

AMPLIMITE D-SUBMINIATURE CONNECTORS

Commercial Product & Solution Guide

Reliable, Scalable Interconnects for Modern Industrial and Electronic Systems

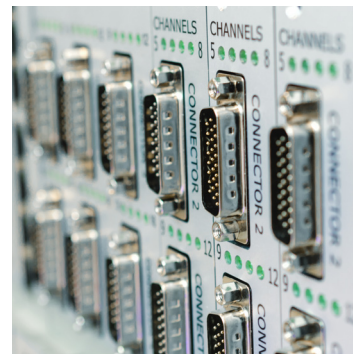


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AMPLIMITE D-SUBMINIATURE CONNECTORS

PORTFOLIO

OVERVIEW

For over 70 years, AMPLIMITE D-Subminiature connectors have served as a core part of TE Connectivity's (TE) interconnect heritage, offering a **robust, standardized, and highly configurable interface** for signal, low-power, and mixed-contact applications across commercial markets. The AMPLIMITE connector system helps enable customers to standardize interfaces while tuning density, mounting, shielding, and cost for each design. Their combination of standardization, robustness, and adaptability makes them a preferred interface as systems become more modular and space constrained.

AMPLIMITE D-Subminiature Connectors Deliver:	
Design Flexibility	Broad portfolio of densities, footprints, terminations, and accessories
Reliability	Tested mechanical retention and contact systems
EMI Performance	Metal shells and 360° shielding solutions
Scalability	From simple I/O to dense, stacked PCB designs
Cost Control	Standardized interface helps reduce custom tooling and sourcing risk
Global Availability	TE manufacturing, distribution, and support worldwide

Why AMPLIMITE Connectors?

- One of the **broadest commercial D-Subminiature connector portfolios** available
- Deep **engineering support and application knowledge**
- Full ecosystem: connectors, backshells, accessories, cable assemblies
- Strong global supply chain and lifecycle support
- Continuous portfolio refresh to meet emerging industrial needs

Commercial Design Intent

- Long lifecycle, standards-based D-Sub interface
- Broad configuration flexibility for global OEM platforms
- Compatibility with industry-standard D-Sub mating interfaces
- Optimized for PCB, cable, and harness integration

AMPLIMITE D-SUBMINIATURE CONNECTOR PRODUCT FAMILIES

STANDARD DENSITY AMPLIMITE D-SUBMINIATURE CONNECTORS

Description

Classic D-Subminiature connectors with size-20 or size-22 contacts, supporting a wide range of PCB and cable terminations.

Key Features

- Contact counts: 9, 15, 25, 37, 50
- Plug and receptacle options
- Vertical and right-angle PCB mount
- Crimp and IDC cable termination
- Tin, gold alloy, and selective gold-plating options
- Thermoplastic housings (UL 94 V-0, high temp variants)

Key Benefits

- Tested, globally recognized interface
- Easier sourcing and second-source compatibility
- Cost-effective for high-volume production



HIGH-DENSITY AMPLIMITE .050 SERIES D-SUBMINIATURE CONNECTORS

Description

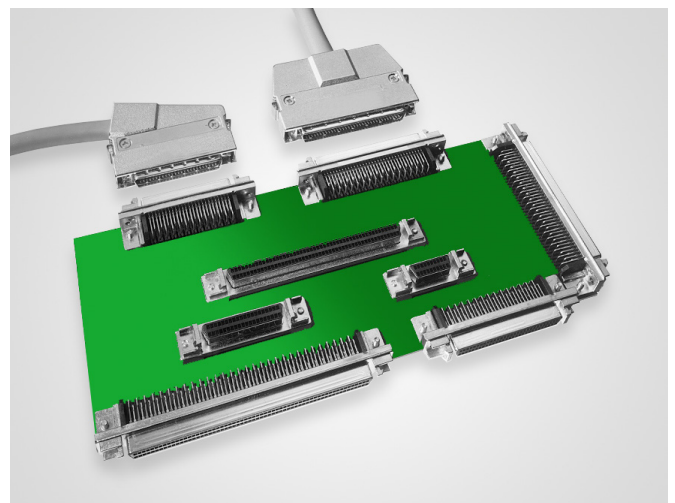
High density D-Subminiature connectors on a .050 x .100 in (1.27 x 2.54 mm) grid for space-constrained designs.

Key Features

- Up to 100+ positions
- Gold-plated tuning fork contacts
- PCB and IDC cable connector options
- High signal density without increasing connector footprint

Key Benefits

- Board space savings
- Higher I/O count per connector
- Ideal for compact electronics and modular equipment



AMPLIMITE STACKED D-SUBMINIATURE CONNECTORS

Description

Vertically stacked D-Sub connectors designed to **reduce PCB real estate** while maintaining full D-Sub functionality.

Key Features

- Receptacle-over-receptacle configurations
- Front metal shells for EMI/RFI shielding
- Built-in grounding indents
- Standard mating compatibility

Key Benefits

- Enables multi-port designs on dense PCBs
- Reduces connector count and board area
- Supports modular system architectures



HARDWARE, SHIELDING, ACCESSORIES & KITS

Backshells & Shielding Hardware

Description

Backshells attach to the rear section of a D-subminiature connector. They protect the termination while providing strain relief, and help improve EMI performance.

