



# SOLUTIONS FOR THE INTERNET OF THINGS

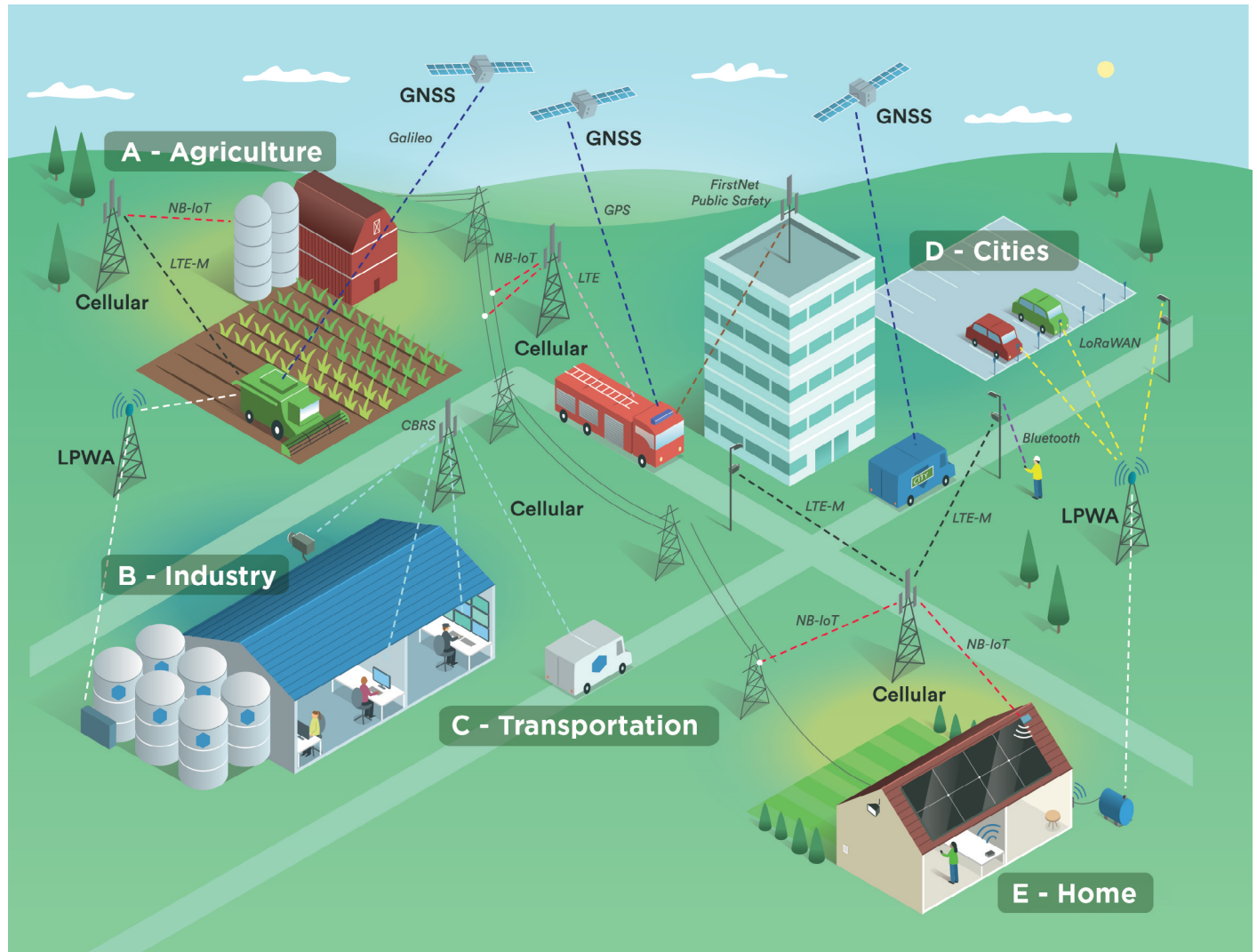
## Quick Reference Guide

Engineering a more connected future of everything with a broad portfolio of industry-leading antennas and connectors, supporting multi-frequency applications for some of today's most ambitious IoT designs

# THE INTERNET OF THINGS: CONNECTING THE FUTURE OF EVERYTHING

In every industry and in every application, wireless connectivity is the business-critical upgrade driving the world's cutting edge products and services. In retail, smart metering, remote monitoring, transportation, public safety, and everything in between, getting data to the cloud and enabling sense and control on the ground is critical to satisfying customer demand and enabling smarter products that produce previously-impossible results. The right IoT solutions are critical to robust, cutting-edge next generation products that perform reliably in the field. TE Connectivity's (TE) expanded line of antennas and connectors are enabling new possibilities, driving us towards a more connected future of everything.

