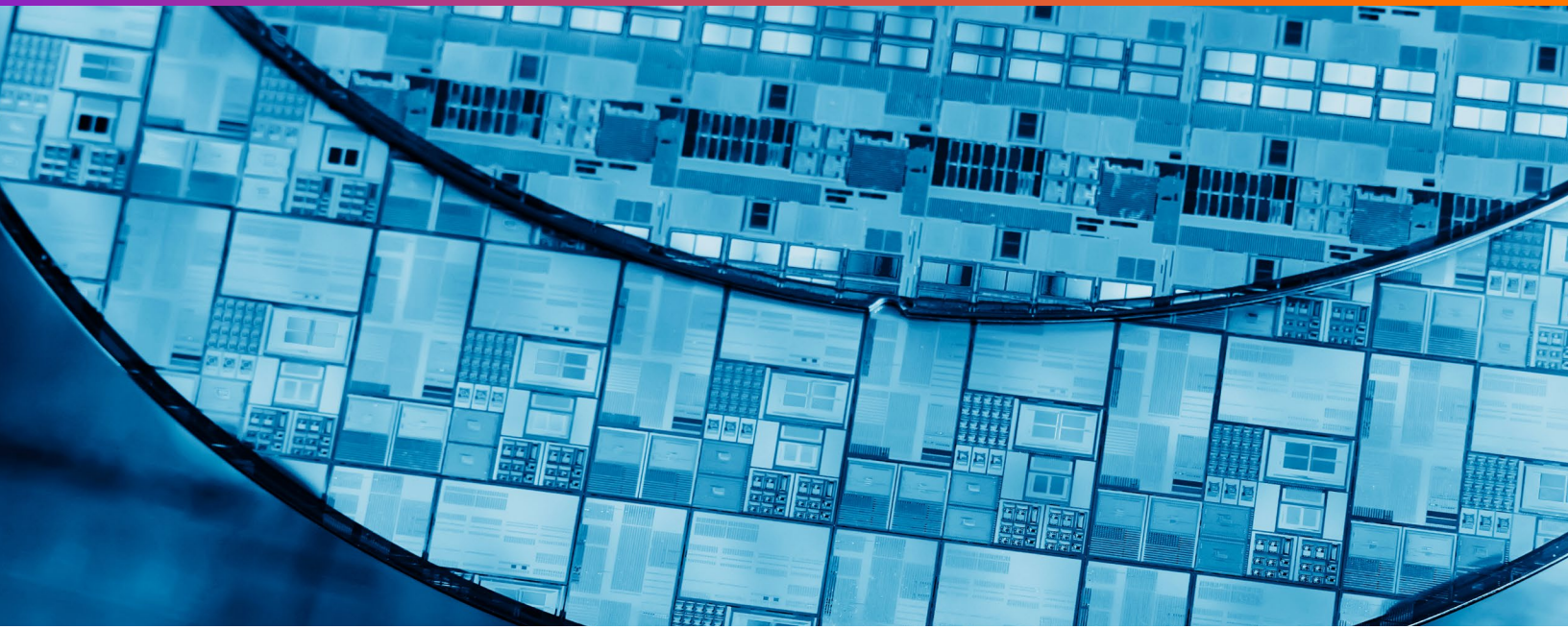




Application Guide Semiconductor Equipment

Cables, Connectors and Assemblies —
Engineered Under One Roof





Complete Connectivity Solutions for Semiconductor Equipment

As an all-in-one connectivity solutions provider, LAPP manufactures cables, connectors and fully engineered assemblies from a single source, giving semiconductor OEMs a turnkey path from component selection to ready-to-install solutions. That matters on the fab floor, where every tool depends on power, data and signal connections to function.

Semiconductor OEMs face connectivity challenges that rarely exist in isolation. The cables, connectors and assemblies have to work as a system to address factors such as:

- **Continuous flex:** Robotic arms, pick-and-place systems and drag chains subject cables to tens of millions of bending and torsion cycles, demanding coordinated material and construction choices across both cable and connector.
- **Chemical exposure:** Etch and deposition processes involve acids, alkali solutions and ultra-pure water that degrade standard cable materials, requiring jacket compounds, insulation and connector sealing to be specified together.
- **EMI/RF interference:** Dense arrangements of servo drives, VFDs and high-frequency switching create shielding demands that must be maintained consistently across the entire signal path, from cable construction through connector termination.
- **Limited real estate:** Shrinking tool footprints compress the space available for cable routing, connectors and control panel wiring, necessitating miniature solutions.
- **Fast installation timelines:** OEMs need quick connections and reliably performing tools from day one – which means cables, connectors and assemblies that arrive pre-engineered and ready to install, not components that require field integration.
- **Supply chain resilience:** Global supply chain disruptions, long lead times and sudden demand surges, driven in part by AI-enabled device growth, create bottlenecks that are harder to manage when cables and connectors come from separate suppliers.
- **Regulatory and design complexity:** Meeting environmental and safety compliance across regions, managing long design-in cycles and keeping pace with faster, smaller, higher-performing equipment all add pressure to connectivity decisions.
- **Cost pressures:** Raw materials represent 70–80% of cable cost, and intense competition across the supply chain creates ongoing margin pressure, making consolidated sourcing and integrated design increasingly important for OEMs.

