Miniature high performance twist pin connectors

Micro-D & Nano-D, Rectangular & Circular
SPACE MICRO-D CONNECTORS

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EXPERTISE IN SPACE

Lightweight, miniature, reliable and highly resistant to cosmic radiation and high temperatures: these are the qualities of wires, cables, cable assemblies, wire harnesses and connectors offered by AXON’ for space applications. The scope of products and services offered by the company is extensive:

- ESA wires for spacecraft cabling
- Cable assemblies & harnesses terminated with various connector styles
- MIL-STD-1553 bus harnesses for data transmission
- High data rate assemblies including SpaceWire and very high speed links up to 10 Gb/s
- Microwave coaxial assemblies up to 50 GHz
- Bar bars for power distribution in spacecraft
- Numerous accessories including halorings, EMC banding adaptors and backshells
- Bespoke interconnect solutions
- Cable and interconnect engineering services

In addition to this large range of products, AXON’ CABLE has developed miniature Micro-D connectors and Nano-D connectors designed to meet the most severe challenges of space:

- **Miniature Micro-D connectors**
  - 1.27 mm (0.050”) contact spacing,
  - Weight and space saving solution,
  - ESCC 3401/029 EPPL 2,
  - Custom design.

- **Miniature Nano-D connectors**
  - 0.635 mm (0.025") contact spacing,
  - Extreme miniaturization,
  - ESCC 3401/086 EPPL2.

**Flight heritage**

Involved in numerous space projects in orbit and beyond for over 20 years, AXON’ CABLE has a wealth of experience in designing and manufacturing interconnect solutions able to withstand the stresses of launch and the harsh space environment. Rocket launchers, ISS, Mars rovers, LEO and GEO satellites, manned and unmanned flights, thrusters, space research and experimental equipment are just a few examples.

Space programmes with AXON’ on-board include Ariane, Alphabus, Curiosity, Bepi Colombo, Corot, Eurostar, Exomars, Gaia, Galileo, Globalstar, Insight, Iridium, Mangalayyan, Maven, O3B, Sentinel, Spacebus, Vega.
MICRO-D FOR SPACE APPLICATIONS

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Micro-D connectors and assemblies for space applications

AXON’ has drawn upon long experience in the highly challenging environment of space electronics to develop Micro-D connectors and assemblies suitable for this demanding area. Marrying the Micro-D design with the need to be able to reliably transmit signals, power and high speed data, AXON’ has developed custom solutions for a wide variety of applications in space.

AXON’ space products are assembled to the highest standards, meeting the ECSS-Q-ST-70-08C and ECSS-Q-ST-70-28C requirements, and all such products are built in one of our humidity controlled, class 100,000 (ISO 8) clean rooms.

AXON’ has been approved to ESCC-3401/029 EPPL2 since 2006.
### GENERAL CHARACTERISTICS

#### Characteristic | Specification | Test Method
--- | --- | ---
**CURRENT RATING** | 2.5 A max for AWG26 & uninsulated wires* | Para 9.11.1 OF ESCC 3401
**CONTACT RESISTANCE** | 5 mΩ @ current rating; 6 mΩ @ low level current | Para 9.11.1 OF ESCC 3401
**INSULATION RESISTANCE** | 5000 MΩ min @ 500 Vac | Para 9.11.1 OF ESCC 3401
**DIELECTRIC WITHSTANDING VOLTAGE** | 600 Vrms / 2 mA (leakage current) | Para 9.11.2 OF ESCC 3401
**WORKING VOLTAGE** | - Sea level 0m: 150 Vrms
- Altitude 33km: 100 Vrms | Para 9.13.5 OF ESCC 3401
**CONTACT ENGAGING & SEPARATION FORCE** | 1.667 N maximum; 0.137 N minimum | Para 4.3.9 OF ESCC 3401/029
**CONNECTOR MATING & DE-MATING FORCES** | Mating: 20 N (9 ways) to 113 N (51 ways) max
De-mating: 20 N max / 1.3 N min (9 ways)
to 113 N max / 7.1 N min (51 ways) | Para 9.20 OF ESCC 3401
**CONTACT RETENTION** | 22.25 N for male contacts | Para 9.17 OF ESCC 3401
**DURABILITY** | 500 Mating cycles minimum | Para 9.18 OF ESCC 3401
**TEMPERATURE RANGE** | -55°C / +125°C | Para 9.11 OF ESCC 3401
**VIBRATION** | 20g's - no discontinuity > 1µs | Para 9.11 OF ESCC 3401
**SHOCK** | 50g's - no discontinuity > 1µs | Para 9.12 OF ESCC 3401
**SALT SPRAY** | 48 hours | Para 9.22 OF ESCC 3401

