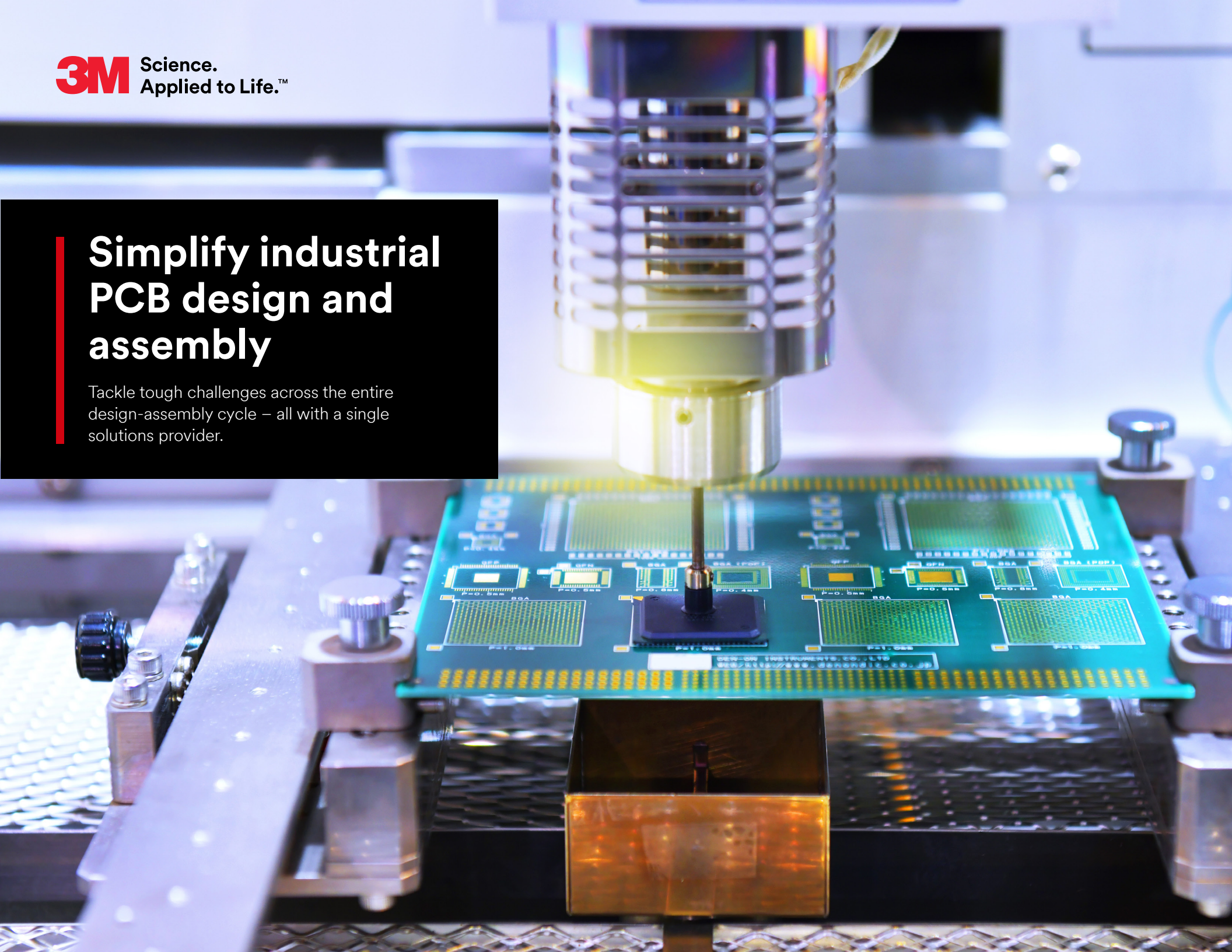
3M Science. Applied to Life.™

Simplify industrial PCB design and assembly

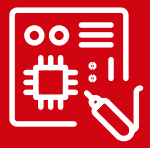
Tackle tough challenges across the entire design-assembly cycle – all with a single solutions provider.



Industrial PCB design and assembly made easy

Printed circuit boards (PCBs) are the foundational electronics that allow industrial equipment across some of the world's most critical industries to function reliably. Today's designs are being shaped by rapid miniaturization and widespread adoption of high-density interconnect (HDI) technology, growing use of flexible and rigid-flex boards, high-performance and maintenance-friendly materials, and the ability to withstand harsh environments. AI-powered designs and assembly processes, and increasing sustainability goals are also key drivers for the industry.

3M is here to help engineers and assemblers address their challenges across the entire design-build process. Our broad portfolio offering of electronics assembly materials and interconnect solutions combined with R&D capabilities in 31 countries, bench-to-bench collaboration models, the ability to innovate across 49 technology platforms and our global quality-committed manufacturing means we provide solutions for critical challenges today – and exciting new possibilities for tomorrow.



Design and Integration Flexibility

Freedom to design smaller, lighter, more complex architectures while driving performance.