LAPP delivers that integrated approach for semiconductor OEMs, with deep knowledge of fab environments, tool requirements and the design-in process, from standard catalog products through fully engineered, application-specific assemblies.

LAPP Product Families for Semiconductor Equipment

Product Family	Function	Key Semiconductor Applications
ÖLFLEX®	Power and control cables	Motor drives, servo systems, drag chains, control panels
ETHERLINE®	Industrial Ethernet cables	Factory networking, real-time control, sensor networks
UNITRONIC®	Data and signal cables	Bus systems, sensor/actuator wiring, signal transmission
EPIC®	Power, signal and data connectors	Panel connections, robotic interfaces, field-installable terminations
SILVYN®	Cable tracks and flexible conduits	Cable protection in chemically aggressive or high-motion environments
All products specified for the semiconductor market carry UL listings.		

ÖLFLEX® Power and Control Cables

The primary cable family for semiconductor tool wiring. ÖLFLEX® cables handle power distribution, motor control and signal transmission across the full range of motion requirements.

Flexibility options:

- Static and occasional flex
- Continuous flex (millions of cycles)
- Torsion-rated for robotic motion
- VFD and servo cable variants for motor-driven systems

Shielding options:

- Tin-plated braided copper for drag chain installations
- Copper wire wrapping for torsion resistance in robotic applications
- Aluminum foil lamination for high-frequency EMI environments
- Composite foil + braid for broad-spectrum protection
- Shielded and unshielded versions available



Jacket and Insulation Materials		
Material	Properties	Your Benefits
Polyurethane (PUR)	Abrasion resistance, oil resistance, continuous flex durability	Survives millions of drag-chain cycles. Fewer unplanned cable replacements and less downtime.
Thermoplastic elastomer (TPE)	Flexibility, chemical resistance, wide temperature range	Handles aggressive process chemistries and extreme temps without degrading or contaminating your fab.
PVC/Nylon	General-purpose insulation, flame resistance	Cost-effective protection for standard routing. Generally safer in the event of a fault.
Silicone	High-temperature tolerance, flexibility	Stays pliable and reliable in high-heat zones where other jackets crack or stiffen.
Cross-linked polyethylene (XLPE)	Moisture resistance, low dielectric constant	Protects electrical integrity in wet-process environments, reducing risk of capacitive leakage.

ETHERLINE® Industrial Ethernet Cables

Industrial Ethernet cables for the networking protocols used in semiconductor equipment.

ETHERLINE® Cables – Key Specs And Features	
Specification	Details
Supported protocols	EtherNet/IP, PROFINET, EtherCAT
Category ratings	CAT.5 through CAT.7
Data rates	Up to 10 Gbit/s
Jacketing	PUR
Shielding	Premium shielding for EMI and crosstalk protection
Flex rating	Continuous flex configurations available

UNITRONIC® Data Cables

Data and signal cables for control signal transmission, sensor/actuator wiring and bus system architectures.

- Stationary and continuous-flex configurations
- Resistant to chemical exposure, mechanical stress and humidity
- Compatible with common fieldbus systems

EPIC® Connectors

Modular connectors that deliver power, signal and data in a single housing. EPIC® connectors are designed to pair directly with ÖLFLEX® cables as part of an integrated system.

Connector Types and Interfaces		
Type	Form Factor	Typical Use
Circular	M 12, M23	Signal, power, motion control
Data	M8, M12, RJ45	Industrial Ethernet, PROFINET
Rectangular	Standard and high-density housing	Power distribution, multi-circuit panel connections

Key features:

- Modular insert system with variable combinations of power, signal and data contacts
- Positive locking mechanisms (lever, twist-quick-lock, POWERLOCK)
- 360-degree integrated EMI shielding
- High pin count versions in compact housings for space-constrained panels
- Field-installable for on-site assembly and repair



SILVYN® Cable Tracks and Flexible Conduits

Cable protection for routing in demanding semiconductor environments.

