

# 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.

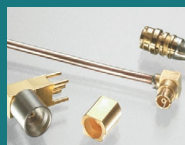
Antenna technology, in particular, has become an essential tool for enhancing communication and data exchange between vehicles, infrastructure, and passengers. Modern vehicles rely on the latest technologies to keep people and equipment safe and seamlessly connected.

TE offers antennas and connectors to help improve real-time traffic management and communication.

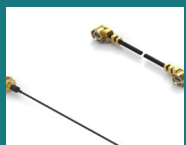
Our high-performance, high-bandwidth portfolio offers notable signal integrity and speed, and our broad catalog of connectivity configurations support greater design flexibility.

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

### INTERNAL EMBEDDED ANTENNAS



RF CONNECTORS



MICRO-COAXIAL CONNECTORS



SMA/SSMA CONNECTORS



USB CONNECTORS



DISPLAYPORT CONNECTORS

### EXTERNAL ANTENNAS



HDMI CONNECTORS



CT CONNECTORS



MINI CT CONNECTORS



MICRO CT CONNECTORS

# SMART TRANSPORTATION SOLUTIONS FOR TRANSIT SYSTEMS

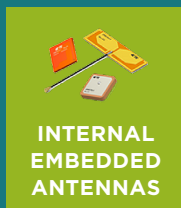


## CONNECTIVITY ON THE MOVE

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.



INTERNAL  
EMBEDDED  
ANTENNAS



RF CONNECTORS



MICRO-COAXIAL  
CONNECTORS



SMA/SSMA  
CONNECTORS



USB  
CONNECTORS



DISPLAYPORT  
CONNECTORS



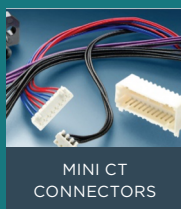
EXTERNAL  
ANTENNAS



HDMI  
CONNECTORS



CT CONNECTORS



MINI CT  
CONNECTORS



MICRO CT  
CONNECTORS



# SMART TRANSPORTATION SOLUTIONS FOR FLEET TELEMATICS



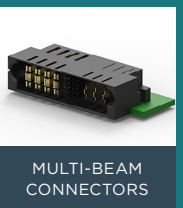
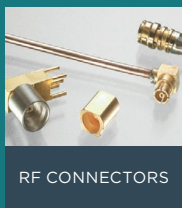
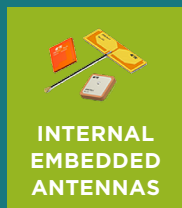
## CONNECTIVITY FOR THE LONG HAUL

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



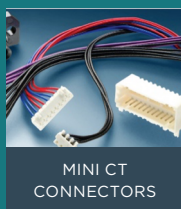
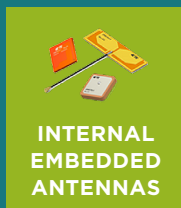
## CONNECTIVITY WHEN IT MATTERS MOST