Manufacturability and Throughput

Faster, cleaner, more predictable assembly with potentially fewer defects and higher first-pass yields.

Performance and Reliability

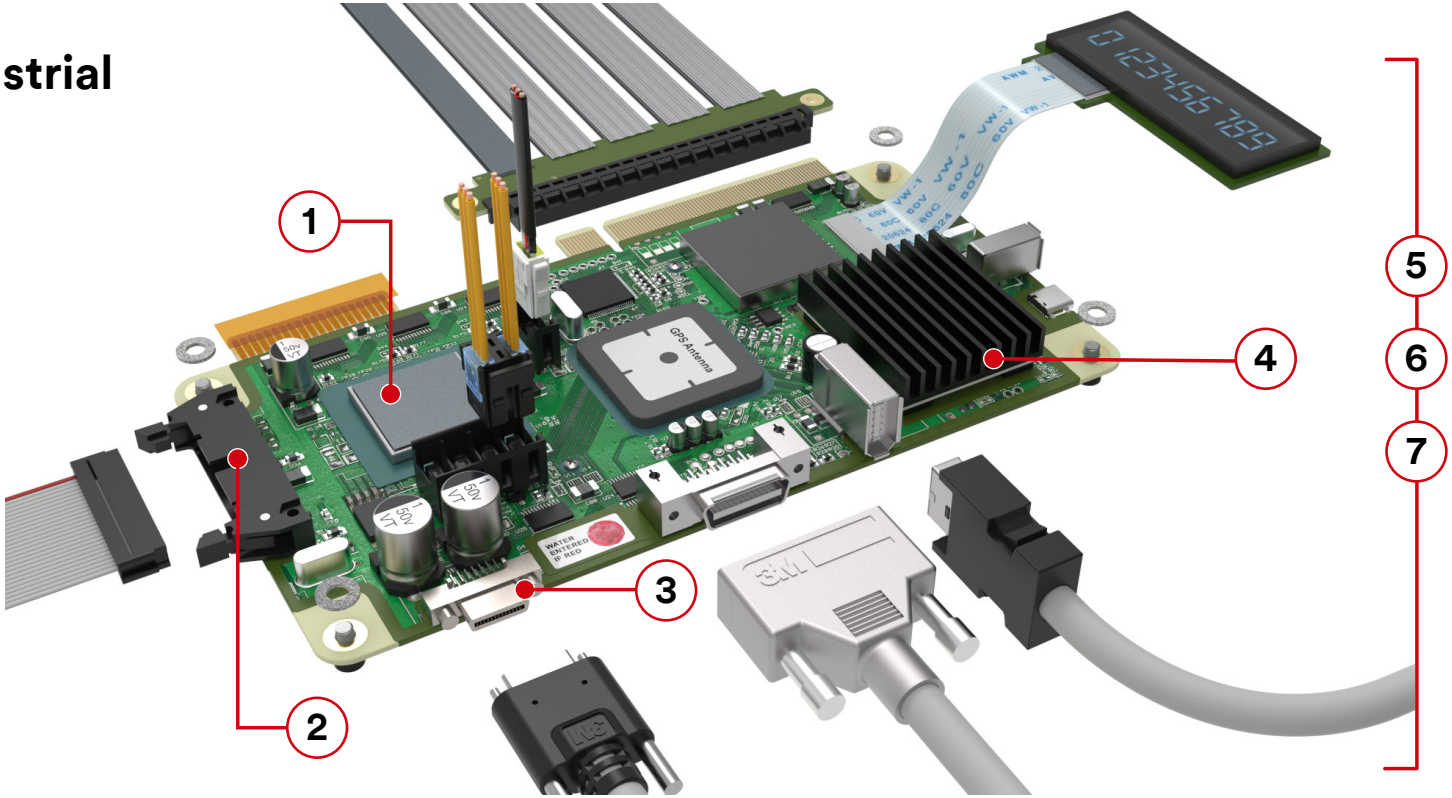
Help ensure your design performs as intended – thermally, electrically and mechanically from design and into the field – while meeting your compliance targets.

Solutions for industrial PCB design and assembly

1. Signal integrity
2. Mechanical stability
3. Miniaturization
4. Thermal management

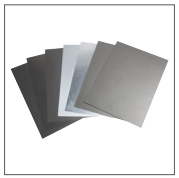
Across the board:

5. EMC compliance
6. Assembly
7. Bonding



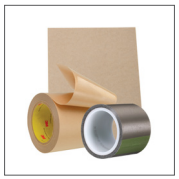
Signal integrity

Poor signal integrity can potentially lead to data corruption, system instability or potentially complete device failure. Design for reliable and predictable performance in challenging industrial applications.