* For a single contact. Please refer to derating rule of ESCC 3401/029.

### Materials & Finish

#### Component | Material | Finish
--- | --- | ---
**MALE CONTACT (TWIST PIN)** | COPPER AND BERYLLIUM COPPER | GOLD PLATING IN ACCORDANCE WITH ASTM B-488, TYPE II, CLASS 1 (1.27 µM (0.050") MIN), CODE C
**FEMALE CONTACT** | COPPER ALLOY | OVER NICKEL UNDERPLATEN IN ACCORDANCE WITH SAE-AMS-00 N-290 CLASS 2 (1.27 µM (0.050") TO 3.81 µM (0.150")
**METAL SHELL** | ALUMINIUM ALLOY, TYPE 6061 | HIGH-PHOSPHOROUS ELECTROLESS NICKEL PLATING – 25.4 µm MIN.
**PLASTIC INSERT / PCB TRAY** | LIQUID CRYSTAL POLYMER, 30% LOADED GLASS FIBRE POLYESTER, 94V0, IN ACCORDANCE WITH MIL-M-24519 (200°C) | 2.54 µm GOLD PLATING OVER NICKEL UNDERPLATING
**INTERFACIAL SEAL** | FLUOROSILICONE RUBBER | HEAT-CURED TO MEET ECSS-Q-70-71 A OUTGASSING REQUIREMENTS
**HARDWARE** | STAINLESS STEEL, 300 SERIES | PASSIVATION IN ACCORDANCE WITH SAE-AMS-2700
**ENCAPSULANT** | SPACE GRADE EPOXY RESIN | **INSULATED WIRE** | - POLYIMIDE INSULATED WIRES IN ACCORDANCE WITH ESCC 3901/002
- PTFE INSULATED WIRES IN ACCORDANCE WITH ESCC 3901/013
- ETFE INSULATED SILVER PLATED COPPER IN ACCORDANCE WITH SAE-AS22759/33 | **UNINSULATED WIRE** | SOLID COPPER WIRES IN ACCORDANCE WITH QQ-W-343 TYPE ‘S’ GOLD PLATED ACCORDING TO MIL-G-45204, CLASS 2 GRADE C OR D
**IDENTIFICATION CODE**

<table>
<thead>
<tr>
<th>SERIES</th>
<th>MDSA</th>
<th>2</th>
<th>15</th>
<th>P</th>
<th>V01301</th>
<th>F</th>
<th>46</th>
<th>M</th>
</tr>
</thead>
</table>

**PLATING**
- 2: Nickel plated.
- 5: Gold plated.

**NUMBER OF CONTACTS**
- 9, 15, 21, 25, 31, 37, 51.
- See pages 26 & 27 for contact arrangements.

**GENDER**
- P: Male crimped contacts.
- S: Female crimped contacts.

**WIRE TYPE**
- V01301: Single wire ESCC 3901/013 - Variant 01 (AWG28).
- V01302: Single wire ESCC 3901/013 - Variant 02 (AWG26).
- V00256: Single wire ESCC 3901/002 - Variant 56 (AWG26).
- G: Uninsulated wires: gold plated AWG2501.
- E: Single wire M22759/33-26 (recommended for space application by MIL-DTL-83513).
- NB: Other wires upon request.

