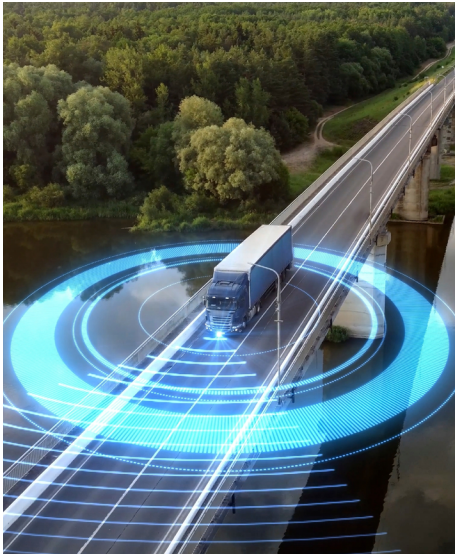




DRIVING TOWARD A MORE CONNECTED FUTURE: COMPONENTS FOR SMART TRANSPORTATION

Solution Guide

From roadways and transit systems, to fleet telematics and public safety, TE Connectivity (TE) is helping to enable the future of smart transportation with high-quality, high-performance connectivity solutions.

DESIGN REQUIREMENTS FOR SMART TRANSPORTATION

Smart transportation demands smarter technology. As transportation technologies rapidly evolve, so does their reliance on enhanced communication infrastructure to keep passengers and equipment safe and seamlessly connected. Through integrated solutions to reduce complexity and improve performance, TE's extensive portfolio of antennas and connectors can help address these demands and create a more sustainable and connected future.



CONNECTIVITY

High-quality, enhanced-signal wireless transmission in a wide range of frequencies, including Bluetooth, cellular, and GNSS



DURABILITY

Ruggedized components offer robust designs to withstand harsh elements, impact resistance, and vibrations



PERFORMANCE

Precision-engineered solutions developed by a team of seasoned experts



SCALABILITY

Broad portfolio of configurations, offering greater design flexibility and versatility



MINIATURIZATION

High-performance miniaturized components designed to maximize space-savings and minimize weight



COST-SAVINGS

Integrated solutions to reduce complexity, optimize performance, and improve cost-efficiency



SMART TRANSPORTATION SOLUTIONS FOR ROADWAYS



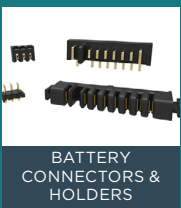
CONNECTIVITY TO EVERYTHING

From electronic tolling to roadside monitoring and traffic control, wireless connectivity plays a critical role in enabling safer, more efficient roadways.

Antenna technology, in particular, has become an essential tool for enhancing communication and data exchange between vehicles, infrastructure, and passengers. Modern vehicles rely on the latest technologies to keep people and equipment safe and seamlessly connected.

TE offers antennas and connectors to help improve real-time traffic management and communication. Our high-performance, high-bandwidth portfolio offers notable signal integrity and speed, and our broad catalog of connectivity configurations support greater design flexibility.

ENHANCE EFFICIENCY AND SAFETY BY PROACTIVELY MONITORING AND EVALUATING ROAD CONDITIONS.



SMART TRANSPORTATION SOLUTIONS FOR TRANSIT SYSTEMS

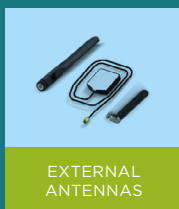
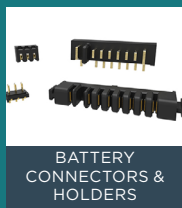
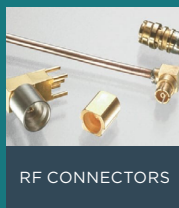
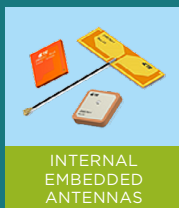


CONNECTIVITY ON THE MOVE

Wireless connectivity is revolutionizing how we communicate by providing reliable and fast data connections on trains, buses, and other forms of public transportation. In addition to improving the passenger experience, antenna technology can assist transit authorities in monitoring passenger flow and tracking vehicle locations. This information can be used to optimize routes, improve scheduling, and enhance safety and security.

To help enable reliable, consistent connectivity between vehicles and passengers, TE offers multi-band antennas supporting a wide range of wireless technologies. To support the growing need for miniaturization, we offer smaller, more compact antennas and connectors, designed to maximize space-savings.