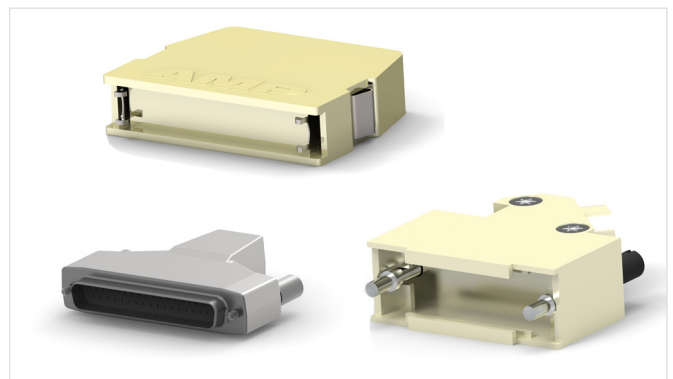
Shielding hardware helps mitigate EMI and radio-frequency interference (RFI) by providing a path to system ground.

Key Features

- 360° EMI/RFI shield termination
- Straight and angled cable exits
- Strain relief for cable protection
- Jackscrews, thumbscrews, snap-latch options

Key Benefits

- Improved signal integrity
- Reduced EMI compliance risk
- Enhanced mechanical retention



AMPLIMITE Cable Clamp Kits

Description

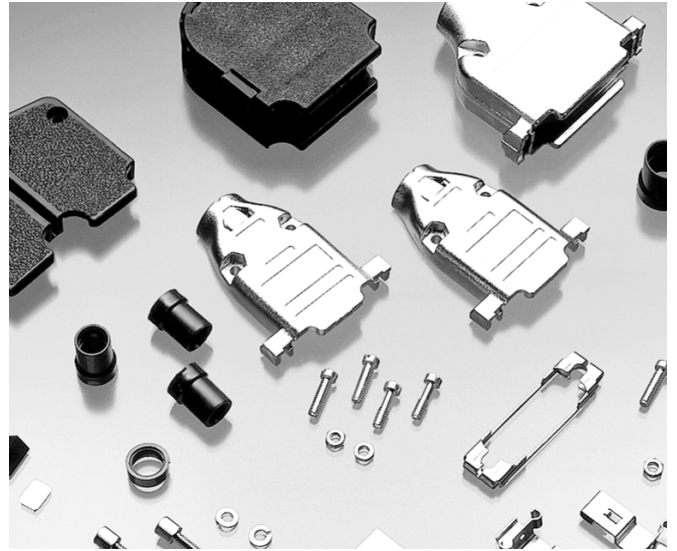
Cable clamp kits are accessory components used with D-subminiature connectors to provide mechanical strain relief and secure cable retention at the rear of the connector or backshell.

Key Features

- Modular cable clamps
- Crimp snap-in contacts
- Mating hardware options
- Mixed accessory kits for fast assembly

Key Benefits

- Simplified procurement
- Faster assembly and installation
- Reduced assembly errors



Pre-Assembled Cable Assemblies

Description

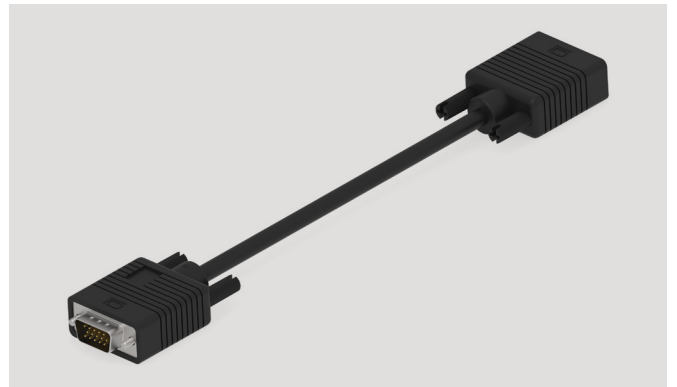
Factory-assembled AMPLIMITE cable assemblies for plug-and-play system integration.

Key Features

- Multiple pin counts and cable lengths
- EMI-shielded metal shells
- UL 94 V-0 housings
- Electrically tested assemblies

Key Benefits

- Reduced labor and assembly time
- Consistent quality
- Faster time-to-market



INDUSTRIES & POSSIBLE APPLICATIONS

WIRING HARNESSES & SUBASSEMBLIES

Standardized interface helps to simplify harness design
Broad backshell and strain relief options
Pre-assembled cable solutions reduce build complexity

Applications	Emerging Applications
• Control and signal wiring harnesses for industrial equipment • Modular harness assemblies for configurable OEM platforms • Point-to-point signal distribution harnesses • Mixed signal harnesses (digital + analog + low-power) • Panel-to-panel interconnect harnesses • Rack-level wiring looms • Serviceable harness interfaces for field replacement	• Pre-terminated harnesses for rapid OEM customization • Harness standardization for global manufacturing platforms • Cost-optimized harness interfaces replacing custom circular connectors • Harnesses for edge computing and gateway devices

AMPLIMITE Solutions

Cable-mount D-Sub connectors + accessories

Recommended Products

- [207464-7](#) – 25-position cable plug (crimp termination)
- [1658660-1](#) – 37-position cable receptacle (crimp)
- **AMPLIMITE Cable Clamp Kits** (multiple part numbers by shell size)
- **Pre-assembled cable assemblies** ([2478170-x](#) series)

Best fit use cases

- Control wiring harnesses
- Modular subassemblies
- Field-replaceable harness interfaces



PCBS & PCB ASSEMBLIES

Vertical, right-angle, and stacked PCB options
High-density .050 series for compact designs
EMI-shielded metal shells for board-level compliance

Applications	Emerging Applications
• Board-to-cable interfaces • Board-to-board interconnect via stacked PCB connectors • I/O connectors for embedded control boards • Debug, programming, and service ports • Backplane and daughtercard interfaces • Auxiliary I/O on controller boards	• Compact industrial controller PCBs • Multi-port designs using stacked D-Subminiature connectors to save board space • High-density sensor aggregation boards • Embedded AI accelerator boards (control and diagnostic interfaces) • Modular PCB platforms requiring standardized I/O footprints