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



### 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
<a href="#">ANT-DB1-NSP250-T</a>	Safety, Transit	Wi-Fi/WLAN, Surface Mount
<a href="#">L9000015-01</a>	Safety, Transit	2.4 GHz Directional Ceramic Patch
<a href="#">ANT-W63RPC1-UFL-100</a>	Safety, Transit	Rigid Adhesive Mount, Dipole, Wi-Fi 6
<a href="#">ANT-LPC-FPC-100</a>	Fleet, Safety, Road	LTE/LPWA/GNSS, Flexible, Dipole, MHF1/U.FL
<a href="#">ANT-LTE-SP610-T</a>	Fleet, Safety, Road	LTE, LTE-M, NB-IoT, Monopole, Surface Mount
<a href="#">ANT-LTE-CER-T</a>	Fleet, Safety, Road	LTE, Ceramic Chip
<a href="#">ANT-GNCP-C25L12100</a>	Fleet	L1/L2 Active Ceramic Patch GNSS
<a href="#">ANT-GNFPC-SAHL1100UF</a>	Fleet	Flexible Adhesive L1 GNSS
<a href="#">L000642-01</a>	Road, Transit	RFID/NFC Flexible PCB, Adhesive
<a href="#">L000601-01</a>	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
<a href="#">L000321-01</a>	Road, Transit	VersAnte Antenna, 3-Port Puck
<a href="#">L000322-02</a>	Road, Transit	VersAnte Antenna, 2 or 3-Port
<a href="#">FTRA6171M5PB-001</a>	Road, Transit, Fleet, Safety	5G Phantom Antenna, 617-7125 MHz, IP67, Type N
<a href="#">L000795-15</a>	Road, Transit, Fleet, Safety	Multi-Band, LTE, External, Adhesive-Mount
<a href="#">ANT-5GW-MMG1-SMA-1</a>	Road, Transit, Fleet, Safety	Magnetic Mount, 5G Cellular, SMA Plug
<a href="#">ANT-DB1-WRT-MON-RPS</a>	Road, Transit	Dual-Band, Wi-Fi, External, Panel-Mount
<a href="#">L000434-04</a>	Fleet, Safety	FP40 Ultra 4x4 MIMO Multi-Port
<a href="#">ANT-5GW-SPS1-1</a>	Transit	Panel-Mount, 5G/LTE Puck
<a href="#">L000423-07</a>	Safety	FP20 Auto Multi-Port Vehicle
<a href="#">ANT-5GW-SPNF1</a>	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
<a href="#">CONMMCX001-SMD</a>	MMCX, Female Socket, 50 Ohm, 6 GHz
<a href="#">CONMMCX002-SMD-T</a>	MMCX, Female Socket, 50 Ohm, 6 GHz, Reel
<a href="#">CONMMCX007</a>	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
<a href="#">1909763-1</a>	U.FL, Male Pin, 50 Ohm, 6 GHz
<a href="#">2334884-1</a>	UMCC Gen 4, Male Pin
<a href="#">CSJ-SGFB-100-MHF4</a>	MHF4-type (Male) to SMA (female), 0.8 mm Cable Assembly
<a href="#">CSI-SGFI-200-UFFR</a>	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
<a href="#">5-1814832-2</a>	SMA Jack, Female Socket, 50 Ohm, Through-Hole
<a href="#">5-1814400-2</a>	SMA Jack, Female Socket, 50 Ohm, Through-Hole, Right-Angle
<a href="#">CON SMA020.062-G</a>	SMA Jack, Female, Edge-Mount, 0.062" PCB Mount
<a href="#">CON SMA007</a>	SMA Plug, Male Pin, 50 Ohm, Free Hanging
<a href="#">CON SMA012</a>	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
<a href="#">1-1747981-2</a>	Standard Profile, 1 Port, Right Angle, Surface Mount
<a href="#">2013978-2</a>	HDMI-C, 1 Port, Right Angle, Surface Mount
<a href="#">2-1747981-3</a>	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
<a href="#">2129320-3</a>	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
<a href="#">2305018-2</a>	USB TYPE-C	USB 3.1 Receptacle, Right Angle, SMT, IPX8
<a href="#">2295018-2</a>	USB TYPE-C	USB 3.1 Receptacle, Right Angle, SMT, Splash Proof
<a href="#">2479774-1</a>	USB TYPE-C	USB 2.0 Receptacle, Charge Only, Right Angle, Through-Hole
<a href="#">1734366-1</a>	USB-A	USB 2.0 Receptacle, Vertical, Through-Hole
<a href="#">292304-1</a>	USB-B	USB 2.0 Receptacle, Right Angle, Through Hole
<a href="#">2174507-2</a>	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

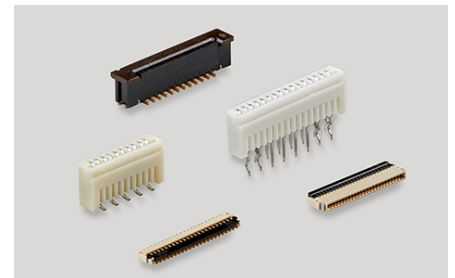
PART NUMBER	SERIES	DESCRIPTION
<a href="#">179228-2</a>	AMP CT	2.0mm Crimp Type Receptacle Housing (2 Position)
<a href="#">292133-2</a>	AMP CT	2.0mm Post Header Assembly, Vertical Box Type (2 Position)
<a href="#">179609-1</a>	AMP CT	2.0mm Crimp Type Receptacle Contact
<a href="#">353908-6</a>	AMP MINI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

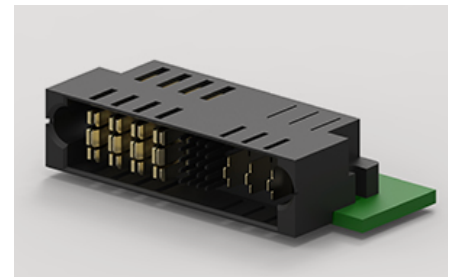
PART NUMBER	DESCRIPTION
<a href="#">1-2328702-0</a>	0.5mm, Back Flip/Dual Contact (10 Pin)
<a href="#">2328702-4</a>	0.5mm, Back Flip (4 Pin)
<a href="#">2328702-8</a>	0.5mm, Back Flip (8 Pin)
<a href="#">1-2328724-3</a>	0.3mm, Front Flip (13 Pin)
<a href="#">2-2328724-1</a>	0.3mm, Front Flip (21 Pin)