IMPROVE ROUTE EFFICIENCY AND SAFETY, AND ENHANCE CONNECTIVITY BETWEEN DRIVERS, PASSENGERS AND CONTROL CENTERS.



SMART TRANSPORTATION SOLUTIONS FOR FLEET TELEMATICS



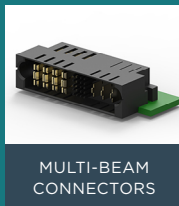
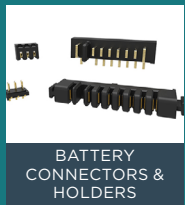
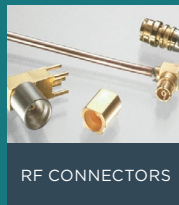
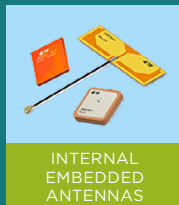
CONNECTIVITY FOR THE LONG HAUL

Improving wireless connectivity in fleet telematics allows for optimized routes, improved safety, and enhanced profitability. Data tracking and monitoring applications require reliable, consistent connectivity to inform real-time decisions and maximize efficiencies.

GPS tracking and on-board diagnostics can help monitor a fleet of trucks, optimize farming operations, and manage fuel consumption in construction equipment.

With power-efficient antenna solutions, and durable connectors built to withstand high temperatures and high vibration environments, TE is helping to enable reliable connectivity for fleet telematics applications.

MAXIMIZE PRODUCTIVITY AND PROFITABILITY WITH DURABLE, HIGH-PERFORMING SOLUTIONS.



SMART TRANSPORTATION SOLUTIONS FOR PUBLIC SAFETY



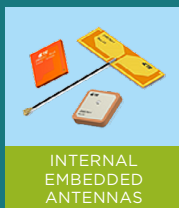
CONNECTIVITY WHEN IT MATTERS MOST

To more efficiently serve their communities, public safety vehicles such as police cars, ambulances, fire trucks, and traffic control vehicles, require continuous and reliable connectivity with their control centers.

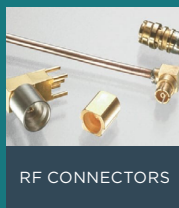
Smart surveillance systems can help police identify certain problem areas to implement additional crime prevention measures. While real-time video and traffic information can help emergency responders optimize their route and response time.

TE's antennas and connectors are helping to create a safer more connected future. We offer high-performance, enhanced-signal wireless connectivity solutions to help enable critical communication systems. Our rugged and durable components are designed for impact and vibration resistance and provide protection from harsh elements.

ENABLE SITUATIONAL AWARENESS AND IMPROVE COMMUNITY SAFETY WITH CONTINUOUS, RELIABLE CONNECTIVITY.



INTERNAL
EMBEDDED
ANTENNAS



RF CONNECTORS



MICRO-COAXIAL
CONNECTORS



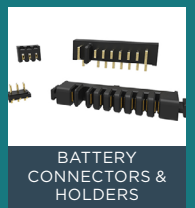
SMA/SSMA
CONNECTORS



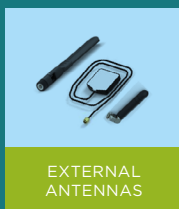
USB
CONNECTORS



DISPLAYPORT
CONNECTORS



BATTERY
CONNECTORS &
HOLDERS



EXTERNAL
ANTENNAS



HDMI
CONNECTORS



WIRE-TO-BOARD
CONNECTORS



FINE PITCH
BOARD-TO-BOARD
CONNECTORS



SIM CARD
CONNECTORS



SPRING FINGER
CONTACTS

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, through-hole, adhesive, connector
- More than 300 standard internal antenna SKUs available for fast sample testing
- High-performance, low-profile options to address customer needs