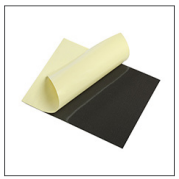
3M™ EMI/RFI Absorbers

High permeability at the most common frequencies of connected devices



3M Electrically Conductive Tapes

Excellent shielding performance for shield can applications

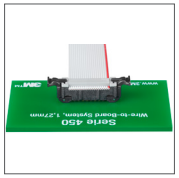


3M Electrically Conductive Gaskets

Compressible grounding and shielding solution

3M Twin Axial High-Speed Cable Solutions

Consistent high-speed performance with minimal crosstalk



3M Wire and Boardmount Connectors

Stable, low-loss connections in compact designs

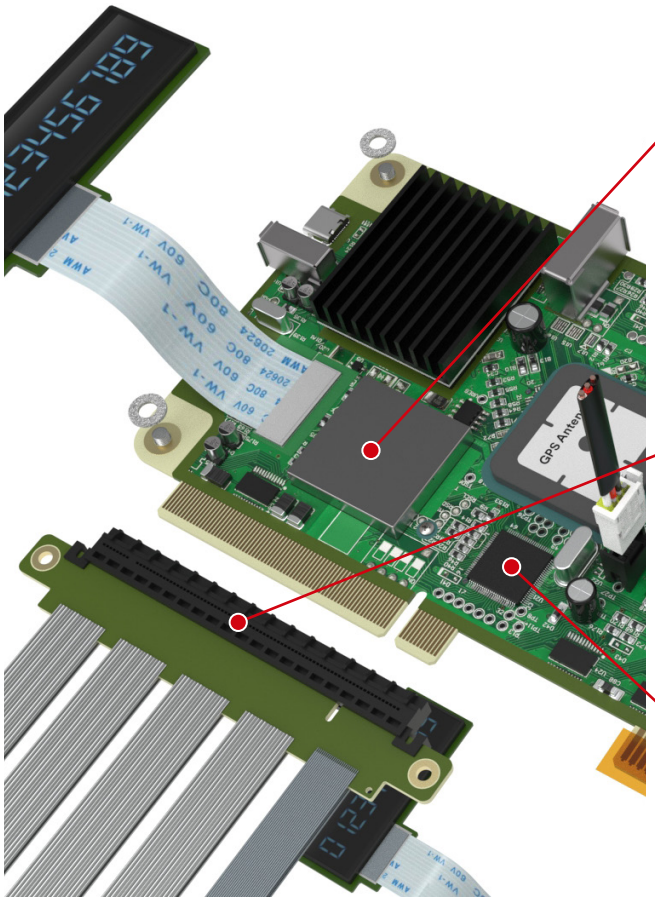
3M MDR/SDR Connectors

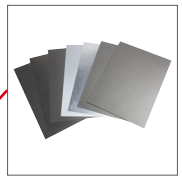
Reliable, shielded I/O connections for harsh environments

3M Industrial Camera Cable Assemblies

Flexible, robust assemblies delivering stable high-speed imaging signals

Key applications
for signal integrity



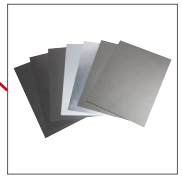


3M™ EMI Absorber & Magnetic Shielding Material AB3000 Series

- Apply: Placed inside of lid of Faraday cage
- Value: Absorb unwanted frequencies to limit escape from shield can
- Feature: Frequency range (1GHz – 10GHz)

3M™ Twin Axial PCI Express Extender Assemblies Gen 5.0

- Apply: High-speed 3M Twin Axial Extender Assemblies for PCI Express Gen 5.0 applications (backward compatible)
- Value: Bend and fold 3M TwinAx high-speed cable with minimal impact on signal integrity
- Feature: Continuous longitudinal shielding allows for high-bandwidth, resonance-free signal integrity performance



3M™ EMI Shielding Absorber AB6005SHF

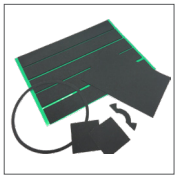
- Apply: Placed on top of the source of noise (unwanted EMI)
- Value: Combination absorber and shielding tape that is highly effective in confined spaces
- Feature: Frequency range (10MHz – 18GHz)

Mechanical stability

If the board or its components expand and contract, crack or fatigue over time, it can cause intermittent failures, signal loss or complete system shutdowns. Help maintain long-term reliability and performance of equipment operating under demanding conditions.

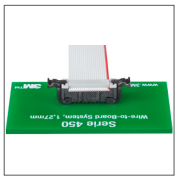
3M™ Bumpon™ Protective Products

Consistent, repeatable spacing, vibration isolation and prevent board flexing



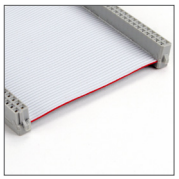
Foams and molded elastomers (Aearo Technologies, a 3M company)