**WIRE COLOUR**
- Wire code E: Yellow.
- L: White.
- 10 Colours code per MIL-STD-681, as required by MIL-DTL-83513.
- Uninsulated wires or ESCC wires.

**BLANK** (see wire descriptions and wire colours page 298).

**WIRE LENGTH (in cm)**
- XXX = length in cm.

**HARDWARE**
- B: Fixed mounting holes (no hardware).
- C: U-clips with low profile hex socket head jackscrews (removable).
- D: U-clips with low profile slot head jackscrews (removable).
- M: Low profile Allen head jackscrews (removable).
- N: High profile Allen head jackscrews (removable).
- S: Low profile slot head jackscrews (removable).
- T: High profile slot head jackscrews (removable).
- P: Jackpost (removable).
- K: High profile slot head jackscrews (non-removable).
- L: Low profile Allen head jackscrews (non-removable).
- F: Floating mount (non-removable).

**LAT Level to be indicated when ordering - see page 299**

- Nickel or gold plated shells for space applications.
- Supplied pre-wired and fully potted.
PCB CONNECTORS

METAL SHELL
- Nickel or gold plated shells for space applications.
- Board right angle or straight to accommodate all configurations.
- To be used with flexible and rigid printed circuit boards.
- Several tail lengths available.

IDENTIFICATION CODE

| SERIES | MDSA | Micro-D Space AXON® connectors.
|--------|------|------------------
| PLATING | 2 | Nickel plated.
| | 5 | Gold plated.

NUMBER OF CONTACTS
9, 15, 21, 25, 31, 37, 51.
See pages 26 & 27 for contact arrangements.

GENDER
P: Male crimped contacts.
P: Female crimped contacts.

TERMINATION TYPE
BS: Board Straight version.
BR: Board Right Angle version.
CBR: Condensed Board Right Angle version.

HARDWARE
B: No jackpost, no threaded PCB mounting hole.
P: Jackposts installed, no threaded PCB mounting hole.
T: Threaded PCB mounting holes only.
W: Jackposts installed and threaded PCB mounting hole.
See page 190 to 200 for hardware description.

CONDUCTOR TYPE
G: Uninsulated ESCC wire AWG2501 gold plated.

TAIL LENGTH
1. 2.80 mm - 0.110”.
2. 3.80 mm - 0.150”.
3. 4.80 mm - 0.190”.
4. 6.35 mm - 0.250”.

Tolerance: ± 0.38 mm (0.015”).
NB: Other wires upon request.
WIRE DESCRIPTIONS

- Insulated wire AWG28, in accordance with ESCC 3901/013 Variant 01 (V01301)
  - Conductor: Max Ø: 0.42 mm
    - Nominal cross-section: 0.089 mm²
  - Insulation: Max Ø: 0.82 mm
    - Max weight: 1.8 g/m
    - Colour: Natural

- Insulated wire AWG26, in accordance with ESCC 3901/013 Variant 02 (V01302)
  - Conductor: Max Ø: 0.50 mm
    - Nominal cross-section: 0.14 mm²
  - Insulation: Max Ø: 0.89 mm
    - Max weight: 2.3 g/m
    - Colour: Natural

- Insulated wire AWG28, in accordance with ESCC 3901/002 Variant 61 (V00261)
  - Conductor: Max Ø: 0.43 mm
    - Nominal cross-section: 0.10 mm²
  - Insulation: Max Ø: 0.68 mm
    - Max weight: 1.23 g/m
    - Colour: Brown

- Insulated wire AWG26, in accordance with ESCC 3901/002 Variant 56 (V00256)
  - Conductor: Max Ø: 0.53 mm
    - Nominal cross-section: 0.15 mm²
  - Insulation: Max Ø: 0.78 mm
    - Max weight: 1.93 g/m
    - Colour: Black