PRODUCTS

PART NUMBER	APPLICATION	DESCRIPTION
ANT-DB1-NSP250-T	Safety, Transit	Wi-Fi/WLAN, Surface Mount
L9000Q015-01	Safety, Transit	2.4 GHz Directional Ceramic Patch
ANT-W63RPC1-UFL-100	Safety, Transit	Rigid Adhesive Mount, Dipole, Wi-Fi 6
ANT-LPC-FPC-100	Fleet, Safety, Road	LTE/LPWA/GNSS, Flexible, Dipole, MHF1/U.FL
ANT-LTE-SP610-T	Fleet, Safety, Road	LTE, LTE-M, NB-IoT, Monopole, Surface Mount
ANT-LTE-CER-T	Fleet, Safety, Road	LTE, Ceramic Chip
ANT-GNCP-C25L12100	Fleet	L1/L2 Active Ceramic Patch GNSS
ANT-GNFPC-SAHL1100UF	Fleet	Flexible Adhesive L1 GNSS
L000642-01	Road, Transit	RFID/NFC Flexible PCB, Adhesive
L000601-01	Safety	Ultra-Wide Band Ceramic Chip

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



PRODUCTS

PART NUMBER	APPLICATION	DESCRIPTION
L000321-01	Road, Transit	VersAnte Antenna, 3-Port Puck
L000322-02	Road, Transit	VersAnte Antenna, 2 or 3-Port
FTRA6171M5PB-001	Road, Transit, Fleet, Safety	5G Phantom Antenna, 617-7125 MHz, IP67, Type N
L000795-15	Road, Transit, Fleet, Safety	Multi-Band, LTE, External, Adhesive-Mount
ANT-5GW-MMG1-SMA-1	Road, Transit, Fleet, Safety	Magnetic Mount, 5G Cellular, SMA Plug
ANT-DB1-WRT-MON-RPS	Road, Transit	Dual-Band, Wi-Fi, External, Panel-Mount
L000434-04	Fleet, Safety	FP40 Ultra 4x4 MIMO Multi-Port
ANT-5GW-SPS1-1	Transit	Panel-Mount, 5G/LTE Puck
L000423-07	Safety	FP20 Auto Multi-Port Vehicle
ANT-5GW-SPNF1	Transit	Panel-Mount, 5G Cellular

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



PRODUCTS

PART NUMBER	DESCRIPTION
CONMMCX001-SMD	MMCX, Female Socket, 50 Ohm, 6 GHz
CONMMCX002-SMD-T	MMCX, Female Socket, 50 Ohm, 6 GHz, Reel
CONMMCX007	MMCX, Male Pin, 50 Ohm, 6 GHz

MICRO-COAXIAL CONNECTORS/CABLES



FEATURES

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



PRODUCTS

PART NUMBER	DESCRIPTION
1909763-1	U.FL, Male Pin, 50 Ohm, 6 GHz
2334884-1	UMCC Gen 4, Male Pin
CSJ-SGFB-100-MHF4	MHF4-type (Male) to SMA (female), 0.8 mm Cable Assembly
CSI-SGFI-200-UFFR	SMA (Female) to U.FL (Female) 1.13mm Cable Assembly

SMA/SSMA CONNECTORS



FEATURES

- Subminiature connector designed for performance through 27 GHz
- Broad range of standard configurations



PRODUCTS

PART NUMBER	DESCRIPTION
5-1814832-2	SMA Jack, Female Socket, 50 Ohm, Through-Hole
5-1814400-2	SMA Jack, Female Socket, 50 Ohm, Through-Hole, Right-Angle
CON SMA020.062-G	SMA Jack, Female, Edge-Mount, 0.062" PCB Mount
CON SMA007	SMA Plug, Male Pin, 50 Ohm, Free Hanging
CON SMA012	SMA Plug, Male Pin, 50 Ohm, Free Hanging

HDMI CONNECTORS



FEATURES

- Full shielding for electrostatic discharge protection
- Simple, user-friendly connector
- Replaces existing audio and digital cabling in one assembly



PRODUCTS

PART NUMBER	DESCRIPTION
1-1747981-2	Standard Profile, 1 Port, Right Angle, Surface Mount
2013978-2	HDMI-C, 1 Port, Right Angle, Surface Mount
2-1747981-3	Standard Profile, 1 Port, Right Angle, Surface Mount

DISPLAYPORT CONNECTORS



FEATURES

- Enable high-definition media content on computers and audio-visual components
- Smaller, user-friendly external connector
- Notable EMI shielding



PRODUCTS

PART NUMBER	DESCRIPTION
2129320-3	Mini Display Port Receptacle Connector, 4 Row, Reversed