- Acid and solvent resistant
- Stationary and continuous-flex configurations
- UV, flame and abrasion resistant options available

SILVYN® Construction	
Material	Properties
Steel-reinforced PVC	Chemical resistance, general protection
Steel-reinforced PUR	Flexibility, abrasion resistance
Steel-reinforced metal	High mechanical strength, extreme environments

EMI Shielding: A System-Level Approach

Shielding is only as effective as the weakest point in the signal path. A cable with excellent screening paired with an unshielded connector leaves a gap at the termination point.

Cable-side shielding:

- Twisted-pair construction cancels common-mode EMI
- Composite shields (foil + braid) protect across a broad frequency range

Connector-side shielding:

- EPIC® connectors with integrated cable glands provide 360-degree screening at the termination point
- Connector shielding effectiveness should match or exceed the cable's rating
- Proper grounding to the equipment chassis is required to complete the shield

The ÖLFLEX® + EPIC® combination provides matched shielding performance from cable to connector.

Why Plug-and-Play Assemblies

Plug-and-play assemblies are no longer optional. They are becoming essential for scaling semiconductor manufacturing. Pre-assembled cable and connector solutions address several persistent pain points for semiconductor OEMs:



How Plug-and-Play Addresses Common Challenges	
Challenge	Remedy
Slow tool installation	Assemblies arrive terminated and tested; no on-site wire prep
Field wiring errors	Factory-built connections eliminate reversed polarity, improper shield termination and incorrect pin torque
Complex procurement	One assembly part number replaces separate POs for cables, connectors, contacts and hardware
Labor shortages	Shifts termination work from field technicians to repeatable factory production
Multi-vendor finger-pointing	Single-source accountability for the complete connection

LAPP builds custom assemblies to OEM specifications, including cable lengths, bending requirements, connector styles and routing configurations. We test each assembly before it ships.

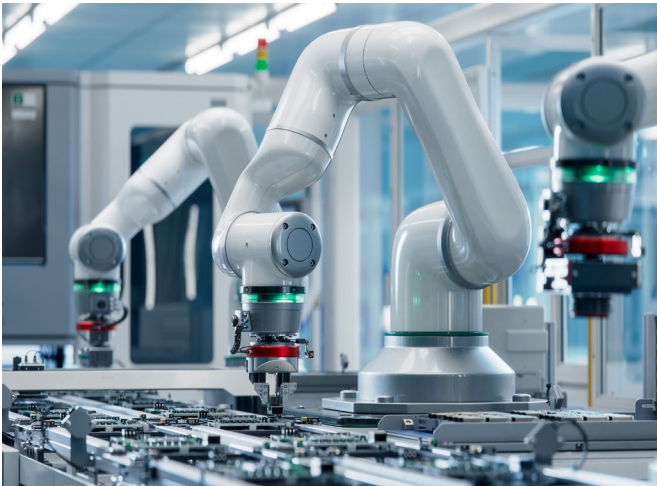
The Single-Source Advantage

Most connectivity suppliers specialize in either cables or connectors and source the rest from third parties. At LAPP, we manufacture both. Beyond product breadth, we are also actively investing in the semiconductor vertical, aligning with OEM ramp cycles, production timelines and the design-in requirements of next-generation equipment.

What that means for semiconductor OEMs:

- **Vertical integration:** We control quality, lead times and inventory across the full cable-to-connector assembly.
- **U.S.-based production:** LAPP’s cables are manufactured in the United States, with raw materials on hand. Speed is a competitive advantage in semiconductor manufacturing, and local production directly reduces lead times and international logistics exposure — a particular advantage for OEMs supported by CHIPS Act funding that incentivizes domestic sourcing.

- **Engineering partnership:** Collaborative support from system planning through design, testing and final implementation.
- **Online specification tools:** Configuration wizards, cross-reference guides and CAD drawing libraries.



From Standard Products to Complete Assemblies	
Engagement Level	What LAPP Delivers
Standard products	Off-the-shelf UL-listed cables and connectors from local inventory
Configured solutions	Cable and connector combinations specified and matched for your application
Custom assemblies	Fully engineered, pre-terminated plug-and-play assemblies built and tested to OEM specifications

Your Partner From Design to Delivery

Connect with LAPP’s semiconductor connectivity experts to explore how we can support your next-generation equipment designs. From cable and connector selection to complete turnkey assemblies, LAPP provides a single-source path from design to delivery.

One Partner. Total Connectivity.

*For more information or to connect
with your local LAPP representative,
please visit ***lapp.com***.*