## 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

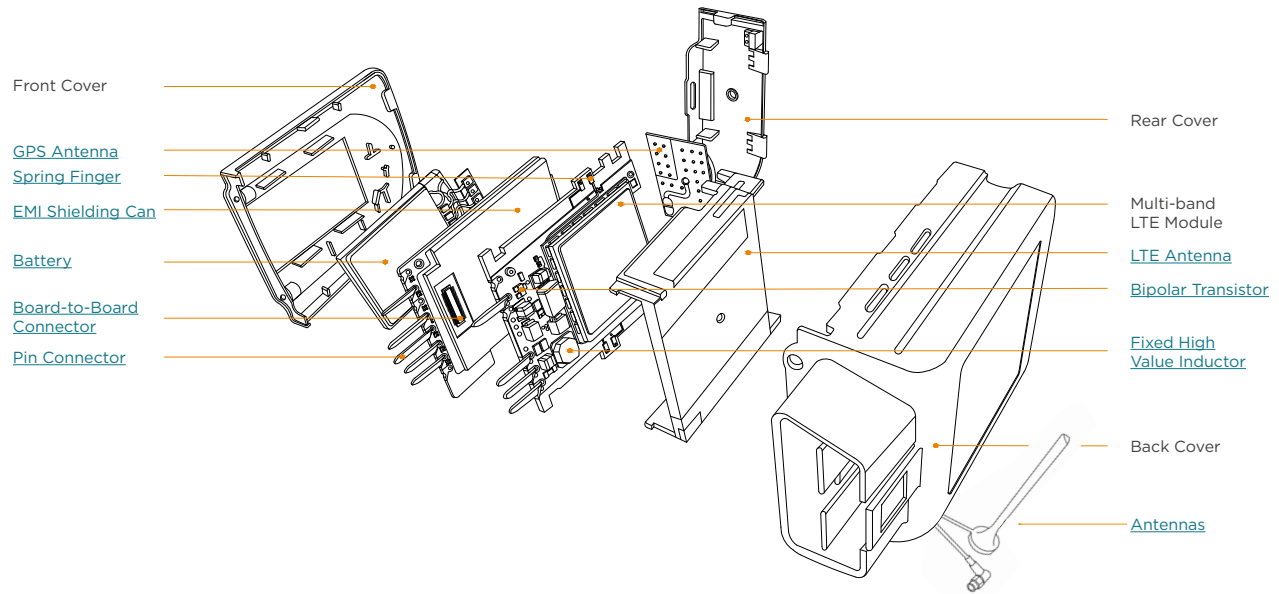
PART NUMBER	DESCRIPTION
<a href="#">8-6450832-4</a>	MULTI-BEAM XLE Connectors, Right Angle Header
<a href="#">3-6450852-5</a>	MULTI-BEAM XLE Connectors, Vertical Receptacle, Solder
<a href="#">2334519-2</a>	MULTI-BEAM Plus Connectors, Board Side
<a href="#">2334579-6</a>	MULTI-BEAM Plus Connectors, Board Side



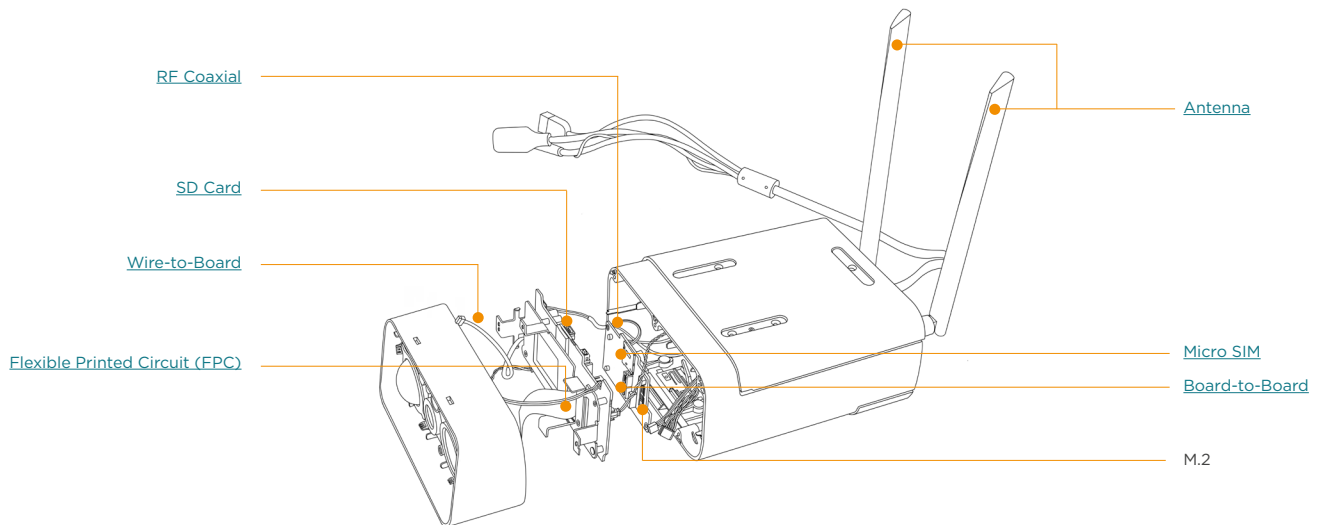
# TE COMPONENTS FOR SMART TRANSPORTATION DEVICES

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 ▶**



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