Vibration damping and noise suppression



3M Wire and Boardmount Connectors

Strong, secure connections that withstand vibration



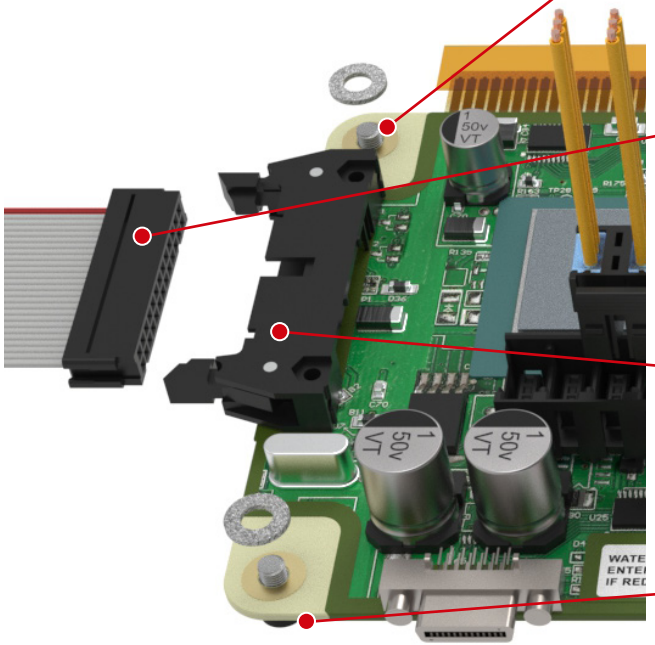
3M Molded On Cable Assemblies

Rugged connections with strain relief that helps maintain stability

3M Industrial Camera Cable Assemblies

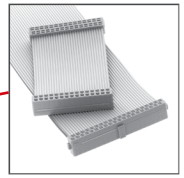
Cable assemblies available with screw locks for secure connections in challenging environments

Key applications for mechanical stability



CONFOR™ SC Foam or ISOLOSS™ Elastomer Isolators (Aearo Technologies, a 3M company)

- Apply: Mounted to frame
- Value: Helps prevent PCB flexing and detachment during impact and drop shock
- Feature: Custom molded and die-cut parts to fit design requirements

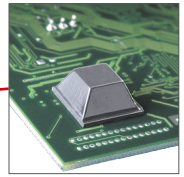


3M™ Molded Assemblies

- Apply: Wiremount cable assembly for I/O
- Value: Shield against elements, including high vibration to remove risk of accidental disconnection
- Feature: Molded one-piece design (customizable configurations available upon request)

3M™ Four-Wall Header Straight and Right Angle 3000 Series

- Apply: PCB boardmount I/O
- Value: Latch/eject system for secure mating and easy maintenance
- Feature: Plastic latches with metal roll pins help ensure reliable connection



3M™ Bumpon™ Protective Bumpers

- Apply: To frame of PCB
- Value: Absorb vibrations and noise, allow for good air circulation to help prevent board flexing
- Feature: Wide variety of shapes, material and adhesives to meet design requirements

3M™ Camera Link Industrial Camera Cable Assembly, SDR, 1Sx26-x1xx Series

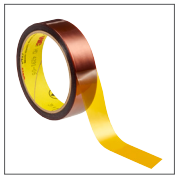
- Apply: 3M Camera Link Industrial Camera Cable Assembly SDR, 1Sx26-x1xx Series for Camera Link® applications
- Value: Angled cable connectors enable smaller-footprint connections, design flexibility and help reduce stress on cables, especially on applications with motion
- Feature: Thumbscrews add connection reliability, even for applications with vibration and repetitive motion

Thermal management

Excess heat can degrade electronic components, shift electrical characteristics, shorten product life or cause complete system failure. By controlling temperatures and dissipating heat efficiently, you can help ensure reliability and consistent performance of industrial equipment in various environments.

3M™ Twin Axial High-Speed Cable Solutions

Thin, flexible routing that helps reduce thermal load around dense components



3M High-Temperature Tapes

Chemically resistant polyimide masking tapes, available with an optional low-static coating, designed for clean and reliable removability

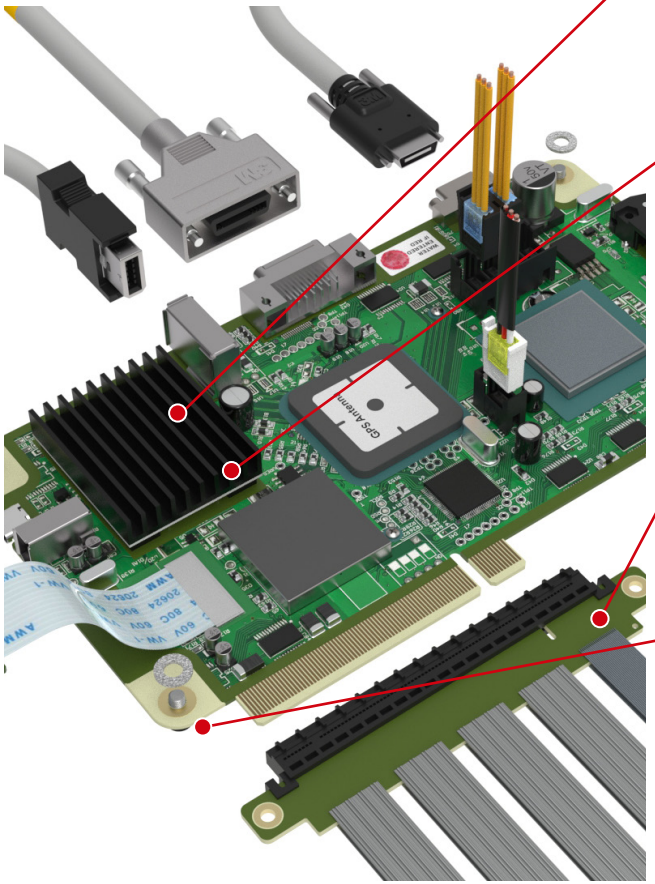
3M Thermally Conductive Tapes

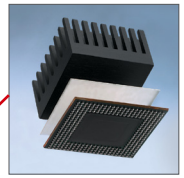
High adhesion bonding tapes that dissipate heat for effective performance