USB 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



PRODUCTS

PART NUMBER	TYPE	DESCRIPTION
2305018-2	USB TYPE-C	USB 3.1 Receptacle, Right Angle, SMT, IPX8
2295018-2	USB TYPE-C	USB 3.1 Receptacle, Right Angle, SMT, Splash Proof
2479774-1	USB TYPE-C	USB 2.0 Receptacle, Charge Only, Right Angle, Through-Hole
1734366-1	USB-A	USB 2.0 Receptacle, Vertical, Through-Hole
292304-1	USB-B	USB 2.0 Receptacle, Right Angle, Through Hole
2174507-2	USB MICRO	USB 2.0 Receptacle, Right Angle, Through-Hole

WIRE-TO-BOARD CONNECTORS

AMP CT, MINI CT, 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

PRODUCTS

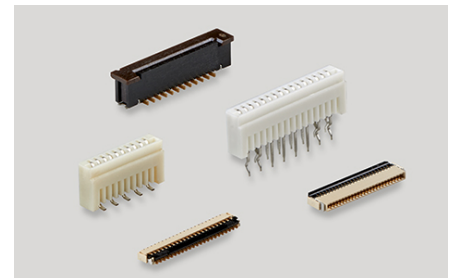
PART NUMBER	SERIES	DESCRIPTION
179228-2	AMP CT	2.0mm Crimp Type Receptacle Housing (2 Position)
292133-2	AMP CT	2.0mm Post Header Assembly, Vertical Box Type (2 Position)
179609-1	AMP CT	2.0mm Crimp Type Receptacle Contact
353908-6	AMP MINI CT	1.5mm Crimp Type (6 Position) Receptacle Housing
292272-6	AMP MINI CT	1.5mm Single Row Header Assembly (6 Position)
353907-1	AMP MINI CT	1.5mm Crimp Type Receptacle Contact
1-2355088-0	AMP MICRO CT	1.2mm Mating Retention Receptacle Assembly (10 position)
1-2355091-0	AMP MICRO CT	1.2mm Single Row Post Header Assembly, Vertical Type (10 Position)

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



PRODUCTS

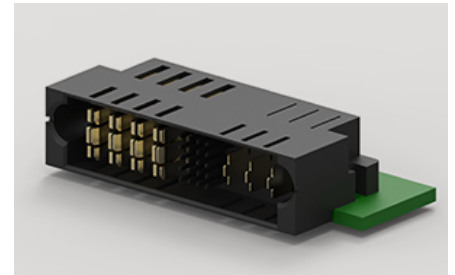
PART NUMBER	DESCRIPTION
1-2328702-0	0.5mm, Back Flip/Dual Contact (10 Pin)
2328702-4	0.5mm, Back Flip (4 Pin)
2328702-8	0.5mm, Back Flip (8 Pin)
1-2328724-3	0.3mm, Front Flip (13 Pin)
2-2328724-1	0.3mm, Front Flip (21 Pin)

MULTI-BEAM (XLE, PLUS) CONNECTORS



FEATURES

- Designed with efficiency in mind, help enable reduced installation times
- Higher power density reduces power consumption
- Modular design allows for high scalability and flexibility in configurations
- Available in vertical and right-angle configurations



PRODUCTS

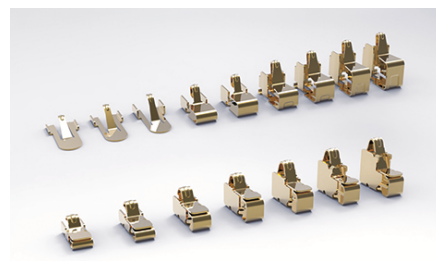
PART NUMBER	DESCRIPTION
8-6450832-4	MULTI-BEAM XLE Connectors, Right Angle Header
3-6450852-5	MULTI-BEAM XLE Connectors, Vertical Receptacle, Solder
2334519-2	MULTI-BEAM Plus Connectors, Board Side
2334579-6	MULTI-BEAM Plus Connectors, Board Side

SPRING FINGER CONTACTS



FEATURES

- Used for grounding between a device and printed circuit board (PCB)
- Helps to prevent EMI noise and static
- Used as a connection for simple stacking between primary and secondary PCBs
- Available in heights as low as 0.8mm and up to 7mm