AMPLIMITE Solutions

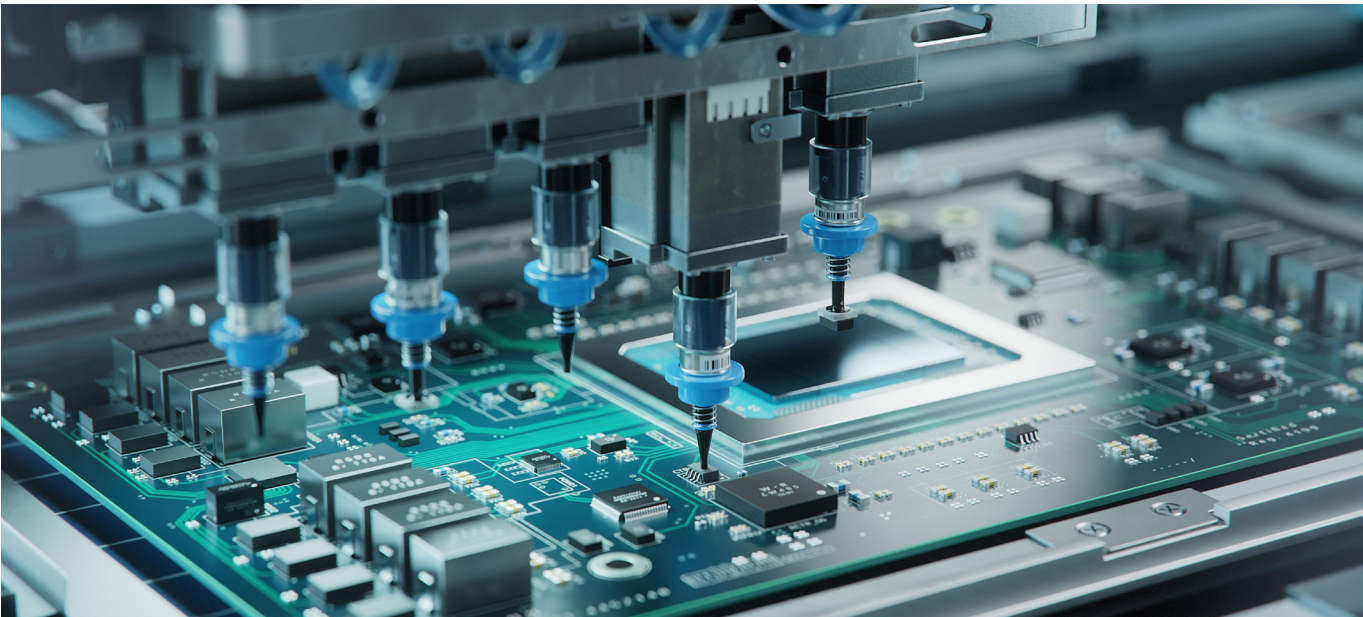
PCB-mount standard density & high-density connectors

Recommended Products

- [2-748003-0](#) – 9-position PCB plug, vertical mount, 4-40 insert
- [1-5747299-4](#) – 15-position PCB receptacle, female screwlocks
- **AMPLIMITE .050 Series PCB connectors** (20-100+ positions)

Best-fit use cases

- Controller boards
- Embedded I/O
- Service and debug ports
- Compact PCB designs requiring high density



MOTION CONTROL & DRIVES

Secure locking hardware resists vibration
Mixed signal capability supports control + feedback
Long-term mating durability

Applications	Emerging Applications
• Servo drive control interfaces • Stepper motor controller I/O • Encoder feedback signal connections • Brake control and monitoring signals • Drive parameterization and diagnostics ports • External control pendant interfaces	• Distributed motion systems in robotics • Modular drive architectures • Compact drive units requiring dense control interfaces • Retrofit interfaces for legacy motion platforms

AMPLIMITE Solutions

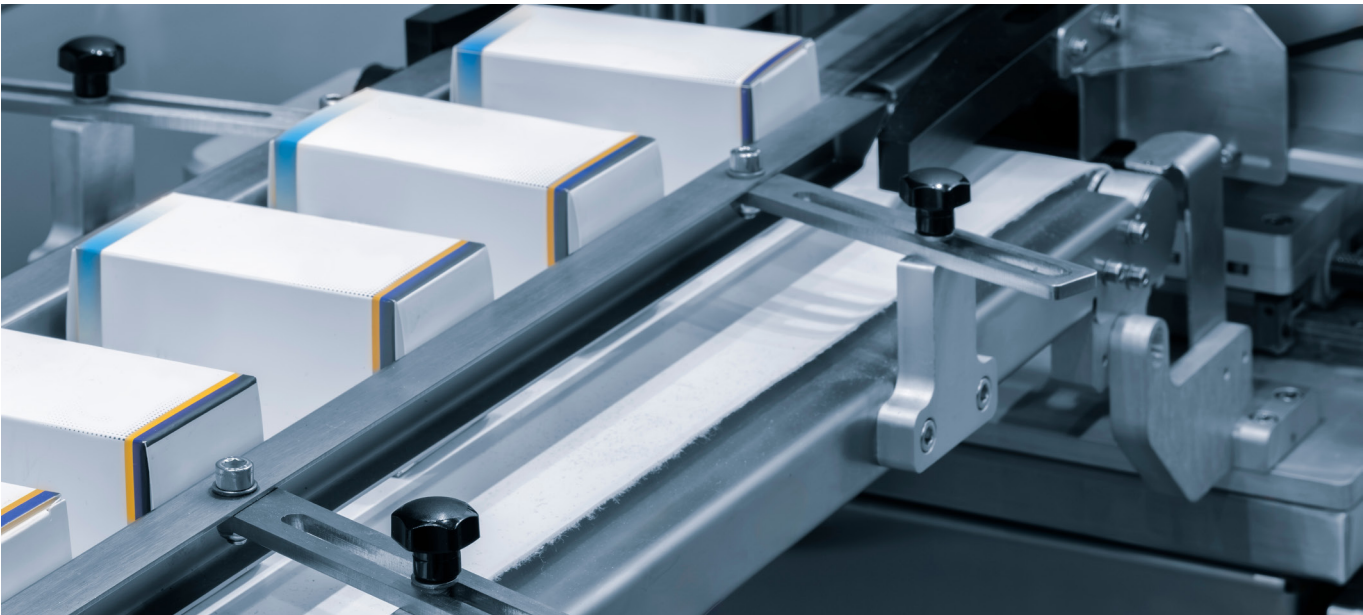
PCB or cable mount D-Subminiature connectors with secure locking