## HOW TE SUPPORTS THE IoT ECOSYSTEM



### A - AGRICULTURE

- Smart Farming
- [Smart Tracking](#)
- Environmental Monitoring

### B - INDUSTRY

- [Warehouse Automation](#)
- Mobile Robotics
- Inventory Management

### C - TRANSPORTATION

- [Fleet Telematics](#)
- [Public Safety](#)
- [Electric Vehicle Charging](#)

### D - CITIES

- [Smart Buildings](#)
- [Smart Health](#)
- [Smart Surveillance](#)

### E - HOME

- [Smart Meters](#)
- Home Security
- Connected Home

## TE RF IMPLEMENTATION SUPPORT

TE has designed, produced, sold, and shipped over 1 billion antennas globally and is one of the largest suppliers of IoT antennas in the world. TE can provide advanced antenna solutions for most wireless devices, with many combinations to address customer required features. Our antenna designs can accommodate a broad range of frequency bands for operation on network in both regional and global markets.

- Customer project baseline evaluation
- Tuning of standard antenna solution
- Custom specific antenna solution
- Throughput, efficiency, and coexistence optimization
- Active and passive antenna performance
- Radiation pattern/SAR optimization
- Design for manufacturing
- World-class fully-integrated manufacturing capabilities



## MEETING THE COMPONENT REQUIREMENTS OF IoT END DEVICES

TE offers products and expertise to help meet challenging and varied requirements. As TE evolves existing products and develops new ones to support the Internet of Things, we consider:



### Durability

- Mating Cycles
- Reliable/Tested
- High Efficiency



### Miniaturization

- Fine Pitch & Low-Profile Connectors
- Scalable & Light-Weight
- Custom Designed or Off the Shelf Antennas



### Modular Designs

- Footprint/Position Range
- Density Options
- Mounting/Mating Options
- Connector and Cable Options



### EMI/Grounding

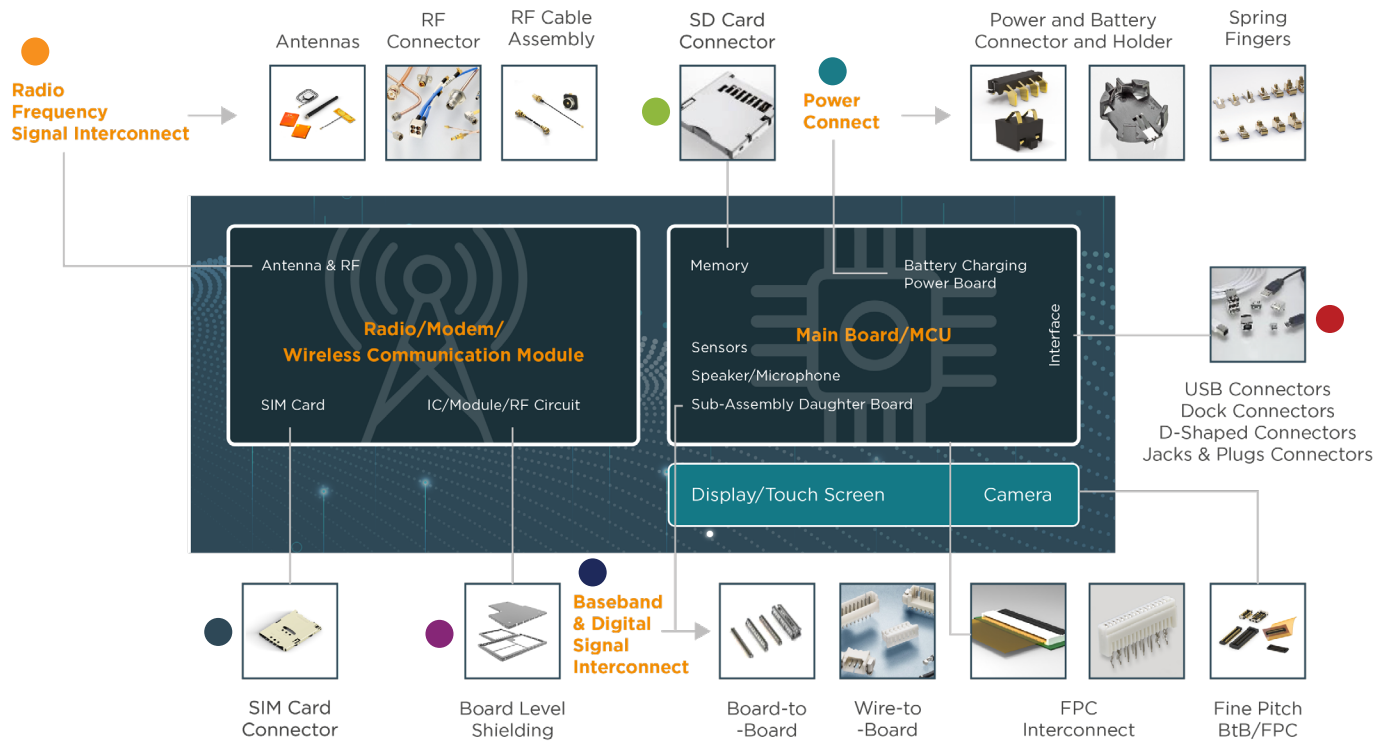
- Customizable & Scalable
- Your Operator in Mind with a Wide Working Range
- Antennas with On and Off-Ground Options