- Uninsulated solid wire AWG2501, in accordance with QQ-W-343 type "S" (G)
  - Gold plated per MIL-G-45204, Class 2 grade C or D
  - Conductor Ø: 0.455 ± 0.005 mm
  - Min gold plating thickness: 0.5 µm
  - Max weight: 1.6 g/m

- Insulated wire M22759/33-26 (E)
  - Conductor: Nom Ø: 0.483 mm
    - Nominal cross-section: 0.154 mm²
  - Insulation: Nom Ø: 0.81 mm
    - Max weight: 2.1 g/m
LAT Levels

The required level of Lot Acceptance Testing is to be specified when ordering. The sample size of the three Lot Acceptance Tests are shown in the diagram below. All components assigned to a subgroup shall be subjected to all the tests of that subgroup in the table test sequence.

AXON® Space Micro-D connectors are tested according to ESCC 3401.

Lot Acceptance "level 3":
No additional tests or inspections are required for this level.

Lot Acceptance "level 2":
This level includes the electrical and endurance subgroup.

Lot Acceptance "level 1":
This level includes everything in level 2 plus environmental and mechanical subgroups.

---

**SAMPLE SIZES ACCORDING TO REQUIRED LAT LEVEL**

**LEVEL 1 - Lot Acceptance**
- 5 Mated Connector Sets + 10 Contact Sets
- Environmental mechanical subgroup
- 3 Connector Sets
- Wiring §9.10 of ESCC3401
- Climatic Sequence §9.13 of ESCC3401
- Permanence of marking §9.19 of ESCC3401
- Corrosion §9.22 of ESCC3401
- Plating thickness §9.14 of ESCC3401

**LEVEL 2 - Lot Acceptance**
- 2 Mated Connector Sets + 10 Contact Sets
- 2 Connector Sets
- Wiring §9.10 of ESCC3401
- Rapid change of Temperature §9.16 of ESCC3401
- Contact Retention §9.17 of ESCC3401
- Endurance §9.18 of ESCC3401

**LEVEL 3 - None**
- 10 Contact Sets
- Engagement / Separation Forces §9.28 of ESCC3401

---

No failures allowed
120 WAY MICRO-D CONNECTORS

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An enduring trend in the electronics industry is the continuing drive towards miniaturisation. This leads in turn to ever greater cabling densities with an ever larger number of signals required within limited space constraints. In answer to these challenges, AXON’ CABLE has developed a range of 120 way Micro-D connectors. They are available as pigtails or within assemblies but can equally be supplied as PCB connectors in either surface mount or through hole format. Connector savers are part of the range.

These connectors have been developed and tested for the challenging requirements of space electronics, and can be used for any applications where severe environmental conditions and high density cabling are critical. Keying hardware is an option.

AXON’ can offer specific numbers of contacts for custom designed applications. Specific designs are not contained within the MIL specification but AXON’s solutions remain fully compatible with the MIL-DTL-83513 standard as far as performance and construction are concerned.

Contact arrangements

1.27 mm (.050") contact spacing.
1.27 mm (.050") spacing between two rows.
References

<table>
<thead>
<tr>
<th>DESIGNATION</th>
<th>REFERENCE</th>
<th>COMMENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 WAY PLUG CONNECTOR FOR CABLE OR ASSEMBLY</td>
<td>P562630</td>
<td>Wire, length and colour type to be defined</td>
<td>305</td>
</tr>
<tr>
<td>120 WAY SOCKET CONNECTOR FOR CABLE OR ASSEMBLY</td>
<td>P562631</td>
<td>Wire, length and colour type to be defined</td>
<td>305</td>
</tr>
<tr>
<td>120 WAY SOCKET SURFACE MOUNT PCB CONNECTOR</td>
<td>P562632</td>
<td>Can only be mated with pigtail plug</td>
<td>306</td>
</tr>
<tr>
<td>120 WAY PLUG BOARD STRAIGHT PCB CONNECTOR</td>
<td>P562633</td>
<td></td>
<td>307</td>
</tr>
<tr>
<td>120 WAY CONNECTOR SAVER</td>
<td>P562634</td>
<td></td>
<td>307</td>
</tr>
</tbody>
</table>

The AXON’ 120 way Micro-D connector can be ordered with standard wires and colours (see pages 29 & 30).
For more AXON’ 120 way Micro-D connectors references, please ask for our Cables & harnesses for space applications catalog.

