SOLUTION GUIDE

COMPONENTS FOR AGRICULTURE EQUIPMENT IN SMART FARMING SYSTEMS



COMPONENTS FOR AGRICULTURE EQUIPMENT IN SMART FARMING SYSTEMS

Agricultural equipment increasingly incorporates electronic components to support connectivity, data exchange, and system monitoring. These physical machines often operate across remote and demanding outdoor environments, where exposure to vibration, weather, and environmental stress must be considered.

TE Connectivity (TE) offers a broad portfolio of high-performance antennas, connectors, and cable assemblies designed to protect data and power transmission for rugged farming machinery—supporting reliable communication across large-scale, distributed agricultural system architectures.

DESIGN REQUIREMENTS FOR SMART FARMING SYSTEMS

Smart agriculture demands smarter technology. Agricultural equipment increasingly incorporates electronic components to support connectivity, data exchange, and system monitoring. These applications often introduce challenges related to environmental exposure, system integration, and long-term operation.

Common Design Considerations:



CONNECTIVITY
Designed to help support multi-band wireless connectivity between vehicles, infrastructure, and systems using cellular, Wi-Fi, and global navigation satellite system (GNSS) technologies



DURABILITY
Components designed to help support operation in environments that may involve exposure to vibration, mechanical stress, temperature variation, dust, or moisture



PERFORMANCE
Components within this portfolio may support performance-related requirements through defined electrical and mechanical specifications documented in applicable product datasheets and technical resources



SCALABILITY
Availability of product variants and configurations that may support use across multiple platforms



MINIATURIZATION
Compact component form factors designed to help support space-constrained and weight-sensitive transportation designs



COST-SAVINGS
Standardized component offerings that may help support efficient integration and manufacturing approaches, depending on system design and application needs

CONNECTING EQUIPMENT TO AGRICULTURAL SYSTEMS

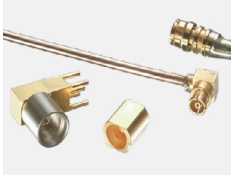
Agricultural equipment is typically exposed to intense vibration, dust, moisture, temperature extremes, and long operational lifecycles. Electronics engineered for these harsh environments must balance mechanical robustness at the machine level with the increasing connectivity, telemetry, and sensing demands required by macro-level smart farming systems.

The component categories shown help connect common smart agriculture design considerations to TE product options. From ruggedized connectivity for exposed equipment environments to compact interconnects for space-constrained electronics, these products can support needs related to durability, connectivity, performance, scalability, and integration.

The following component categories are commonly used in this application.



INTERNAL EMBEDDED ANTENNAS



RF CONNECTORS



MICRO-COAXIAL CONNECTORS



SMA CONNECTORS



USB CONNECTORS



DISPLAYPORT CONNECTORS



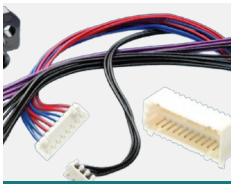
MULTI-BEAM CONNECTORS



EXTERNAL ANTENNAS



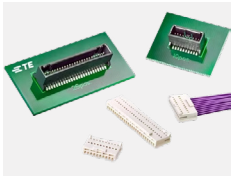
HDMI CONNECTORS



WIRE-TO-BOARD CONNECTORS



AMP MINI CT CONNECTORS



AMP MICRO CT CONNECTORS



FPC CONNECTORS

ANTENNAS

Antennas help support GNSS positioning, precision positioning and guidance systems, and wireless connectivity across WLAN and cellular architectures.

Durability + Connectivity — Rugged external antenna packages help support wireless communication in outdoor agricultural equipment environments where exposure to vibration, moisture, dust, and temperature variation may be present.



INTERNAL/EMBEDDED ANTENNAS

FEATURES

- Cellular, 5G, Non-Terrestrial Network Satellite Communications (NTN SatCom), Low-Power Wide-Area (LPWA), Narrowband Internet of Things (NB-IoT), Long-Term Evolution for Machines (LTE-M), Long Range Wide Area Network (LoRaWAN), Wi-Fi, options compatible with Bluetooth technology, GNSS, Ultra-Wideband (UWB), and more
- Various antenna mounting options available across the portfolio, depending on product type
- Samples available for testing, many with evaluation boards
- High-performance, low-profile options to address multiple applications

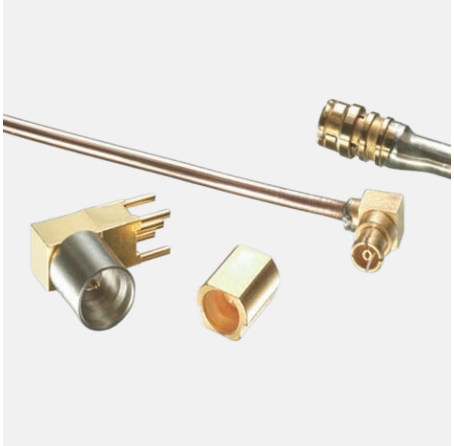


EXTERNAL ANTENNAS

FEATURES

- Batons, blades, whips, pucks, panels, domes, yagis, shark fins, and more form factors available
- Cellular, 5G, NTN SatCom, LPWA, NB-IoT, LTE-M, LoRaWAN, Wi-Fi, GNSS, UWB, and options compatible with Bluetooth technology
- High reliability: high performance, rugged packages with extensive environmental testing
- Various connector and cable options available for broad compatibility

CONNECTORS



RF CONNECTORS

RF connectors help to enable RF signal transmission between antennas, communication modules, and telematics systems.