### High Data Rate, Bandwidth, and Power

- Widest Single Range Connectors
- Various Connector Power Options
- Efficient and Reliable Antennas in Multiple Frequencies

## TE COMPONENTS SUPPORTING IoT END DEVICES



### Radio Frequency Signal Interconnect

- [Bluetooth Antennas](#)
- [Cellular Antennas](#)
- [ISM, LPWAN, LoRa Antennas](#)
- [GPS, GNSS Antennas](#)
- [Outdoor Antennas](#)
- [Public Safety Antennas](#)
- [RFID Antennas](#)
- [Vehicle Antennas](#)
- [Wi-Fi Antennas](#)
- [Custom Antenna Designs](#)
- [RF Connectors](#)
- [Micro Coaxial Connectors & Cable Assemblies](#)

### SIM Card

- [SIM Card Connector](#)

### IC/Module/RF Circuit

- [Board Level Shielding](#)

### Power Connect

- [Power and Battery Connector & Holder](#)
- [Spring Fingers](#)

### Memory

- [SD Card Connector](#)

### Baseband & Digital Signal Interconnect

- [Board-to-Board Connectors](#)
- [Wire-to-Board Connectors](#)
- [FPC Interconnect](#)
- [Fine Pitch Board-to-Board/Board-to-FPC](#)

### Interface

- [Dock Connectors](#)
- [D-Shaped Connectors](#)
- [Jacks & Plugs Connectors](#)
- [USB Connectors](#)

## EXAMPLE TE COMPONENTS SUPPORTING IoT END DEVICES



### 5G/LTE Panel Mount Antennas

- 2G/3G/4G/5G/CBRS/LTE
- 410-5925 MHz
- External puck-style
- Ground plane independent
- IP67
- Compact, robust design



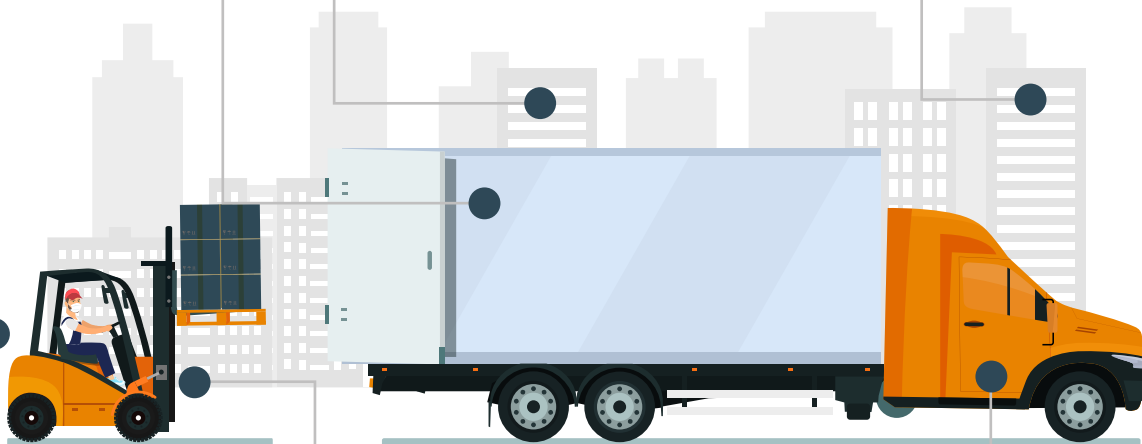
### MiMo Fixed Wireless Access Antennas

- 2x2 MiMo for 4G/5G LTE
- 617-6000 MHz
- Global cellular coverage
- Stylish, portable housing
- Cost-effective solution to increase bandwidth and signal strength



### Infrastructure Antennas

- [Cellular Baton Antennas](#)
- [Wi-Fi Panel and Omni Antennas](#)
- [RFID Panel Antennas](#)
- [DAS Indoor and Outdoor Antennas](#)



### Low Profile Omni Antennas

- 5G PHANTOM antenna
- Global cellular coverage
- IP67
- Ground plane independent
- Rugged, robust construction



### Indoor/Outdoor Blade Omni Antennas

- 4G/5G
- 617-7125 MHz
- IP67 and non-rated configurations
- Ruggedized to support high shock, vibration, and humidity
- Hinged/swivel connection



### Trigger Multiport Antennas

- 3G/4G/5G/ISM/CBRS, Wi-Fi, GNSS
- Ideal for vehicle under-dash locations
- Multiple port configurations
- Improved signal received power and quality
- IP67

VIEW OUR FULL PORTFOLIO OF ANTENNA SOLUTIONS ▶

## TE SOLUTIONS FOR THE INTERNET OF THINGS

Across industries, TE Connectivity provides safe, sustainable, and efficient connector and antenna solutions along with implementation and optimization services to enable a more connected world. The Internet of Things links end devices and access points to everyday settings and tasks that help individuals, businesses, and potentially whole societies live in a smarter and more comfortable way. Below are just a few IoT products from our extensive portfolio.