3M™ Bumpon™ Protective Products

High adhesion urethane spacer improves ventilation

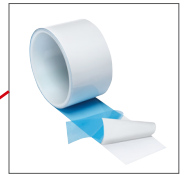
Key applications for thermal management





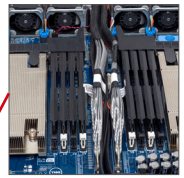
3M™ Thermally Conductive Silicone Interface Pad 5595S

- Apply: Interface between PCB and heat sink
- Value: Good thermal stability of the base polymer with excellent softness of the thermal pad
- Feature: Soft silicone pads conform to a variety of substrates



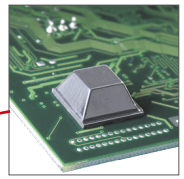
3M™ Thermally Conductive Adhesive Transfer Tape, 8810

- Apply: Interface between heat-generating components and heat sinks
- Value: Good thermal conductivity and good electrical insulation
- Feature: Soft and conforms well to non-flat substrates while offering excellent adhesive performance



3M™ Twin Axial Extender Assemblies for PCI Express Gen 5.0

- Apply: High-speed PCIe® Gen 5.0 applications (backward compatible)
- Value: Bend and fold 3M TwinAx high-speed cable to avoid obstructing cooling airflow, redirect airflow and help improve thermal management
- Feature: Thin 3M TwinAx cable routes easily in dense applications, reducing airflow restriction to help lower thermal load

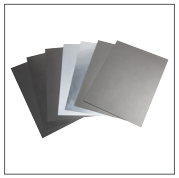


3M™ Bumpon™ Protective Bumpers

- Apply: To frame of PCB
- Value: Improve spacing to allow for good air circulation
- Feature: Wide variety of shapes, material and adhesives to meet design requirements

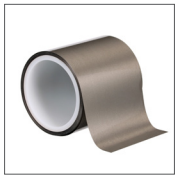
EMC compliance

Uncontrolled, radiated or conducted electromagnetic emissions can interfere with nearby equipment and insufficient immunity leaves systems vulnerable to external disturbances. Achieving EMC compliance ensures your systems perform reliably alongside other industrial machinery and meet your regulatory requirements.



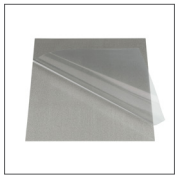
3M™ EMI/RFI Absorbers

Efficiently absorbing frequency ranges including Wi-Fi 5, Wi-Fi 6E and sub-6 bands



3M Electrically Conductive Single-Sided Tapes

Single-sided conductive pressure-sensitive adhesive (CPSA) with excellent grounding and shielding performance



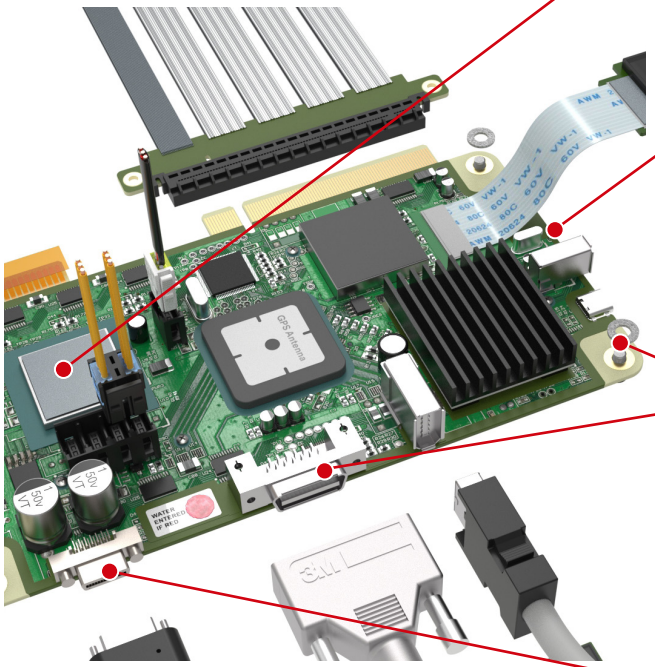
3M Electrically Conductive Double-Sided Tapes

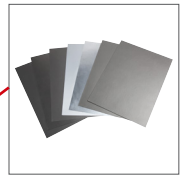
Double-sided conductive pressure-sensitive adhesive (CPSA) with excellent grounding and shielding performance