Keying Hardware

<table>
<thead>
<tr>
<th>SPECIAL 120 WAY MALE HARDWARE KIT WITH KEYWAY: J</th>
<th>SPECIAL 120 WAY FEMALE HARDWARE KIT WITH KEYWAY: H</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Image of male hardware kit with keyway J]</td>
<td>![Image of female hardware kit with keyway H]</td>
</tr>
</tbody>
</table>
## Electrical & mechanical characteristics

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>SPECIFICATIONS</th>
<th>TEST METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT RATING</td>
<td>2.5 A max @ 23°C</td>
<td>EIA-364-70</td>
</tr>
<tr>
<td>CONTACT RESISTANCE</td>
<td>8 mΩ max.</td>
<td>EIA-364-06</td>
</tr>
<tr>
<td>INSULATION RESISTANCE</td>
<td>5000 MΩ min. @ 500 Vdc</td>
<td>EIA-364-21</td>
</tr>
<tr>
<td>DIELECTRIC WITHSTANDING VOLTAGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- SEA LEVEL 0 M</td>
<td>250 Vdc</td>
<td>EIA-364-20</td>
</tr>
<tr>
<td>- ALTITUDE 21 KM (70,000 FT)</td>
<td>100 Vdc</td>
<td></td>
</tr>
<tr>
<td>CONTACT ENGAGING AND SEPARATION FORCE</td>
<td>170 g max. (6 oz) / 14 g min. (0.5 oz)</td>
<td>EIA-364-37</td>
</tr>
<tr>
<td>CONNECTOR MATING AND DE-MATING FORCE</td>
<td>283 g (10 oz) X 120</td>
<td>EIA-364-13</td>
</tr>
<tr>
<td>CONTACT RETENTION</td>
<td>2.26 kg (5 lbs) for 5 seconds min.</td>
<td>EIA-364-29</td>
</tr>
<tr>
<td>DURABILITY</td>
<td>500 mating cycles min.</td>
<td>EIA-364-09</td>
</tr>
<tr>
<td>TEMPERATURE RANGE</td>
<td>-55°C / +150°C</td>
<td></td>
</tr>
<tr>
<td>VIBRATION</td>
<td>20 g’s - No discontinuity &gt;1µs</td>
<td>EIA-364-28</td>
</tr>
<tr>
<td>SHOCK</td>
<td>50 g’s - No discontinuity &gt;1µs</td>
<td>EIA-364-27</td>
</tr>
<tr>
<td>SALT SPRAY</td>
<td>48 hours</td>
<td>EIA-364-26</td>
</tr>
<tr>
<td>HUMIDITY</td>
<td>Insulation resistance &gt; 1MΩ</td>
<td>EIA-364-31</td>
</tr>
</tbody>
</table>