Recommended Products

- [1-5747299-4](#) – PCB receptacle with female screwlocks (vibration resistance)
- [207464-7](#) – Cable plug for encoder and control harnesses

Best-fit use cases

- Servo drive control
- Encoder feedback
- Drive diagnostics



POWER SUPPLIES & TRANSFORMERS

Supports low-to-moderate power plus signal
Mixed-contact system consolidation
Cost-effective alternative to custom connectors

Applications	Emerging Applications
• Control and monitoring interfaces on power supplies • Low-power auxiliary connections • Signal and sense line interconnects • Power supply programming ports • Status and alarm signal outputs	• Intelligent power supplies with digital monitoring • Compact industrial power modules • Modular power shelves with standardized I/O • Hybrid signal + low-power interconnect consolidation

AMPLIMITE Solutions

Standard-density D-Subminiature connectors for control and monitoring

Recommended Products

- [2-748003-0](#) – PCB plug for control signals
- [1658660-1](#) – Cable receptacle for auxiliary interfaces

Best-fit use cases

- Power supply monitoring
- Programming and status interfaces
- Hybrid signal consolidation



CONTROL & AUTOMATION SYSTEMS

Validated interface for PLCs, I/O modules, gateways
EMI-robust shielding options

Applications	Emerging Applications
• PLC I/O modules • Distributed control systems (DCS) • Remote I/O blocks • Industrial gateways and protocol converters • Control cabinets and enclosures • Operator interface panels (HMI back-end connections)	• Industrial IoT edge nodes • Modular automation cells • Smart factory retrofit systems • Control systems designed for global machine export

AMPLIMITE Solutions

Panel mount and PCB mount connectors

Recommended Products

- [2-748003-0](#) – PLC and I/O PCB interfaces
- [1-5747299-4](#) – Secure panel-mounted receptacle
- **AMPLIMITE backshells with 360° shielding**

Best-fit use cases

- PLC I/O modules
- Industrial gateways
- Control cabinets



TEST & MEASUREMENT EQUIPMENT

High pin density for auxiliary and control signals
Stable electrical performance
Modular, serviceable interface design

Applications	Emerging Applications
• Auxiliary control and signal interfaces • Instrument I/O ports • Calibration and service connectors • Data acquisition modules • Test fixture interfaces • Automated test equipment (ATE) sub-systems	• Modular test platforms • Portable and benchtop test instruments • High-channel count measurement systems • Serviceable field test equipment

AMPLIMITE Solutions

High-density PCB and cable connectors

Recommended Products

- AMPLIMITE .050 Series PCB connectors
- [207464-7](#) / [1658660-1](#) – Cable interfaces for fixtures and instruments

Best-fit use cases

- Instrument I/O
- ATE subsystems
- Calibration and service ports



DATA, NETWORKING & STORAGE EQUIPMENT

Applications	Emerging Applications
• RAID storage systems • File servers and routers • Network appliances • Control and management ports • Diagnostic and maintenance interfaces	• Edge data processing systems • Compact industrial servers • Storage platforms for factory data analytics • AI inference appliances (control + auxiliary interfaces)

AMPLIMITE Solutions

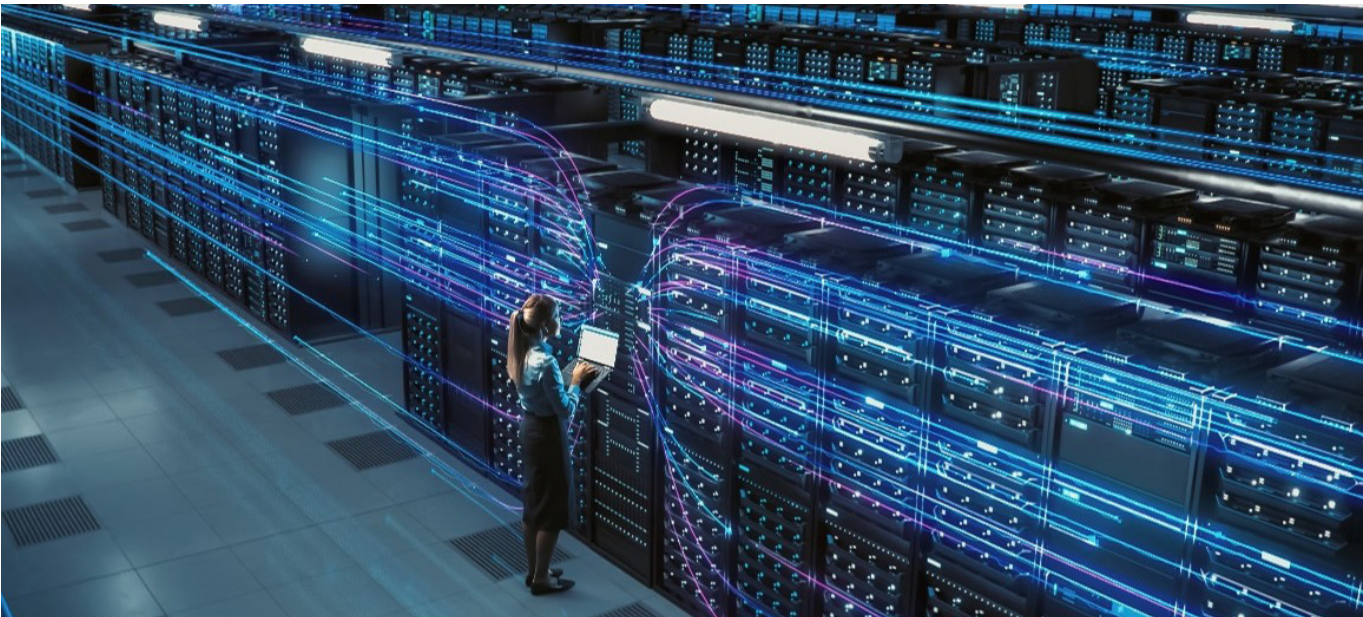
Cable assemblies and shielded PCB connectors