3M Electrically Conductive Gaskets

Low compression set foam provides exceptional EMI/RFI shielding and grounding performance

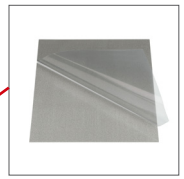
Key applications for EMC compliance





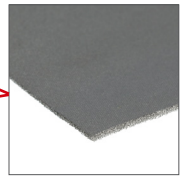
3M™ EMI Absorber & Magnetic Shielding Material AB3000 Series

- Apply: Place on a chip or over a PCB trace emitting EMI
- Value: Help eliminate radiated and conducted emissions
- Feature: Frequency range (1GHz – 10GHz)



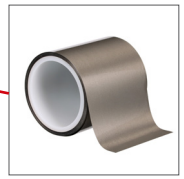
3M™ Electrically Conductive Double-Sided Tape 9793KW Series

- Apply: Bonding PCB to the enclosure
- Value: XYZ electrically conductive pressure-sensitive adhesive (CPSA) offering adhesion and grounding performance to many surface types
- Feature: Provides electrical grounding performance with small-size contact while also providing strong adhesion and weather sealing



3M™ Electrically Conductive Gasket Tape MSG7000SDX Series

- Apply: Connector grounding, PCB grounding
- Value: Highly compressible foam construction for wide range of gap filling and grounding
- Feature: Foam is laminated with conductive fabric carrier for conformability and stability



3M™ Electrically Conductive Single-Sided Tape 5113SFT

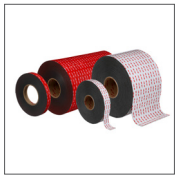
- Apply: Secure and ground cables to provide effective shielding
- Value: Excellent grounding for cables with small contact areas for microelectronics
- Feature: Isotropic XYZ axis conductivity through the adhesive and conformability that allows wrapping around small and large diameters

Bonding

In industrial environments with vibration, heat and mechanical stress, weak or inconsistent bonds can lead to component shift, delamination or failure. Achieve reliable bonding that helps you maintain durability, alignment, thermal performance and overall system reliability.

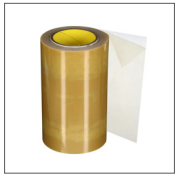
3M™ Scotch-Weld™ Structural Adhesives

One-part and two-part epoxies for component protection



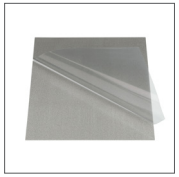
3M™ VHB™ Tapes

Strong, permanent bonding while distributing stress evenly across joined surfaces



3M Thermal Bonding Films

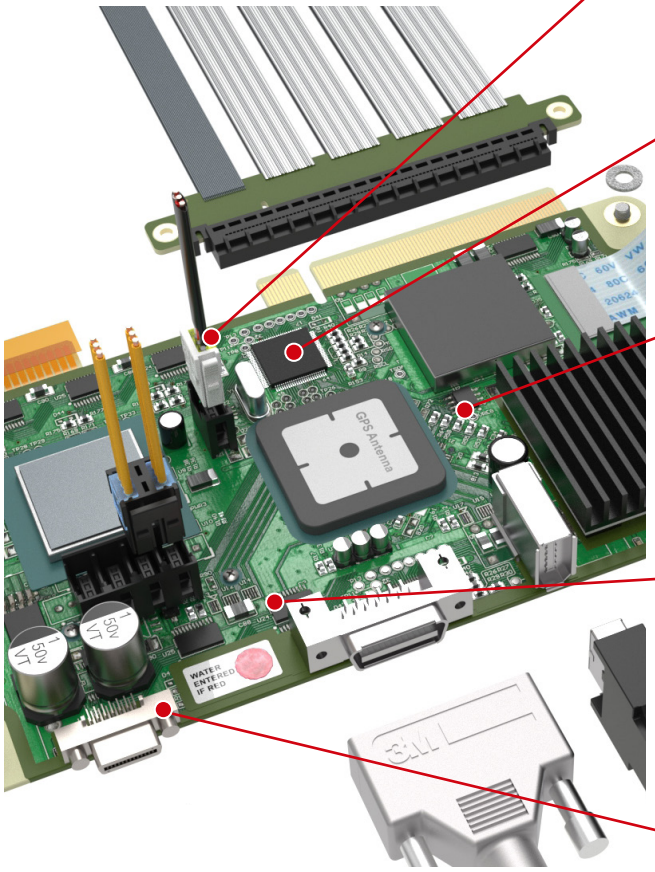
Strong, reliable adhesion that simplifies bonding of complex electronic assemblies



3M™ Electrically Conductive Double-Sided Tape 9793KW Series

Double-sided electrically conductive pressure-sensitive adhesive (CPSA) engineered for excellent electrical grounding, electromagnetic shielding, and reliable bonding and sealing performance