PRODUCTS

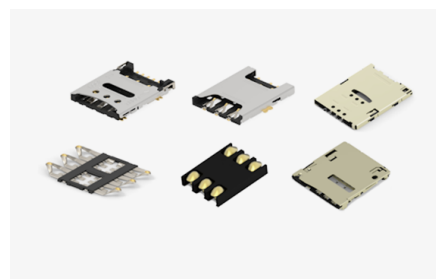
PART NUMBER	DESCRIPTION
2306654-3	Ultra-Small, C-Clip, 1.8 mm Height
1857724-4	Preloaded, C-Clip, 1.8 mm Height
3-2199250-3	C-Clip, 3.2 mm Height
2286211-3	C-Clip, 2.4 mm Height
2339640-1	Box-Clip, 6 mm Height

SIM CARD CONNECTORS



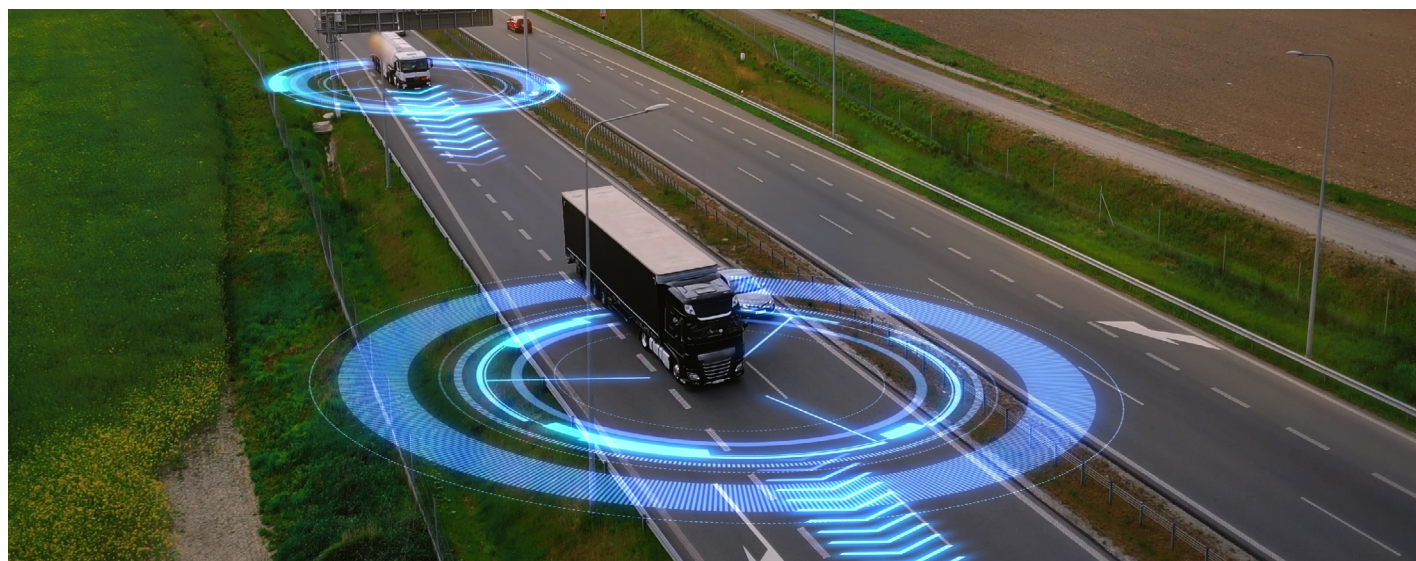
FEATURES

- Large portfolio covering a wide range of styles and card sizes
- Low-profile, small footprint designs help save PCB space
- Dual-slanted design helps to minimize contact jam issues, create stronger mating performance



PRODUCTS

PART NUMBER	DESCRIPTION
2452796-1	Nano SIM 4FF, 1.4 mm Height, Hinge Type
2452808-1	Nano SIM 4FF, 1.37 mm Height, Push-Pull, Low-Profile
2490448-1	Nano SIM 4FF, 1.37 mm Height, Push-Push, Low-Profile
2822541-1	Micro SIM 3FF, 1.27 mm Height, Push-Push, Ultra Low-Profile
2199337-5	Micro SIM 3FF, 1.18 mm Height, Push-Pull, Ultra Low-Profile