Recommended Products

- Pre-assembled cable assemblies ([2478170-x](#) series)
- Standard PCB-mount AMPLIMITE connectors with metal shells

Best-fit use cases

- RAID storage systems
- File servers
- Network appliances



INDUSTRIAL MACHINERY & EQUIPMENT

Applications	Emerging Applications
• CNC machines • Packaging machinery • Printing and labeling equipment • Material handling systems • Industrial inspection equipment • Vision systems (control and trigger signals)	• Smart machinery with embedded sensing • Retrofit upgrades for legacy machines • Modular machine subassemblies • Digital twins and monitoring interfaces

AMPLIMITE Solutions

Ruggedized PCB and cable connectors

Recommended Products

- [1-5747299-4](#) – Panel mounted receptacle with locking
- **AMPLIMITE Cable Clamp Kits** for strain relief

Best-fit use cases

- CNC machines
- Packaging machinery
- Industrial inspection systems



ROBOTICS & AUTONOMOUS SYSTEMS

Applications	Emerging Applications
• Robot controller I/O • End-effector signal interfaces • Safety and interlock signals • Teach pendant connections • Sensor and vision system interfaces	• Collaborative robots (Cobots) • Mobile robots (AMRs/AGVs) • Service and inspection robots • Modular robotic platforms requiring standardized connectors • Reconfigurable production lines

AMPLIMITE Solutions

High-retention, shielded connectors

Locking PCB and panel-mount D-Subminiature connectors

Cable-mount connectors with strain relief

High-retention hardware and jackscrews

Recommended Products

- [207464-7](#) – Cable plug for robot harnesses
- [1658660-1](#) – 37 position cable receptacle
- [5745079-6](#) – 25 position HDE plug kit
- [747784-8](#) – Jackscrew hardware kit (4-40)
- AMPLIMITE backshells with jackscrews

Best fit use cases

- Robot controller I/O
- End-effector signals
- Teach pendant interfaces
- Vibration-prone automation systems
- Serviceable robot subsystems
- Mixed signal control + feedback



MEDICAL & LABORATORY EQUIPMENT

Applications	Emerging Applications
• Diagnostic equipment • Imaging system auxiliary interfaces • Laboratory automation systems • Monitoring and control electronics • Service and calibration ports	• Portable diagnostic devices • Modular lab instrumentation • Remote and automated testing platforms • Long-lifecycle medical electronics