For the full selection, visit [www.te.com/iot](http://www.te.com/iot)

### RF CONNECTORS

#### FEATURES

- Transmit analog signals while minimizing RF signal losses
- Available in small sizes, with tight tolerance electrical characteristics
- Rugged materials manufactured to withstand high use in harsh environments
- Includes MIL-standard connectors qualified for M39012, M55339, M83517

#### ORDERING INFORMATION

Description	Max Frequency	Part Number
Right Angle Through Hole SMA Jack	18 GHz	<a href="#">5-1814400-2</a>
Right Angle Cable Mount SMB Plug for RG174/RG188/RG316 Cable	4 GHz	<a href="#">414002-2</a>
Right Angle Through Hole BNC Jack with Bulkhead	4 GHz	<a href="#">5415025-1</a>



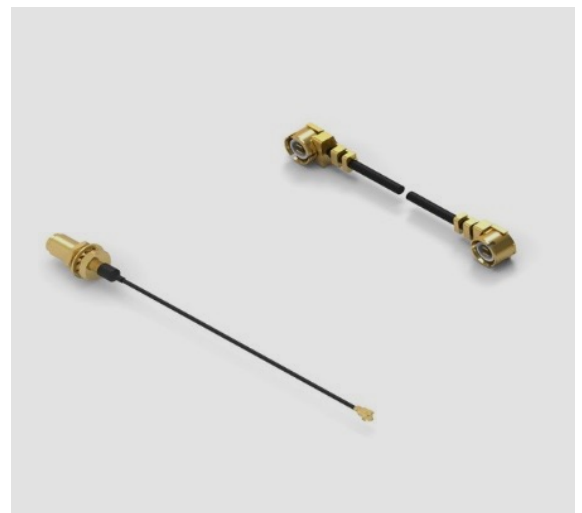
### MICRO COAXIAL CONNECTORS AND CABLES

#### FEATURES

- Suited for applications requiring high density and reliability in a reduced size
- Excellent RF performance up to 6 GHz
- Wide range of coaxial cable connector configurations

#### ORDERING INFORMATION

Description	Max Frequency	Part Number
UMCC Gen I Receptacle	9 GHz	<a href="#">2337019-1</a>
RF Switch	11 GHz	<a href="#">2081956-1</a>
SMA to UMCC Gen I Cable Assembly 100 mm length	9 GHz	<a href="#">2016692-2</a>



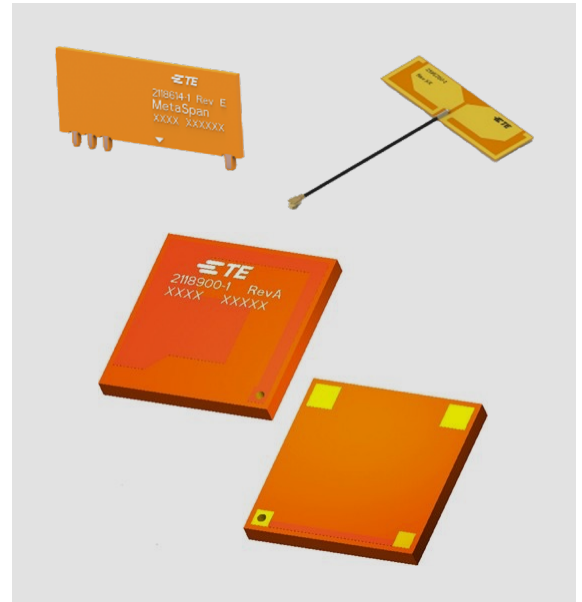
## INTERNAL/EMBEDDED ANTENNAS

### FEATURES

- Cellular 5G NR, LPWA/mMTC, NB-IoT, LTE-M, LoRaWAN, Sigfox, WLAN/Wi-Fi, 2.4 GHz ISM, Bluetooth, GNSS L1+L2+L5, UWB, and more
- Different antenna mounts including: surface mount, through-hole mount, adhesive mount, connector mount
- More than 300 standard internal antenna SKUs available for fast sample testing
- Custom solutions available with high-performance, low-profile options to address customer needs

### ORDERING INFORMATION

Description	Part Number
FPC Adhesive Antenna, 617-7125 MHz, Cellular, GNSS, Wi-Fi 6E	<a href="#">2108921-2</a>
Wi-Fi 6E Triple Band on Board Antenna	<a href="#">2118908-2</a>
GNSS Ceramic Patch Antenna	<a href="#">2108844-1</a>