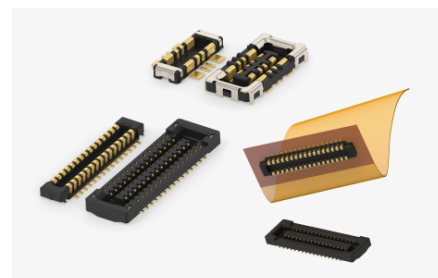


FINE PITCH BOARD-TO-BOARD CONNECTORS



FEATURES

- Expanded portfolio with broader range of pins (8, 10, 20, 24, 30, 34, and 40 position connectors available)
- Low profile, small dimension allow space and cost savings on PCB
- Multiple-point contact system creates firm mating



PRODUCTS

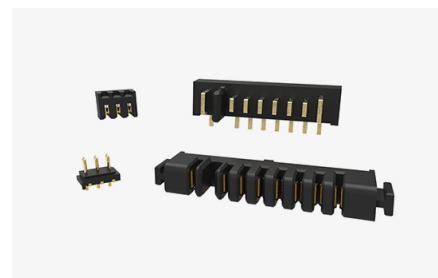
PART NUMBER	DESCRIPTION
1-2201196-0 , 1-2201197-0	0.4 mm, 10 Pin, Plug and Receptacle
2-2363961-0 , 2-2363962-0	0.4 mm, 20 Pin, Plug and Receptacle
2-2363961-4 , 2-2363962-4	0.4 mm, 24 Pin, Plug and Receptacle
3-2363961-0 , 3-2363962-0	0.4 mm, 30 Pin, Plug and Receptacle

BATTERY CONNECTORS & HOLDERS



FEATURES

- Connectors available in board-to-board, cable-to-board, and cable-to-cable connector systems, as sealed or unsealed
- Connector and contact can terminate to the PCB or wire and cable
- Battery holders provide sturdy connection between battery and PCB



PRODUCTS

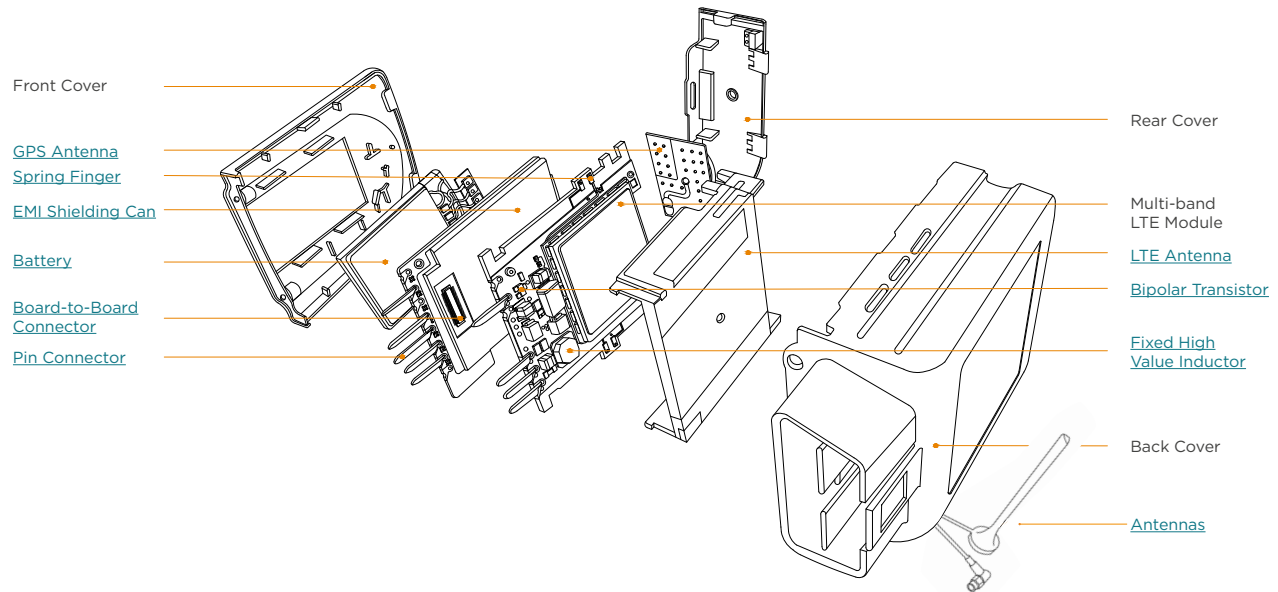
PART NUMBER	TYPE	DESCRIPTION
5787446-1 , 51468800-1	Battery Connector	5 Pin, 5 mm Pitch, Plug and Receptacle
5787531-1 , 5787253-1	Battery Connector	6 Pin, 2 mm Pitch, Plug and Receptacle
1932870-2 , 1932869-2	Battery Connector	6 Pin 3 mm Pitch, Plug and Receptacle
BAT-HLD-001-TR	Coin Battery Holder	1 Pin, Horizontal
2-1775485-2	Coin Battery Holder	3 Pin, Vertical
292448-1	Leaf-Type DC Connector	3 Pin, 3 mm, Pitch and Receptacle