AMPLIMITE Solutions

PCB and cable D-Subminiature connectors with EMI control

Locking PCB and panel mount D-Subminiature connectors

Cable mount connectors with strain relief

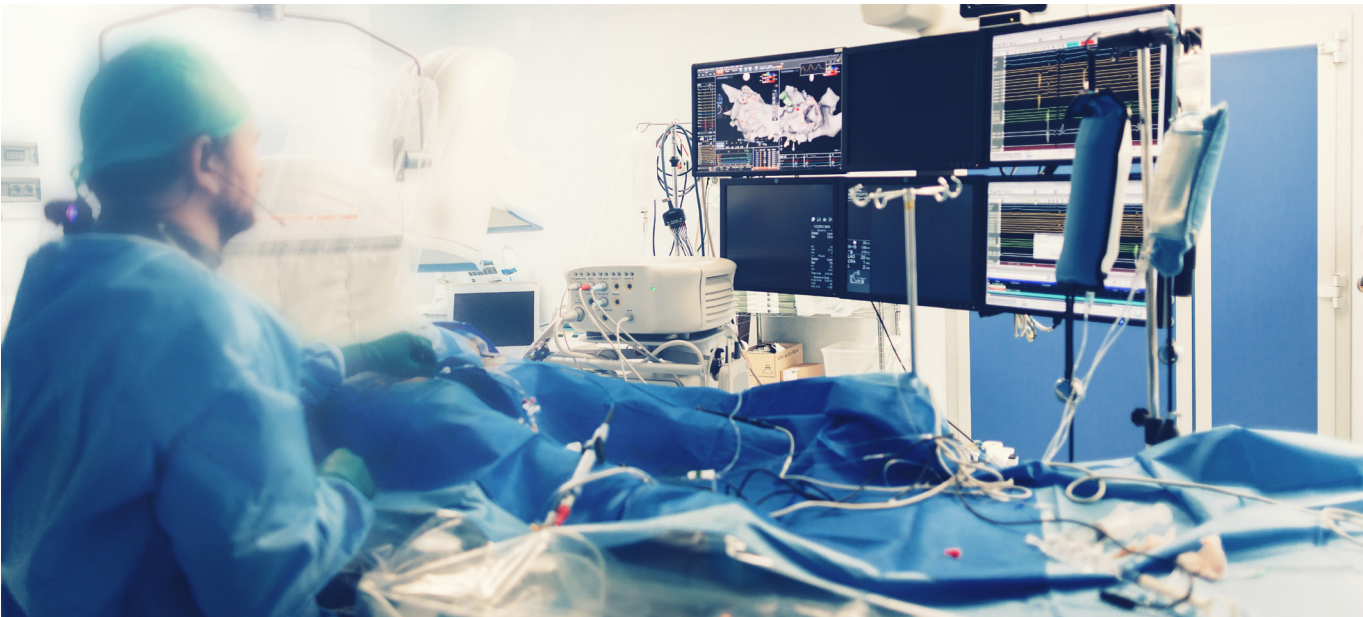
High retention hardware and jackscrews

Recommended Products

- [2-748003-0](#) – PCB interfaces
- Pre-assembled cable assemblies ([2478170-x](#) series)

Best-fit use cases

- Diagnostic instruments
- Lab automation
- Monitoring equipment



SEMICONDUCTOR & MANUFACTURING EQUIPMENT

Applications	Emerging Applications
• Semiconductor fabrication tools • Wafer handling equipment • Process monitoring systems • Equipment control and diagnostics • Factory automation subsystems	• Advanced node fab automation • Modular equipment architectures • Smart manufacturing analytics systems

AMPLIMITE Solutions

Equipment Control & Subsystem I/O Interfaces
Process Module & Chamber Signal Interfaces
Motion, Robotics & Wafer Handling Control Interfaces
Test, Calibration & Service Access Ports
Serviceable, high cycle connectors for BIT, calibration, factory test, and field diagnostics

Recommended AMPLIMITE Products

- **Standard Density PCB Mount AMPLIMITE D-Subminiature connectors**
Examples: [2-748003-0](#) (9 pos PCB plug), [1-5747299-4](#) (15 pos PCB receptacle with locking)
- **Cable Mount AMPLIMITE D-Sub Connectors**
Examples: [207464-7](#) (25 pos cable plug), [1658660-1](#) (37 pos cable receptacle)
- **High Density (.050 Series) AMPLIMITE Connectors**
Compact PCB connectors for dense control and diagnostic interfaces
- **AMPLIMITE Hardware & Accessories**
Jackscrew kits (e.g., [747784-8](#)), die cast cable clamp kits ([5748676-1](#) / [-3](#)) for strain relief and EMI control

Best-fit use cases

- **Long-Life Semiconductor Process Equipment:**
Etch, deposition, inspection, and metrology tools requiring 10-20+ year interface stability
- **Service-Intensive Subsystems:**
Modules designed for frequent maintenance, replacement, and field service access
- **Vibration-Prone Precision Systems:**
Wafer handling, robotics, and motion stages needing secure mechanical retention
- **Legacy Interface Preservation & Retrofit:**
Backward-compatible I/O during tool upgrades and fab infrastructure refresh cycles



EMBEDDED & EDGE COMPUTING PLATFORMS

Applications

- Embedded controllers
- Industrial PCs
- Gateway devices
- AI edge inference systems
- System diagnostics and configuration ports

AMPLIMITE Solutions

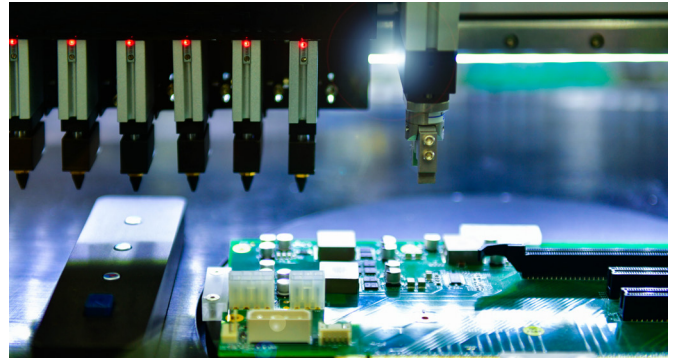
High-density and stacked PCB connectors

Recommended Products

- AMPLIMITE .050 Series PCB connectors
- Stacked PCB AMPLIMITE connectors

Best-fit use cases

- Industrial PCs
- AI edge devices
- Embedded controllers



SERVICE, MAINTENANCE & LIFECYCLE INTERFACES

Cross-Industry Applications

- Field service connectors
- Commissioning ports
- Firmware update interfaces
- Legacy system backward-compatibility ports
- Long-term serviceability interfaces

AMPLIMITE Solutions

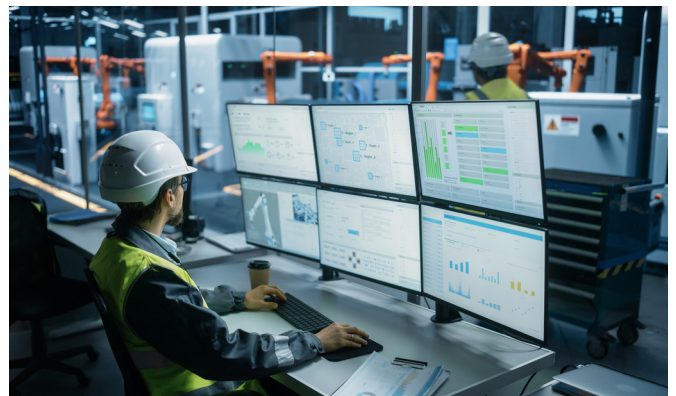
Standard D Sub PCB or cable connectors

Recommended Products

- [2-748003-0](#) – PCB service ports
- [207464-7](#) – Cable service interfaces

Best-fit use cases

- Firmware updates
- Diagnostics
- Long-term serviceability



INDUSTRIAL IOT GATEWAYS

Applications	Emerging Applications
• Control and status I/O • Sensor aggregation interfaces • Commissioning and service ports	• Edge analytics gateways • Factory data acquisition nodes • Retrofit IoT enablement for legacy equipment