## EXTERNAL ANTENNAS

### FEATURES

- Batons, blades, whips, pucks, panels, domes, yagis, vehicle fins, ceiling mounts, and more form factors available
- Cellular, Wi-Fi, Bluetooth, ISM, LoRaWAN, GNSS, and many more frequencies available
- High reliability: high performance, rugged packages with extensive environmental testing
- Various connector options available for broad compatibility

### ORDERING INFORMATION

Description	Part Number
5G Outdoor Swivel Blade Dipole, 617-7125 MHz, IP67, SMA male	<a href="#">DBA6171C3-BSMAM</a>
5G Capitalize PHANTOM, no ground plane required, 617-7125 MHz, IP67, Type N female	<a href="#">FTRA6171M6PBN-001</a>
Broadband Panel-Mount Puck, ground plane independent, 410-5925MHz, SMA male	<a href="#">ANT-5GW-SPS1-1</a>



EASILY FIND THE ANTENNA THAT FITS YOUR NEED WITH OUR NEW ANTENNA SELECTOR



## CUSTOM ANTENNAS

### FEATURES

- Options for customization of off the shelf products including: connector, cable, frequency, etc.
- Laser direct structuring (LDS) antennas can be designed around existing components or structures to save space in the device and still provide a 3D antenna for enhanced performance
- Customer logo printed/embossed on antenna



Looking for a custom antenna solution or expert support in finding the right antenna for your design?

[SUBMIT A REQUEST NOW >](#)

## FPC CONNECTORS

### FEATURES

- Highly suited for miniaturized applications
- Allows for cable routing that can bend and twist
- No tooling required
- Variety of centerline spacing options

### ORDERING INFORMATION

Description	Pin Count	Part Number
Back flip / Dual contact .5 mm	10	<a href="#">1-2328702-0</a>
Back flip .3 mm	13	<a href="#">1-2328724-3</a>
Front flip .25 mm	14	<a href="#">1-2040832-4</a>



## AMPLIMITE D-SUB CONNECTORS

### FEATURES

- Designed to offer robust connection in a wide range of applications
- Board-to-board and cable-to-board connector variants
- Low profile allows high density contacts needed in IoT applications
- Available in shielded variants

### ORDERING INFORMATION

Description	Pin Count	Part Number
Receptacle, Board-to-Board	25	<a href="#">2-5747708-0</a>
Receptacle, Cable-to-Board	68	<a href="#">5786555-7</a>
Plug, Cable-to-Cable	9	<a href="#">205204-4</a>





## WIRE-TO-BOARD CONNECTORS (AMP CT, AMP MINI CT, AMP MICRO CT CONNECTORS)

### FEATURES

- 2 kinds of termination methods: IDC, Crimp
- Discrete wire interconnect
- Circuits range from 2-25 single row, 8-40 dual row

### ORDERING INFORMATION

Description	Pin Count	Part Number
2.0mm AMT CT T/H Vertical Box Header (8 Position)	8	<a href="#">292132-8</a>
1.5mm AMP Mini CT SMT Inverted Thru-Board Assembly (6 Position)	6	<a href="#">2106091-5</a>
1.2mm AMP Micro CT Header Assembly (4 Position)	4	<a href="#">2355091-4</a>



## HIGH PERFORMANCE INTERCONNECTS (HPI)

### FEATURES

- Addresses the needs of low-profile applications that require a reliable, secure wire-to-board signal or low-power connection
- Locking feature strengthens the mating connection and comes with tactile click feedback when mating
- Cost-effective, industry standard design

### ORDERING INFORMATION

Description	Position	Part Number
1mm Locking HPI Housing	4	<a href="#">2367198-4</a>
2mm Right Angle HPI Header	6	<a href="#">440055-6</a>
2mm Vertical HPI Header	4	<a href="#">1775470-4</a>



## MODULAR JACK CONNECTORS

### FEATURES

- Engineered to make secure input/output connections
- Compact, one-piece construction, with preloaded contacts, providing a space-saving, quick-to-install solution

### ORDERING INFORMATION

Description	Category	Part Number
RJ45 Connector	CAT 5	<a href="#">6116075-1</a>
RJ <i>point five</i> Connector	CAT 5e	<a href="#">2170129-1</a>
RJ45 Connector	CAT 6	<a href="#">5556416-1</a>



## RIBBON CONNECTORS

### FEATURES

- Offers quicker, sturdy connections without stripping or prepping wires
- Used to make transition between ribbon cable and PCB circuitry
- Available with mass termination capabilities and several centerline options

### ORDERING INFORMATION

Description	Polarization	Part Number
Cable attached 10 position	Center	<a href="#">5499922-1</a>
Board attached 16 position	Dual	<a href="#">5103308-5</a>
Wire-to-board 26 position	Free	<a href="#">1-746610-6</a>