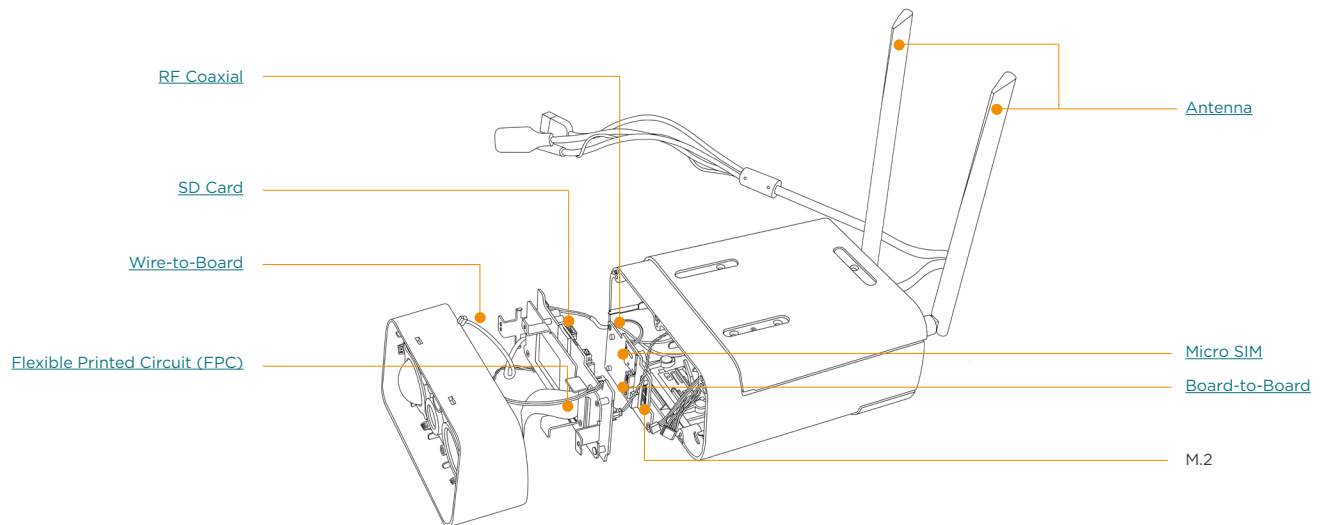
TE COMPONENTS FOR SMART TRANSPORTATION DEVICES

Across a range of devices TE antennas, connectors, and components help deliver performance, reliability, and long operational lifetimes in harsh environments. Below are just a few examples of how our products are incorporated into device designs.

FLEET TELEMATICS HARDWARE



SMART SURVEILLANCE CAMERA



WHY TE?

For more than 80 years, TE engineers and product specialists have worked with customers to produce highly engineered connectivity solutions that make a connected world possible. Our focus on reliability, durability, and sustainability exemplifies our commitment to progress. The unmatched range of our product portfolio enables companies large and small to turn ideas into technology that can transform how the world works and lives tomorrow.



EXTENSIVE PRODUCT PORTFOLIO

We offer a broad portfolio of antennas and connectors, supporting multi-frequency applications for some of today's most ambitious IoT designs.



HIGH QUALITY & RELIABILITY

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



SCALABILITY IN MANUFACTURING

Our engineering and manufacturing expertise, combined with our global footprint, provide one of the largest connectivity portfolios.



FORWARD-THINKING DESIGNS

Our products are designed to meet future technology needs and are supported by global and regional engineers to meet those specific needs.





**FROM CONCEPT TO CONNECTED.
CONNECT WITH AN EXPERT TODAY!**

CONTACT US ▶



te.com/smart-transportation

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