AMPLIMITE Solutions

Standard-density PCB-mount D-Subminiature connectors

High-density (.050 Series) PCB connectors

Shielded cable connectors

Recommended Products

- [2-748003-0](#) – 9-position PCB plug, vertical mount, 4-40 inserts
- [1-5747299-4](#) – 15-position PCB receptacle with female screwlocks
- [5787169-9](#) – AMPLIMITE .050 Series right-angle PCB receptacle
- [5748676-1](#) – Die-cast cable clamp kit (Size 1)

Best-fit use cases

- Long-life industrial gateways
- Harsh-environment factory electronics
- Globally deployed control systems



MODULAR TEST SYSTEMS

Applications	Emerging Applications
• Instrument I/O interfaces • Test fixture connections • Calibration and diagnostics ports	• Modular ATE platforms • Portable and benchtop test systems • Scalable test architectures

AMPLIMITE Solutions

High-density (.050 Series) PCB connectors

Standard D-Sub cable interfaces

Shielded, high-cycle connectors

Recommended Products

- [5787169-9](#) – .050 Series right-angle PCB receptacle
- [1658614-4](#) – 9-position HDF PCB receptacle, lead-free
- [207464-7](#) – 25-position cable plug
- [5207908-1](#) – Strain-relief and screw retention kit

Best-fit use cases

- High mating-cycle environments
- Space-constrained test modules
- Long-term platform reuse



COMPACT INDUSTRIAL ELECTRONICS

Applications	Emerging Applications
• Embedded control boards • Auxiliary I/O and debug ports • Board-to-cable interfaces	• Edge AI controllers • Compact industrial PCs • Modular embedded systems

AMPLIMATE Solutions

High-density and stacked PCB D-Subminiature connectors
Right-angle and vertical PCB connectors
Miniaturized shielding solutions

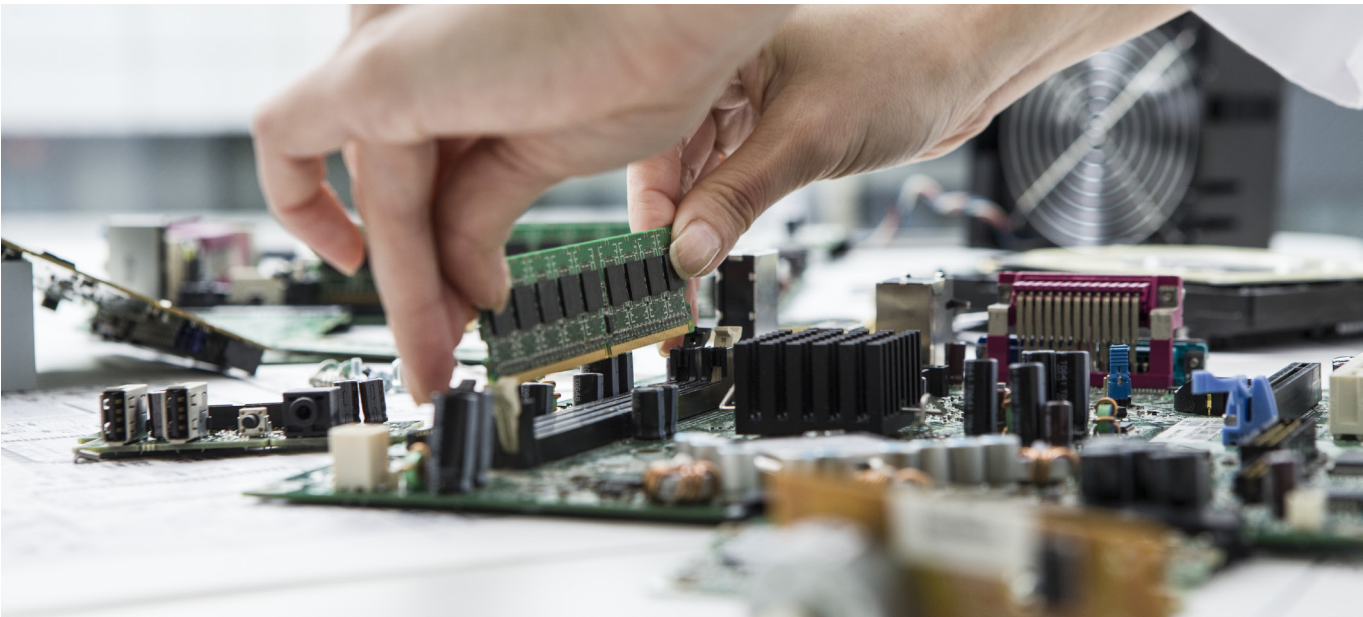
Recommended Products

- [5787169-9](#) – AMPLIMATE .050 Series PCB receptacle
- [2-748003-0](#) – 9-position PCB plug
- [1-5747299-4](#) – 15-position PCB receptacle with locking
- **Stacked AMPLIMATE PCB connectors** (9/9, 15/15 configurations)

Best-fit use cases

- Dense PCB layouts
- Space-constrained enclosures
- Scalable embedded platforms

AMPLIMATE D-Subminiature connectors continue to serve as a **enhanced, standardized, and scalable interface**—particularly where **density, EMI robustness, modularity, and long lifecycle support** are critical. Emerging markets are increasingly leveraging AMPLIMATE connectors not as “legacy ports,” but as **space-efficient, system-level interconnect building blocks** within modern architectures.