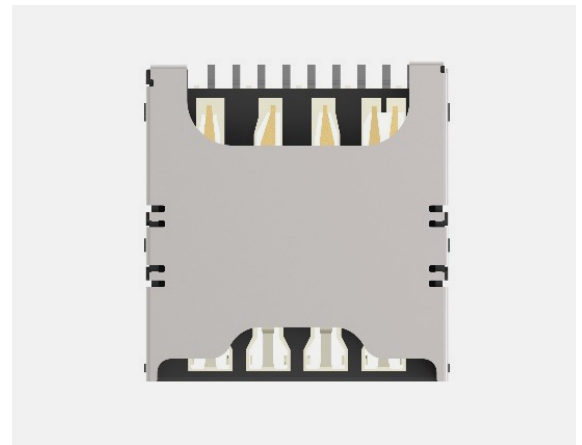
## SIM CARD CONNECTORS

### FEATURES

- Optimized for reliability
- Pre-loaded contacts and spherical contact points improve normal force
- Design freedom, with many products scalable in height within the same form factor

### ORDERING INFORMATION

Description	Polarization	Part Number
Mini SIM card connector (2FF)	Push-push	<a href="#">1981959-1</a>
Micro SIM card connector (3FF)	Push-pull	<a href="#">2199337-5</a>
Nano SIM (4FF)	Push-pull	<a href="#">2336582-1</a>



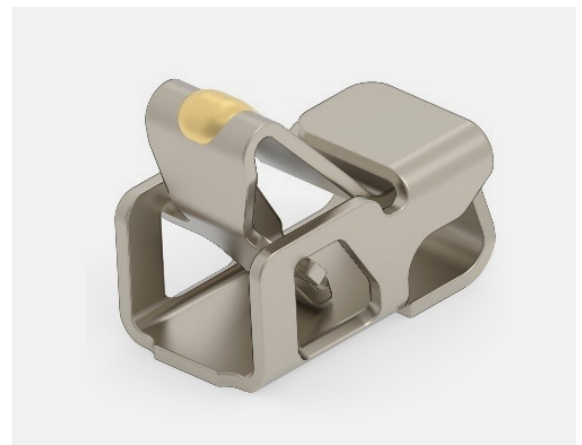
## SPRING FINGERS

### FEATURES

- Used for grounding between a device and PCB
- Provides shielding for anything that can cause vibrations within a device (motors, speakers, microphones)
- Cost-effective solution, requiring limited space

### ORDERING INFORMATION

Description	Uncompressed Height	Part Number
Ultra-Small, C-Clip	1.15 mm	<a href="#">2329497-2</a>
High Current, Pre-loaded, C-Clip	2.4 mm	<a href="#">2286211-3</a>
Uncompressed Height, C-Clip	5 mm	<a href="#">440423-1</a>



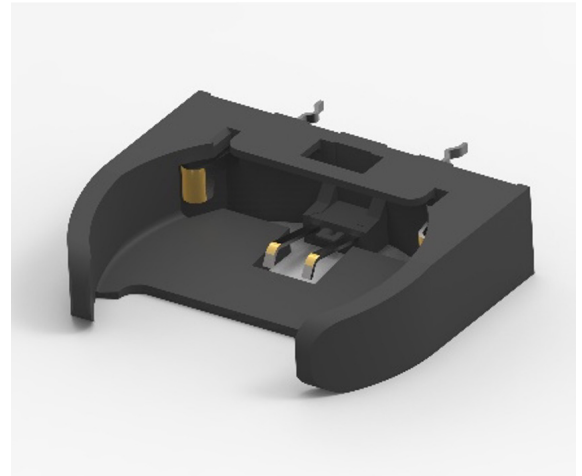
## COIN BATTERY HOLDERS

### FEATURES

- Helps improve button battery assembly process
- Easier to use, providing sturdy connection between battery & PCB
- Wide range of applications

### ORDERING INFORMATION

Description	PCB mount direction	Diameter	Part Number
Coin battery holder for CR2032	Horizontal	20 mm	<a href="#">796136-1</a>
Coin battery holder for CR2032	Vertical	23 mm	<a href="#">1775485-1</a>
Stamped metal coin battery holder for CR2032 and CR2025	Horizontal	23 mm	<a href="#">BAT-HLD-001-TR</a>



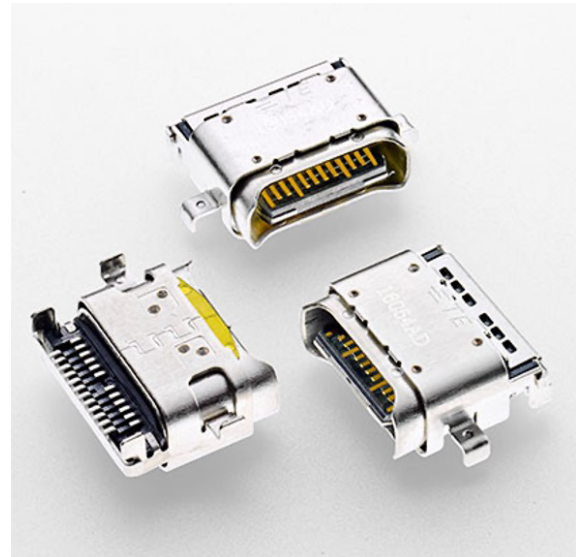
## USB TYPE-C CONNECTORS

### FEATURES

- Provide one interconnect solution for data, power, and A/V
- Enhanced board retention features for added durability
- IPX waterproof and IPX4 splash proof options available
- Save valuable real estate, with one of the smallest dual row SMT footprints

