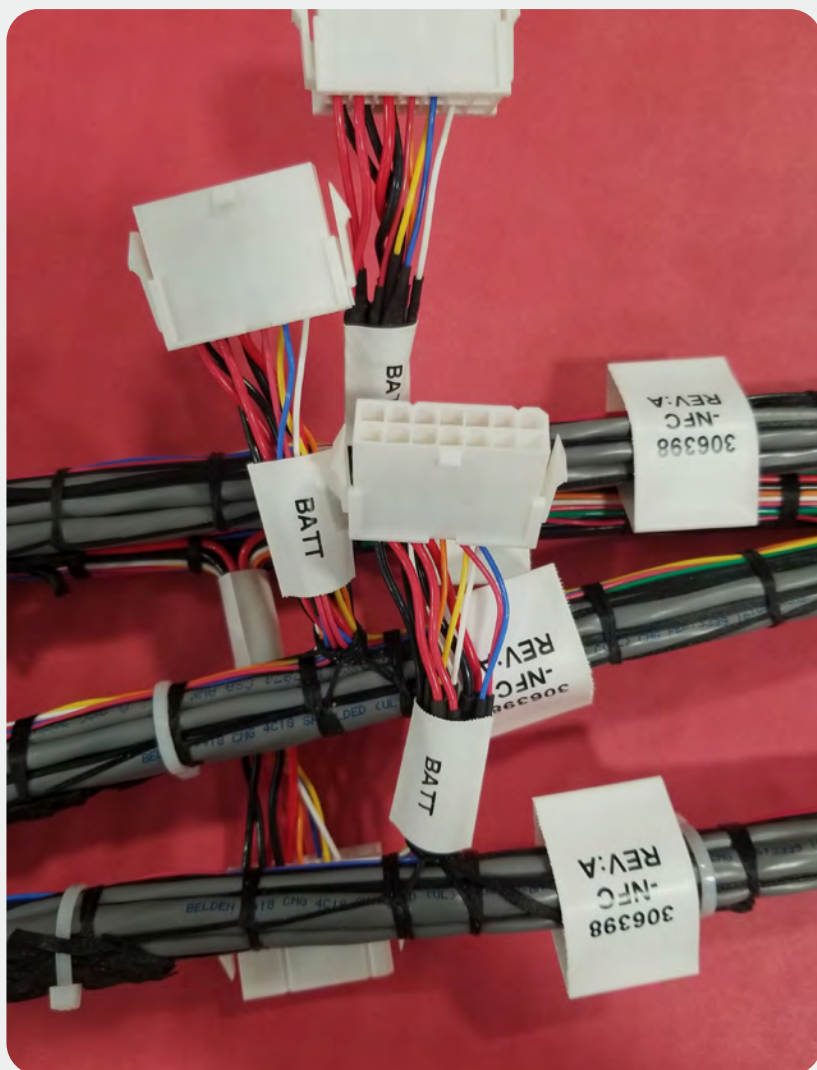
Your provider will work with you to choose materials and construction methods that maximize these benefits based on your needs.