FREQUENTLY ASKED QUESTIONS

1. What's the difference between a standard D Sub and a high density D Sub (HD 20, HD 22, etc.)?

The primary difference between standard and high density (HD) D Sub connectors is contact centerline spacing. Standard D Sub connectors use larger spacing and support fewer pins. High density D Subs such as HD 20 and HD 22 use tighter spacing to fit more contacts within the same shell size, enabling higher I/O density in space constrained designs. For even higher density needs, Micro D (0.050 Series) connectors offer an even smaller pitch.

2. How do I choose between solder cup, crimp, PCB straight pin, and right angle D Sub terminations?

The preferred termination type varies by application. Solder cup terminations are well suited for low volume or field serviceable AMPLIMITE D-Subminiature cable assemblies, while crimp contacts provide highly consistent electrical and mechanical performance for production environments. PCB straight pin styles may be used to minimize signal stubs. Right angle terminations reduce connector height and help manage cable strain.

3. What are typical current and voltage ratings for D Sub contacts?

D Sub contacts typically support currents in the range of approximately 1 A to 7.5 A per contact, depending on the contact series, style, and test conditions. The typical dielectric withstand voltage ranges from 500 to 1000 VAC.

4. What's the best way to handle cable shielding and grounding with a D Sub backshell?

Use a shielded backshell with metal components and proper grounding hardware to achieve effective EMI suppression. Ensure the connector shell mates before the contacts (ground first, break last), and terminate the cable shield directly to the backshell using the shortest and widest possible connection, ideally a full 360° termination. Use the provided strain relief features to prevent mechanical stress on the shield termination, and for panel mounted applications, ensure the backshell or connector shell is solidly bonded to chassis ground for good grounding performance.

5. How do jackscrews, thumbscrews, and latching styles affect reliability?

Jackscrews provide high retention force and are recommended for vibration prone or mission critical applications. Thumbscrews help enable tool less mating for service access, while snap latch styles prioritize speed but offer lower resistance to shock and vibration.

6. Which plating option should I choose - tin, gold, or selective gold?

Gold or selective gold plating with a nickel underplate is recommended for low level signal applications and environments involving vibration, as it provides stable electrical performance and strong resistance to fretting corrosion. Tin plating with a nickel underplate is well suited for the termination side, such as solder or crimp areas, where it offers good manufacturability and excellent electrical connections.

7. How can I reduce crosstalk and EMI in D Sub assemblies?

Use a metal shell (shielded) D Sub connector and avoid plastic shells in EMI sensitive designs. Ensure a continuous ground path and add an EMI/RFI gasket for panel mounted connectors. Use shielded backshells with full shielding coverage and strain relief to protect the cable exit. Secure mating hardware helps maintain reliable shielding over time.

8. How do I identify an unknown D Sub connector from a photo or measurements?

An unknown D Sub connector can be identified by counting the number of contacts, measuring the shell width to determine the shell size, and checking whether the contacts are exposed (plug/male) or recessed (receptacle/female). The mounting style, such as panel mount, PCB mount, or cable mount also helps narrow down the connector type.

9. What are common D Sub failure modes and how do I troubleshoot them?

Typical failure modes include bent pins, intermittent contacts caused by fretting corrosion, and solder joint damage from inadequate strain relief. Visual inspection, continuity testing under cable flex, and verification of backshell strain relief are helpful ways to isolate the root cause of the problem.

10. What insertion and removal force is normal for D Sub connectors?

Insertion and removal force scales with pin count and contact style. Excessive force may indicate misalignment, damaged contacts, incompatible plating systems, or debris within the connector.

11. How do I select a D Sub for harsh environments?

Harsh environment performance can be improved by using secure retention features such as board locks, jackscrews, or screw locks to prevent unmating under vibration or shock. Backshells with strain relief help protect the cable exit. Higher gold plating options with a nickel underplate and metal shells improve durability and corrosion resistance. For EMI/RFI robustness, shielded or metal shell variants with proper shield termination and optional panel gaskets can be used. For specific environmental conditions, always look at product specifications and related reliability qualification testing.

12. What's the difference between 4 40 and M3 hardware?

4 40 hardware uses imperial threads, while M3 uses metric threads, and they are not interchangeable. Matching connector hardware, jackscrews, and panel threads prevents cross threading and ensures proper retention.

13. How do I design a D Sub PCB footprint to reduce solder cracking?

Solder cracking can be minimized by using D Sub PCB connectors with mechanical stabilization features such as boardlocks or retentive legs. Connector specific application specifications and customer drawings should be followed for correct hole patterns and board thickness. PCB support fixtures should be used during insertion and soldering to limit board flex. Cable loads should be transferred through backshells or enclosure kits with strain relief rather than through solder joints. Where applicable, ACTION PIN terminations help further reduce PCB stress.

14. How do I specify and test D Sub cable assemblies?

Typical specifications include 100% continuity testing, insulation resistance, dielectric withstand (hipot), and visual inspection. For EMI sensitive systems, verify low impedance shield to shell termination at both ends of the cable.

15. How do I prevent galvanic corrosion in outdoor D Sub installations?

To prevent galvanic corrosion in outdoor D-sub installations, choose galvanic compatible connector, hardware, and panel. A well defined grounding strategy and the use of corrosion resistant fasteners further reduce long term corrosion risk in harsh environments.

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