### ORDERING INFORMATION

Description	Board Mount	Part Number
USB 3.1 Receptacle on Board Dual Row SMT, IPX8	Top	<a href="#">2305018-2</a>
USB 3.1 Receptacle Offset 0.65mm Dual Row SMT, Splash Proof	Mid Mount	<a href="#">2295018-2</a>
USB 4.0 Gen3 Mid PCB Mount Receptacle	Bottom	<a href="#">2385692-1</a>

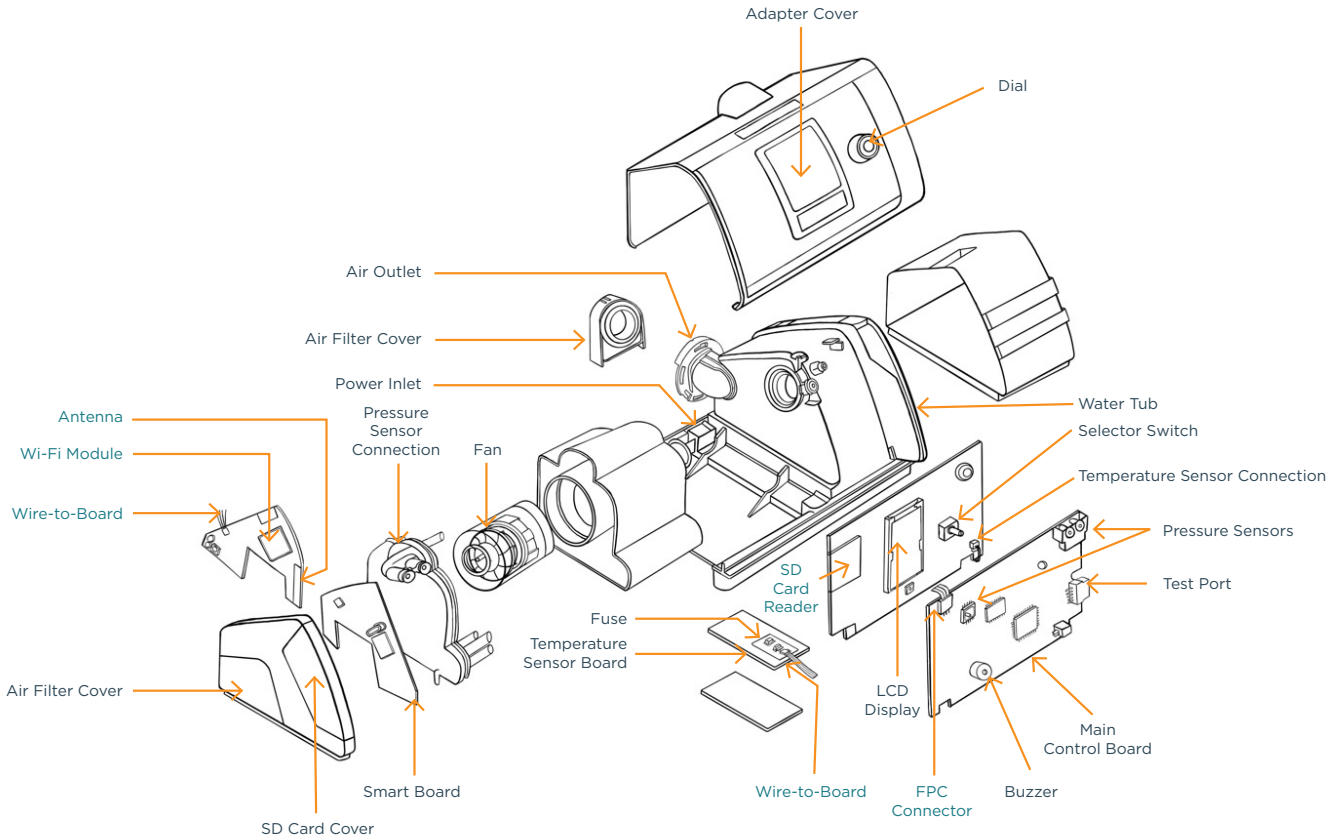


TE offers a complete family of board mount receptacles, including various orientations and PCB mounting styles. Click [here](#) to see our full portfolio of solutions.