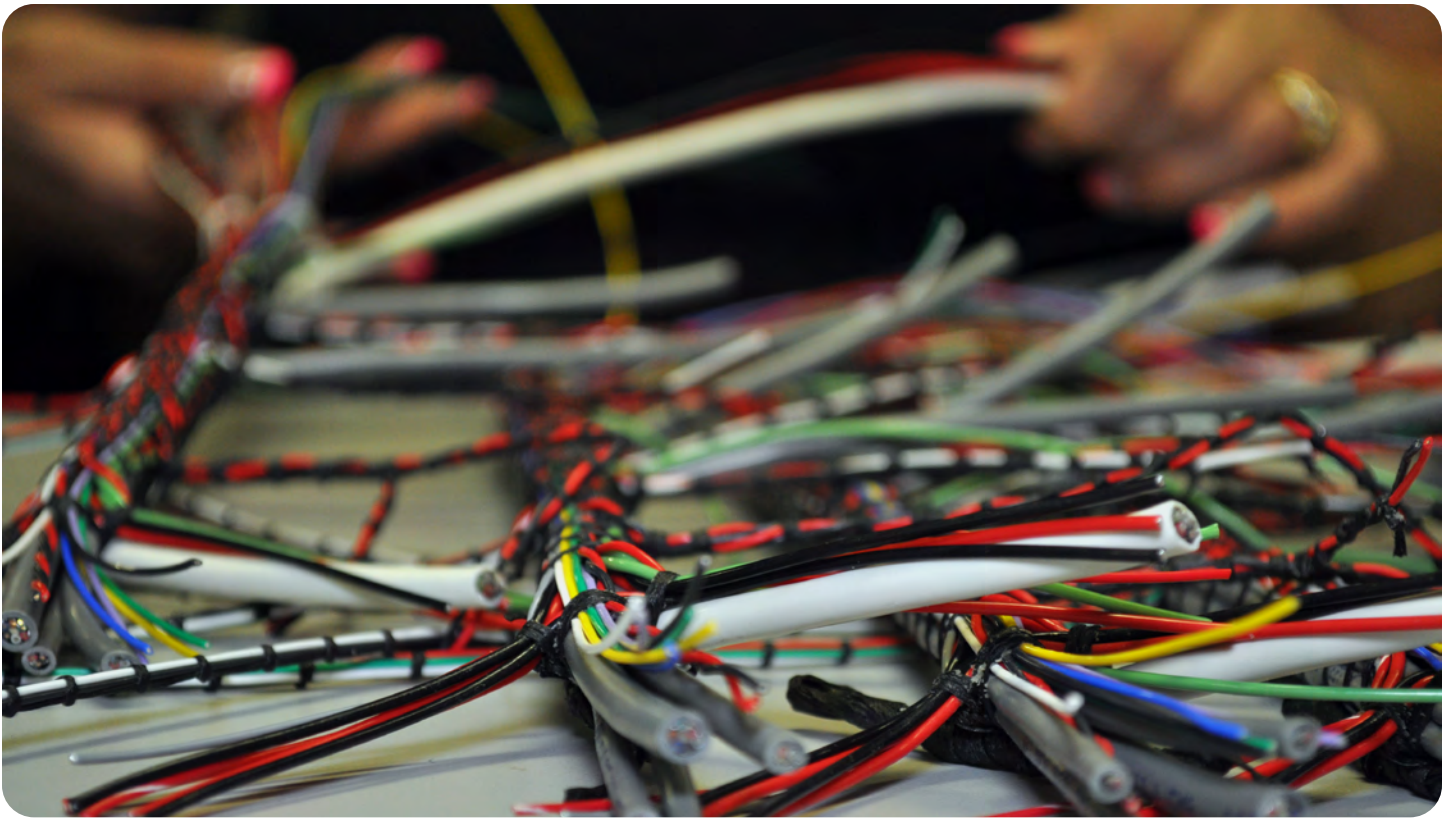
# Medical Cable Assembly Applications

Electro-Prep develops cable assemblies for use across a diverse range of medical-related applications. These include:

- Patient Monitoring
- Imaging
- Ultrasonic Scanners
- Pacemakers
- Disposable Medical Cables
- Catheters
- Guidewires
- EKG Leads
- Defibrillators
- Fiber-Optic Endoscopes
- Robotics
- Surgical Procedures
- RF Ablation
- Pain Management







## Medical Cable Assemblies From Electro-Prep

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At every stage of care, medical professionals rely on cable assemblies to provide life-saving treatments. At Electro-Prep, we've manufactured those assemblies since 1977, providing products that adhere to the highest quality standards. Electro-Prep is ISO 9001:2015-certified, and our products are UL and CSA-listed. We also comply with both J-STD-001 soldering standards and IPC/WHMA-A-620 workmanship standards, so you can be confident in the longevity of our assemblies.

To learn more about our medical industry solutions, [contact us](#) or [request a quote](#) today.

# Quality Wire Harness Manufacturing by Electro-Prep

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Since 1977, Electro-Prep has been a leading provider of superior quality wire and cable arrays for electronic instruments in industrial, commercial, military, and medical settings, among many others. We pride ourselves on producing custom wire harnesses to meet exacting specifications and stringent industry standards.

Our commitment to quality is evident in our extensive certifications, including IPC/WHMA-A-620, IPC J-STD-001, ISO 9001:2015, UL, and CSA. To learn more about our comprehensive wire harness manufacturing capabilities, contact us or request a quote today.

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