Key applications for bonding

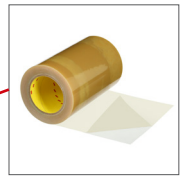


3M™ Scotch-Weld™ Two-Part Epoxy Adhesive DP100 Series

- Apply: Encapsulation of wire terminations and connectors
- Value: Protection and stability
- Feature: Fast handling strength, clarity, environmental resistance

3M™ Scotch-Weld™ One-Part Epoxy Adhesive 6000 Series

- Apply: Potting around IC chip, including 6011LV, 6101, 6100LV
- Value: Enhance structural strength
- Feature: Can cure after reflow, adhesion and drop performance

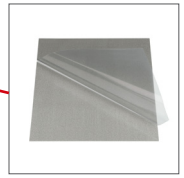


3M™ Thermal Bonding Film 583

- Apply: Splicing of glass fabric during PCB board manufacturing (entire green layer)
- Value: Heat or solvent activated for bonding. It can also be lightly cross-linked using a post heat exposure.
- Feature: Can be solvent activated in the uncured form

3M™ Scotch-Weld™ Two-Part Epoxy Adhesive DP420LX / DP460NS / DP270

- Apply: Dispensed in gap between inductors and FR4
- Value: Helps protect components, inductor reinforcement
- Feature: Rigidity and toughness, non-sag formulation, long open time, high temp and humidity resistance

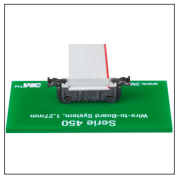


3M™ Electrically Conductive Double-Sided Tape 9793KW Series

- Apply: Bonding PCB to the enclosure or connector to PCB
- Value: XYZ electrically conductive pressure-sensitive adhesive (CPSA) offering adhesion and grounding performance to many surface types
- Feature: Provides electrical grounding performance with small-size contact while also providing strong adhesion and weather sealing

Miniaturization

As components get smaller and traces move closer together, issues like heat buildup, electromagnetic interference and mechanical stress become harder to manage. In industrial environments where vibration, high power and harsh conditions are common, these constraints make it even more difficult to ensure long-term durability and consistent performance in compact PCB designs.

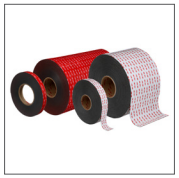


3M™ Wire and Boardmount Connectors

Compact, space-efficient connections enabling tighter, smaller PCB layouts

3M MDR/SDR Connectors

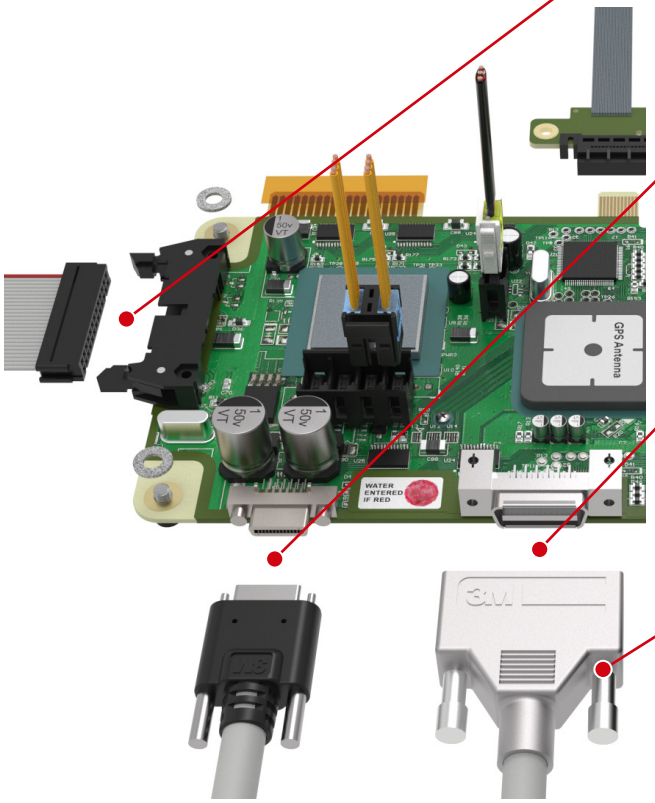
Compact, high-density I/O connectors supporting smaller, space-constrained designs

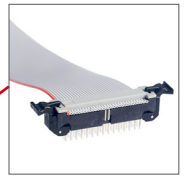


3M™ VHB™ Tapes

Replace rivets, welds and screws while enabling faster production by eliminating the need for drilling, welding, grinding and project cleanup

Key applications
for miniaturization



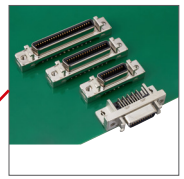


3M™ Socket 451 and 3M Header 452 series

- Apply: High-density wire-to-board PCB I/O
- Value: Compact, space-saving connector system
- Feature: 0.050” pitch wire-to-board system at half the size of industry standard 0.100” pitch

3M Shrunk Delta Ribbon (SDR) System

- Apply: High-density wire-to-board PCB I/O
- Value: Space-saving board and wiremount connector with reliable PCB retention
- Feature: 0.031” / 0.8 mm pitch connector with screwlock retention