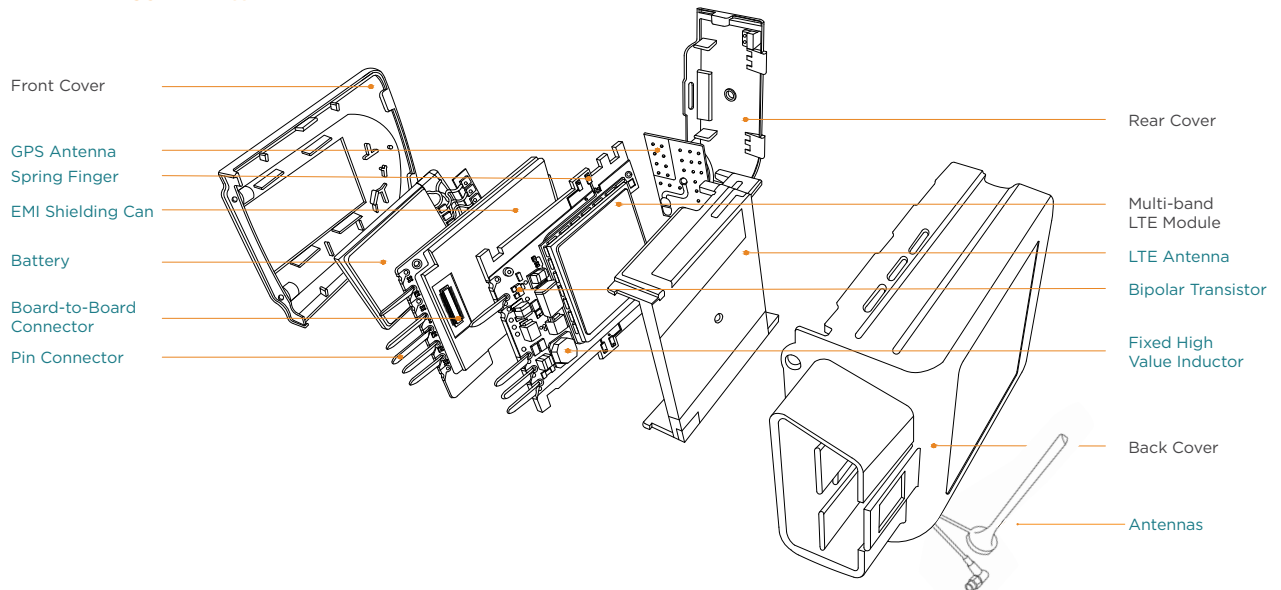
## TE SOLUTIONS FOR IoT DEVICES

Across a range of devices from smart metering and smart buildings to fleet telematics and medical devices, TE antennas, connectors, and components help deliver performance, functionality, and long operational lifetimes in harsh environments. Below are just a few examples of how our products are incorporated into device designs.

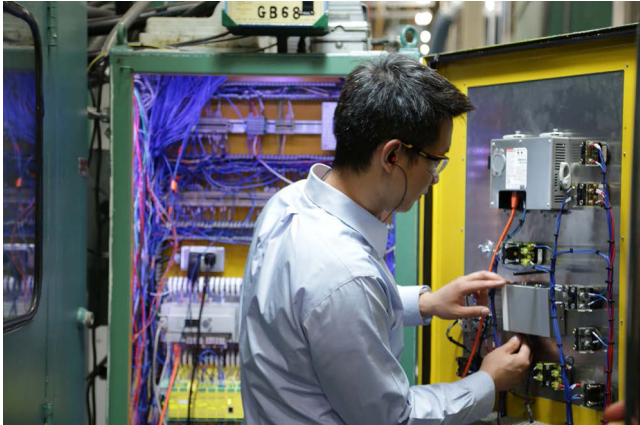
### SMART HEALTH DEVICES



### FLEET TELEMATICS HARDWARE



# WHY PARTNER WITH TE?



Our history in design engineering, global manufacturing prowess, materials science expertise and signal integrity analysis are benefits that contribute to the value of partnering with us. At TE, we view our role of consultant as a trusted advisor, who helps to bring value to our customers through innovative and customized solutions.



## Partnerships that Enhance Innovation

We collaborate with customers and peers to support the development of new technologies.



## Solutions for High Performance

Our products can support high-speed, energy-efficiency, and miniaturization in cloud, IoT end point and edge markets.



## Faster, Flexible Service

TE's manufacturing and value-added support deliver top quality, highly efficient products to meet dynamic design cycles.



## End-to-End Connectivity

TE offers a broad range of product options across data communications and IoT applications, giving customers the opportunity to consolidate their supplier base.



## Sustainable Partnership

TE's engineering and manufacturing expertise, combined with our global footprint provides one of the largest connectivity and sensor portfolios.

## te.com/iot

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## TE Technical Support Center

USA:	1.800.522.6752
Canada:	1.905.475.6222
Mexico:	52.0.55.1106.0800
Latin/S. America:	54.0.11.4733.2200
Germany:	49.0.6251.133.1999
UK:	44.0.800.267666
France:	33.0.1.3420.8686
Netherlands:	31.0.73.6246.999
China:	86.0.400.820.6015