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 standard connectors qualified for M39012, M55339, M83517

Durability + Performance — Rugged connector materials and controlled RF performance help support reliable signal transmission in harsh equipment environments.



MICRO-COAXIAL CONNECTORS/CABLES

Compact RF interconnect solutions for antenna integration and high-density communication modules.

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



SMA CONNECTORS

SMA connectors help maintain secure RF connections in GNSS and wireless communication systems operating in high-vibration environments.

FEATURES

- Threaded (Screw-Type) coupling mechanism helps prevent loosening in high-vibration environments
- High-frequency performance — designed for performance up to 27 GHz
- Low insertion loss & high signal integrity — designed for minimal signal reflection and loss. Maintains consistent RF performance in high-frequency applications

Durability + Performance — The threaded coupling mechanism helps maintain secure RF connections in high-vibration environments, while high-frequency performance and low insertion loss help support consistent RF signal integrity.



HDMI CONNECTORS

Connectors support audio and video transmission between displays, cameras, and onboard electronic systems.

FEATURES

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



DISPLAYPORT CONNECTORS

Connectors used in display and human-machine interface (HMI) systems requiring high-definition video transmission between electronic modules and operator displays.

FEATURES

- Transmit high-definition media content on computers and audio-visual components
- Compact, user-friendly external connector



USB CONNECTORS

Connectors that help facilitate diagnostics, software updates, data transfer, and peripheral connectivity across vehicle electronics.

FEATURES

- Provide one interconnect solution for data, power, and Audio/Visual (A/V)
- Enhanced board retention features for added durability
- Ingress Protection (IPX)-rated waterproof and IPX4 splash-proof options available
- Save valuable real estate, with one of the smallest dual row Surface Mount Technology (SMT) footprints

Durability + Integration — Board retention features and available IPX-rated options help support connector durability and integration in equipment designs where exposure, service access, and data transfer are important considerations.



WIRE-TO-BOARD CONNECTORS

AMP CT, MINI CT, MICRO CT CONNECTORS

Connect sensors, controls, displays, and electronic subsystems throughout agricultural equipment.

FEATURES

- Two termination methods: Insulation Displacement Contact (IDC), Crimp
- Discrete wire interconnect
- Circuits range from 2–25 single row, 8–40 dual row



FPC CONNECTORS

Compact electronic assemblies that require flexible routing between displays, cameras, controls, and computing modules.

FEATURES

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

Miniaturization + Design Integration — Compact form factors and flexible cable routing help support space-constrained electronic assemblies used in displays, cameras, controls, and computing modules.



MULTI-BEAM XLE and MULTI-BEAM PLUS CONNECTORS

Scalable power and signal interconnects for high-power systems and equipment platforms.

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

Scalability + Power Integration — Modular configurations and scalable power/signal interconnect options help support equipment platforms with varying power, signal, and layout requirements.

WHY TE?

TE Connectivity provides connectivity technologies used across industrial, transportation, Edge AI, and IoT applications. Through application knowledge, engineering engagement, and global manufacturing resources, TE helps customers address evolving integration and design requirements.

BROAD CONNECTIVITY PORTFOLIO

A broad portfolio of antennas, connectors, cable assemblies, and interconnect solutions supporting signal, data, power, and wireless communication applications.

DESIGN & ENGINEERING SUPPORT

Application-driven design and engineering support combined with catalog and custom product options across multiple form factors, interfaces, and configurations to help customers address connectivity integration challenges and evolving design requirements.

GLOBAL MANUFACTURING FOOTPRINT

Global manufacturing, supply chain, and distribution resources that help customers align sourcing and production across global operations.

TAKE THE NEXT STEP

Explore Component Configurations

Explore matching components by category in our Virtual Sample Kit for Agricultural Systems, which provides a curated selection of components commonly used in related applications.

Virtual Sample Kit

Shop NexFront Store

Real-time availability! Get the components you need with our te.com store experience.

Shop NexFront Store

Connect with Us

Reach out with questions you may have regarding our products or technologies.

Send a Message

Unlock Benefits

Create an account today to access additional resources for your project.

Sign up Today

Already have an account?

Login

About TE Connectivity

TE Connectivity is a global industrial technology leader creating a safer, sustainable, productive, and connected future. As a trusted innovation partner, our broad range of connectivity and sensor solutions enable the distribution of power, signal and data to advance next-generation transportation, energy networks, automated factories, data centers enabling artificial intelligence, and more. Our more than 90,000 employees, including 10,000 engineers, work alongside customers in approximately 130 countries. In a world that is racing ahead, TE ensures that EVERY CONNECTION COUNTS. Learn more at www.te.com.

Connect With Us

We make it easy to connect with our experts and are ready to provide all the support you need.
Visit **te.com/support** to chat with a Product Information Specialist.

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