3M Mini Delta Ribbon (MDR) System

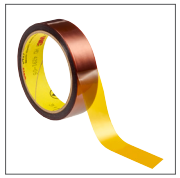
- Apply: High-density wire-to-board PCB I/O
- Value: Space-saving board and wiremount connectors with reliable PCB retention for rugged environments
- Feature: 0.05” / 1.27mm pitch connector with screwlock retention

3M Mini Delta Ribbon (MDR) Cable Assemblies

- Apply: High-density PCB I/O
- Value: Completed cable assembly
- Feature: Shielding with foil and braid for additional signal protection

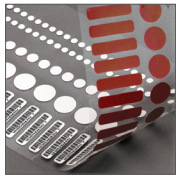
Assembly

Assemblers must consistently meet tight production timelines while maintaining high yields, even as board designs become smaller, denser and more complex. You also manage thermal issues, vibration resistance and reliability demands for harsh industrial environments. Supply chain variability, component shortages and strict quality and regulatory requirements add further pressure. Balancing speed, cost and performance while also helping ensure every board meets rigorous customer specifications is critical.



3M™ High-Temperature Tapes

Chemical-resistant polyimide tape with electrostatic discharge coating providing clean removability



3M Water Contact Indicator Tapes

Visual evidence of water exposure

3M Anisotropic Conductive Films

Flex-to-flex or flex-to-PCB bonding with high reliability

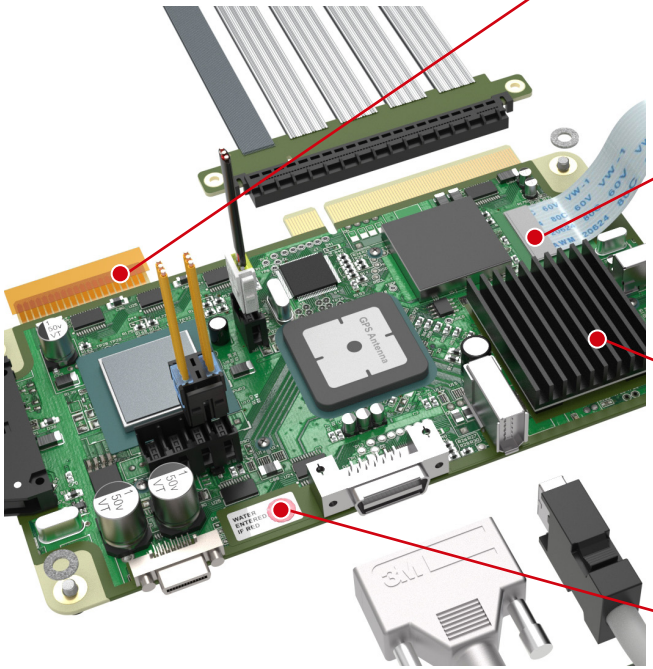
3M Thermally Conductive Tapes

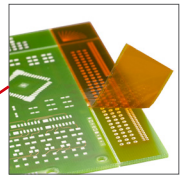
Quick attachment of heat sinks using pressure-sensitive adhesive (PSA)

3M Automation Solutions

Increased assembly efficiency through precise, reliable automated handling and positioning

Key applications
for assembly



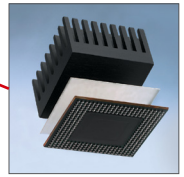


3M™ Polyimide Film Tape 5413 / 5419 Series

- Apply: Apply for PCB solder masking and various high temperatures
- Value: Helps protect sensitive components during soldering process
- Feature: The polyimide film is dimensionally stable at high temps helping reduce adhesive transfer to prevent rework
  - Electrostatic discharge protection (5419)

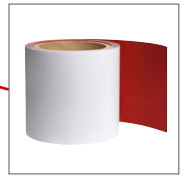
3M™ Anisotropic Conductive Film Adhesive 7303

- Apply: Flex-to-flex or flex-to-PCB bonding
- Value: Conductive particles spaced far enough in the plane of adhesive for good electrical isolation
- Feature: Heat-activated hybrid epoxy thermoset delivers a permanent, high-strength bond when activated by heat



3M™ Thermally Conductive Adhesive Transfer Tape 8810

- Apply: Interface between heat-generating components and heat sinks
- Value: Good thermal conductivity and good electrical insulation
- Feature: Soft and conforms well to non-flat substrates while offering excellent adhesive performance



3M™ Water Contact Indicator Tape 5557

- Apply: Apply on the board to mark visual evidence of water exposure
- Value: Shows water intrusion on PCB
- Feature: Film top layer provides protection from soiling and moisture during handling

Safety Data Sheet: Consult Safety Data Sheet before use.

Regulatory: For regulatory information about this product, contact your 3M representative.

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3M Display and Electronics
Industrial PCB Solutions
3M Center, Building 223-3S-32
St. Paul, MN 55144-1000

Phone 1-800-362-3550
Web www.3M.com/pcb

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