

Parlex RFID Antenna Technology



innovating motion

Parlex RFID Antennae and Microelectronic Products

- ▶ Johnson Electric, through its Parlex brand, provides world-class design, prototyping, and value added assembly for flexible circuits, printed electronics, flat flexible cabling and microelectronics.
- ▶ Johnson Electric has the broadest range of flexible interconnects, smart card contact plates, secure flex circuits and sensor products to serve global telecom, payment, electronic identification, automotive, medical, business machines, aerospace, defense and industrial customers.
- ▶ Custom circuits are developed based on proprietary designs, processes and materials including dielectrics, conductors, printed electronics technology and the expert formulation of inks.
- ▶ We provide unique microelectronic design and solutions as an integral part of our customers' advanced system products.

Parlex RFID Antenna Products

- ▶ Applications

- ▶ Electronic Identification antenna (anti tampering option)
- ▶ E-passport antenna
- ▶ NFC Antenna

- ▶ Technology Leadership

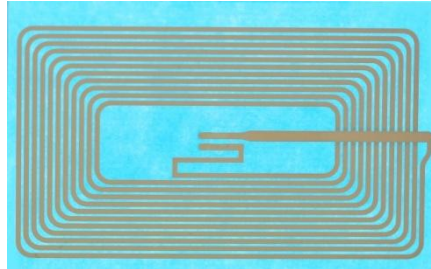
- ▶ Custom-engineered solution
- ▶ Anti-Tampering
- ▶ Reliable communication
- ▶ Durability



Parlex RFID antenna

Parlex RFID Antenna Technology

- ▶ HF Capability
 - ▶ Engineering design including calculation, antenna prototype build, and flip-chip bonding of antenna and chip in prototype quantities.
 - ▶ Inductance measurement of coil antenna to verify initial design.
 - ▶ Resonant frequency measurement of Antenna + Chip to verify frequency of operation to design parameters.
 - ▶ Preliminary Read distance measurement



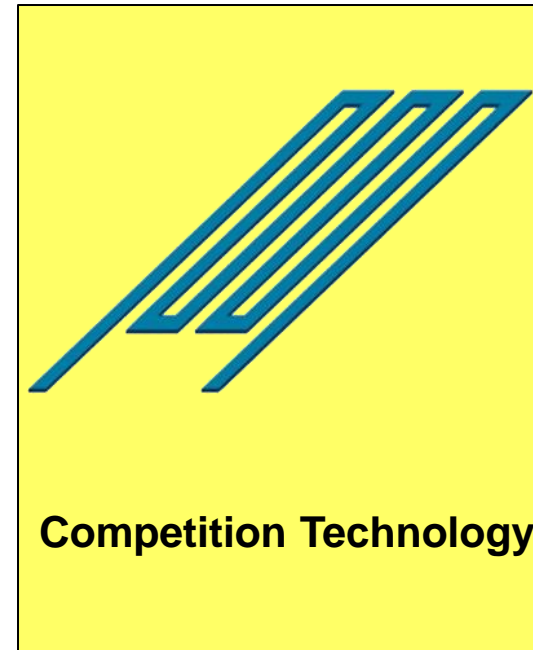
Printed Electronics antenna

Parlex RFID Antenna Technology

- ▶ Anti-tampering capability
 - ▶ Custom breakable conductors based on application security requirements
 - ▶ Applicable to both HF and UHF communication protocols



Device disabled
- Conductors broken



Device not disabled
- Conductors not broken

Parlex Electronic Identification Antenna Technology

▶ HF RFID

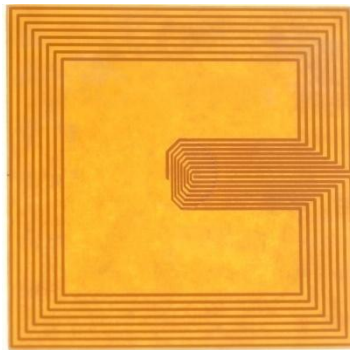
- ▶ Coil type antenna (RLC circuit)
- ▶ Antennas and tags are produced with custom formulated conductors to achieve the best product performance
- ▶ HF antenna is generally suitable for reading distance up to 50cm
- ▶ Anti tampering option

▶ UHF RFID

- ▶ Di-pole type antenna (Skin effect)
- ▶ UHF Antennas and tags are produced with custom formulated conductors to achieve the best product performance
- ▶ UHF is generally suitable for reading distance up to 1m
- ▶ Anti tampering option

Parlex NFC Antenna Technology

- ▶ Coil type antenna (RLC circuit)
- ▶ Material selection (various material types and grades) for customer ease of assembly in final product
- ▶ Antennas and tags are produced with custom copper thickness to achieve the best product performance for each application
- ▶ Unique Parlex **Palflex**® technology for high density flip chip antenna (75 micron line and space)
- ▶ Customized material (transparent, white and black) selection for greater product customization



Parlex NFC antenna

Parlex RFID Antenna

Technology Leadership

- ▶ Custom-engineered solution
- ▶ Custom printed electronics
- ▶ Unique copper plating technology
- ▶ Patented anti-tampering solution

The Safe Choice

- ▶ Highest reliable identification
- ▶ Highest communication reliability
- ▶ Maximum protection to tampering
- ▶ Johnson Electric Production System