## Materials & finish

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>MATERIAL</th>
<th>FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALE CONTACT (TWIST PIN)</td>
<td>COPPER AND BERYLLIUM COPPER</td>
<td>GOLD PLATING IN ACCORDANCE WITH ASTM-B488, TYPE II, CLASS 1 (1.27µM (0.050”) MIN), CODE C OVER NICKEL UNDERPLATE IN ACCORDANCE WITH SAE-AMS-QQ-N-290 CLASS 2 (1.27µM (0.050”) TO 3.81µM (0.150”))</td>
</tr>
<tr>
<td>FEMALE CONTACT</td>
<td>COPPER ALLOY</td>
<td></td>
</tr>
<tr>
<td>METAL SHELL</td>
<td>ALUMINIUM ALLOY, TYPE 6061</td>
<td>ELECTROLESS NICKEL PLATING IN ACCORDANCE WITH SAE-AMS2404, CLASS 4, 0.005 INCH MIN.</td>
</tr>
<tr>
<td>INSERTS</td>
<td>LIQUID CRYSTAL POLYMER, 30% LOADED GLASS FIBRE POLYESTER, 94VO, IN ACCORDANCE WITH MIL-M-24519 (200°C)</td>
<td></td>
</tr>
<tr>
<td>HARDWARE</td>
<td>STAINLESS STEEL, 300 SERIES</td>
<td>PASSIVATION IN ACCORDANCE WITH SAE-AMS2700</td>
</tr>
<tr>
<td>ENCAPSULANT</td>
<td>SPACE GRADE EPOXY RESIN</td>
<td></td>
</tr>
<tr>
<td>UNINSULATED WIRE</td>
<td>AWG 28/31, SOLID COPPER WIRE</td>
<td>GOLD PLATED IN ACCORDANCE WITH A-A-59551</td>
</tr>
</tbody>
</table>
120 way male and female connectors for cable and harnesses

Both male and female connectors can be assembled with various wire sizes in shielded and unshielded forms. High speed variants can also be produced, using controlled impedance shielded twisted pairs which allow data rates of up to 880 Mbps. For space applications, these connectors are assembled in a class 100,000 clean room, and can be terminated with ESA ESCC (European Space Agency) approved wires.
Surface Mount PCB
Card Edge Connectors

Surface Mount (SMT) connectors have two rows of 28 AWG gold plated leads at 0.635 mm (.025") pitch spacing to terminate to PCB’s by soldering. Lugs on either side of the connector allow for mechanical clamping onto the PCB.

AVAILABLE VERSIONS
- Female style to mate with a male pigtail or assembly connector.
- Male and female styles to mate together (this option has a longer shell to retain the keying hardware system).
- Female style for panel mount.

FEMALE SMT
to mate to a male cable connector.

SEE CONTACT LAYOUT ON PCB PAGE 308
**BS CONNECTOR**

The BS version is similar to the straight PCB connector style of the MIL standard. Available in male version only.

**CONNECTOR SAVER**

Connector savers have been developed to protect expensive equipment. Typical applications include test equipment and space-grade instruments.
PCB layout

FEMALE SMT (SURFACE MOUNT STYLE) CONNECTOR

BS VERSION (MALE ONLY)
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Nano-D connectors and assemblies for space applications

0.635 MM (.025") CONTACT SPACING

AXON' has drawn upon long experience in the highly challenging environment of space electronics to develop Nano-D connectors and assemblies suitable for this demanding area. Marrying the Nano-D design with the need to be able to reliably transmit signals, AXON' has developed custom solutions for a wide variety of application in space.

AXON' space products are assembled to the highest standards, meeting the ECSS-Q-ST-70-08C and the ECSS-Q-ST-70-26C requirements, and all such products are built in one of our humidity controlled, class 100,000 (ISO 8) clean rooms. AXON' has been approved to ESCC 3401/086 EPPL2 since 2014.

Different configurations

AXON's range of space Nano-D connectors is available in several different configurations:

- Nano-D rectangular connectors for cables.
- Nano-D rectangular connectors for PCBs.

Characteristics

- 0.635 mm (.025") contact spacing (double the density of a space Micro-D).
- Number of ways: 9, 15, 21, 25, 31, 37 and 51.
- High reliability twist pin contacts.
- Metal shell construction with captivated hardware.
### General Characteristics

AXON’s range of space Nano-D connectors which is covered by the ESCC 3401/086* standard, is ideally suited to equipment and applications where weight, miniaturisation and long term performance are required. It is available in 7 contact arrangements (9 to 51 contacts) for rectangular Nano-D connectors.

