Ducommun RF Space Heritage Overview

Since 1987, Ducommun’s RF engineering and production team has been manufacturing coaxial SPDT and transfer switches for a variety of space and launch applications. Our qualified team has worked hard to design, engineer and manufacture components to withstand extreme environments with temperatures ranging from -55°C to 100°C. Frequency ranges for our heritage products have ranged from DC to 29 GHz utilizing either SMA, TNC or GPO.

Our switches are built to satisfy the stringent demands of today’s space environment via extensive testing, manufacturing and quality procedures. A certified Class 10,000 clean room with Class 100 laminar flow benches is available to satisfy Hi-Rel requirements of missiles, satellites, commercial and military applications.

Space Heritage Programs

- LEO
- METOP
- GALEX
- C/NOFS TDRS
- SWIFT
- MATSAP
- GPS II
- International Space Station
- Hot Bird 6
- GLAST
- Samaritan

For more information, contact our sales team at 310.513.7200 or rfsales@ducommun.com
RF Space Heritage

Ducommun has a legacy of working with both government/defense and commercial space applications. Because of our heritage, we can offer a broad range of switching solutions to both communications link applications and redundancy applications.

Ducommun’s RF coaxial space-qualified switches have been used in a variety of space applications where electrical performance, weight, size and reliability have been mission critical. Our heritage includes both S and K Level qualification testing and screening.

SPDT Space Product Heritage

Ducommun manufactures quality, reliable, high frequency SPDT switches that can operate from DC to 46 GHz with 55 dB minimum isolation. The DK series operates DC to 40 GHz and uses a K connector. The DL series operates DC to 46 GHz and uses a 2.4 mm connector.

SPDT Heritage Options

- Actuators
  - Failsafe
  - Latching
- Indicator circuitry
- Suppression diodes

<table>
<thead>
<tr>
<th>Program</th>
<th>RF Conn</th>
<th>Range (GHz)</th>
<th>RF Power (wcw)</th>
</tr>
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<tbody>
<tr>
<td>Classified</td>
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<td>DC - 18</td>
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<td>C/NOFS</td>
<td>SMA</td>
<td>DC - 3</td>
<td>50</td>
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<td>SMA</td>
<td>22.5 - 29</td>
<td>52</td>
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<td>SWIFT</td>
<td>SMA</td>
<td>2.1064 - 2.2875</td>
<td>10</td>
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<tr>
<td>METOP</td>
<td>SMA</td>
<td>0.4 - 0.41</td>
<td>30</td>
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<tr>
<td>Classified</td>
<td>SMA</td>
<td>9.4 - 9.8</td>
<td>5W avg</td>
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<tr>
<td>GALEX</td>
<td>SMA</td>
<td>0.1 - 10</td>
<td>10</td>
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<tr>
<td>International Space Station</td>
<td>SMA</td>
<td>DC - 3</td>
<td>50 W</td>
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<tr>
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<td>TNC</td>
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<tr>
<td>GPSII</td>
<td>TNC</td>
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<td>GPSII Stop Gap</td>
<td>TNC</td>
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<tr>
<td>Classified</td>
<td>SMA</td>
<td>DC - 18.0</td>
<td>40 - 10</td>
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Transfer Switch Space Heritage

Ducommun manufactures quality, reliable, high frequency transfer switches that can operate from DC to 46 GHz with 55 dB minimum isolation. The TK series operates DC to 40 GHz and uses a K connector. The TL series operates DC to 46 GHz and uses a 2.4 mm connector.

Transfer Heritage Options

- Actuators
  - Failsafe
  - Latching
- Indicator circuitry
- Suppression diodes

<table>
<thead>
<tr>
<th>Program</th>
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<th>Range (GHz)</th>
<th>RF Power (wcw)</th>
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<td>LEO</td>
<td>SMA</td>
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<td>Hot Bird-6</td>
<td>SMA</td>
<td>10.5 - 12.7</td>
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<td>METOP</td>
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<tr>
<td>GLAST</td>
<td>SMA</td>
<td>2.1 - 2.3</td>
<td>20.8</td>
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<td>14.8 - 15.2</td>
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<td>SMA</td>
<td>6.0 - 8.0</td>
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All specifications are subject to change without notice. Please contact a sales representative for additional information.
DUCOMMUN SPACE CAPABILITIES

Engineering
- 25 designers and engineers
- Electrical and mechanical design capabilities
- Various CAD/CAM capabilities
- Spectral radiometry
- Dedicated teams for each product line

Mechanical
- Sheet metal stamping and forming
- Injection molding
- Tool making center
- Laser etching
- NASA certified soldering
- Material and component traceability
- CNC center

Testing
- Environmental
  - Thermal
  - Vacuum
  - Humidity
- Corona
- High Power
- RF to 50 GHz

Assembly
- Dedicated assembly cells
- Class 10,000 clean rooms with 100 flow benches

Certifications
- ISO 9001
- AS9100 Rev C
- MIL-PRF-22885 QPL
- FAA (ACSEP) Part 21
- FAA Repair Station Part 145
- MIL-STD-3009

SPDT Switch
DPDT Transfer Switch
Switch Matrix
SP8T Switch
Additional Space Heritage

- **Space Shuttle Orbiter**
  - Motors and resolvers on the remote manipulator arm
  - Switches and data entry control panels
  - Lock mechanism for cargo bay door
- **International Space Station**
  - RF communications modules
  - UHF/VHF communication panels
  - Airlock control pushbutton switches
  - Robotic arm motors and resolvers
  - Solar array deployment motors
- **Mars Exploration Rover**
  - High gain antenna motors
  - Optics motors and resolvers
  - Jack screw mechanism
- **Satellites**
  - Solar array stepper motor and resolver
  - Solar array deployment motors
  - Antenna pointing system positioning motors