### Electrical & Mechanical Characteristics

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Rating</td>
<td>1 A max.</td>
<td>Para 9.1.1.3 of ESCC 3401</td>
</tr>
<tr>
<td>Contact Resistance</td>
<td>71 mΩ max.</td>
<td>Para 9.1.1.1 of ESCC 3401</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>1000 MΩ min. @ 100 Vrms</td>
<td>Para 9.1.1.2 of ESCC 3401</td>
</tr>
<tr>
<td>Dielectric Withstanding Voltage</td>
<td>- Sea Level 0 m: 250 Vac</td>
<td>Para 9.1.1.2 of ESCC 3401</td>
</tr>
<tr>
<td></td>
<td>- Altitude 21 km (70,000 ft): 100 Vac</td>
<td>Para 9.1.1.2 of ESCC 3401</td>
</tr>
<tr>
<td>Contact Engaging and Separation Force</td>
<td>1.39 N max.</td>
<td>Para 4.3.9 of ESCC 3401/086</td>
</tr>
<tr>
<td></td>
<td>0.11 N min.</td>
<td>Para 9.1.20 of ESCC 3401</td>
</tr>
<tr>
<td>Connector mating and demating force</td>
<td>198 g (7 oz) x number of contacts max.</td>
<td>Para 9.1.18 of ESCC 3401</td>
</tr>
<tr>
<td>Contact Retention</td>
<td>2.2 N min.</td>
<td>Para 9.1.18 of ESCC 3401</td>
</tr>
<tr>
<td>Durability</td>
<td>200 mating cycles min.</td>
<td>Para 9.1.18 of ESCC 3401</td>
</tr>
<tr>
<td>Temperature Ranges</td>
<td>-55°C / +150°C</td>
<td>Para 9.1.11 of ESCC 3401</td>
</tr>
<tr>
<td>Vibration</td>
<td>20 g’s - No discontinuity &gt;1μs</td>
<td>Para 9.1.12 of ESCC 3401</td>
</tr>
<tr>
<td>Shock</td>
<td>50 g’s - No discontinuity &gt;1μs</td>
<td>Para 9.1.12 of ESCC 3401</td>
</tr>
<tr>
<td>Salt Spray</td>
<td>48 hours</td>
<td>Para 9.2.2 of ESCC 3401</td>
</tr>
</tbody>
</table>

### Material & Finish

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Contact (Twist Pin)</td>
<td>Precious Gold Alloy</td>
<td>None</td>
</tr>
<tr>
<td>Female Contact</td>
<td>Precious Gold Alloy</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Leaded Brass Alloy</td>
<td>Gold plating in accordance with ASTM-B488, Type II, Class 1 (1.27 µm min. (.005”)), Code C, over nickel underplate in accordance with SAE-AMS-QQ-N-290, Class 2 (1.27 µm (.005”) to 3.81 µm (.150”))</td>
</tr>
<tr>
<td>Metal Shell</td>
<td>Aluminium Alloy, Type 6061</td>
<td>Electroless nickle plating in accordance with SAE-AMS-2404, Class 4.</td>
</tr>
<tr>
<td>Insert/PCB Tray</td>
<td>Liquid Crystal Polymer, 30% Loaded Glass Fibre POLYESTER (940), in accordance with MIL-M-24519 (20°C)</td>
<td></td>
</tr>
<tr>
<td>Hardware</td>
<td>Stainless Steel, 300 Series</td>
<td>Passivation in accordance with SAE-AMS2700</td>
</tr>
<tr>
<td>Encapsulant</td>
<td>Space Grade Epoxy Resin</td>
<td></td>
</tr>
<tr>
<td>Insulated Wire</td>
<td>Crosslinked ETE Insulated Silver Plated Copper Alloy</td>
<td></td>
</tr>
<tr>
<td>Integral Tail</td>
<td>Gold Plated Solid Copper Base Alloy</td>
<td></td>
</tr>
</tbody>
</table>

*: ISSUE 1 AT THE TIME OF GOING TO PRESS
**RECTANGULAR CONNECTORS FOR CABLES**

**DUAL ROW PIGTAIL & JUMPER**

- Reliability for micro-miniature operating systems.
- High performance metal connector and ETFE crosslinked wire.
- Panel mount available for receptacle connector.
- Operating temperature: -55 / +150°C.
- 7 contact arrangements (9 to 51 contacts).

### IDENTIFICATION CODE

**SERIES**

ND2SA: Nano-D Space application 2 row AXON®.

See below variants included in the ESCC3401/086 specification.

### NUMBER OF CONTACTS

| 09, 15, 21, 25, 31*, 37, 51 |

### 1st CONNECTOR TYPE

**P**: Plug connector.
**M**: Panel mount receptacle connector*.

### 2nd CONNECTOR TYPE

**P**: Plug connector.
**M**: Panel mount receptacle connector*.

### CONNECTIONS (see jumper wiring on page 216)

- **D**: Direct pin 1 to pin 1.
- **I**: Indirect (usual for plug-plug jumper).
- **X**: Pigtail*.

### EMI FAMILY

- **E**: Shielded pigtails or harnesses, shield soldered to the backshell (see page 314).
- **X**: No shield.

### WIRE CODE

- **W1**: Single wire ESCC 3901/012 - Variant 01 (AWG30).
- **W2**: 2 shielded jacketed twisted pairs ESCC 3901/012 - Variant 51 with the remaining wiring being single wire per ESCC 3901/012 - Variant 01.

### COLOUR CODE


For colour code “W” see page 30

### WIRE LENGTH (in cm)

<table>
<thead>
<tr>
<th>L in cm (inches)</th>
<th>5 ≤ L ≤ 10</th>
<th>10 &lt; L ≤ 30</th>
<th>30 &lt; L ≤ 50</th>
<th>L &gt; 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOLERANCE in cm (inches)</td>
<td>-0 / +0.5</td>
<td>-0 / +3</td>
<td>-0 / +7</td>
<td>-0 / +1.18</td>
</tr>
</tbody>
</table>

Attention! Wire length in centimetres - (Tcm = 10 mm = .394").

### HARDWARE 1st CONNECTOR

- **P**: Threaded hole #0-80 UNF (non-removable jackposts, receptacle only).
- **R**: Retractable short hex socket head jackscrews #0-80 UNF (semi-captive, plug only).
- **L**: Short hex socket head jackscrews #0-80 UNF (captive, plug only).
- **V**: Retractable short hex socket head jackscrews #0-80 UNF (semi-captive, plug with backshell only).
- **B**: No hardware*.

### HARDWARE 2nd CONNECTOR

- **P**: Threaded hole #0-80 UNF (non-removable jackposts, receptacle only).
- **R**: Retractable short hex socket head jackscrews #0-80 UNF (semi-captive, plug only).
- **L**: Short hex socket head jackscrews #0-80 UNF (captive, plug only).
- **V**: Retractable short hex socket head jackscrews #0-80 UNF (semi-captive, plug with backshell only).
- **X**: Pigtail*.
- **B**: No hardware*.

*: not included in ESCC specification
SUMMARY OF CHARACTERISTICS

ELECTRICAL & MECHANICAL PERFORMANCE

<table>
<thead>
<tr>
<th>SHELL SIZE</th>
<th>L1 ±0.13 (±.005)</th>
<th>L2 ±0.13 (±.005)</th>
<th>L3 ±0.13 (±.005)</th>
<th>L4 ±0.13 (±.005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 P / 9 S</td>
<td>9.53 ±.375</td>
<td>6.86 ±.270</td>
<td>16.10 ±.634</td>
<td>13.10 ±.516</td>
</tr>
<tr>
<td>15 P / 15 S</td>
<td>11.43 ±.450</td>
<td>8.76 ±.345</td>
<td>18.00 ±.709</td>
<td>15.00 ±.591</td>
</tr>
<tr>
<td>21 P / 21 S</td>
<td>13.34 ±.525</td>
<td>10.67 ±.420</td>
<td>19.91 ±.784</td>
<td>16.91 ±.666</td>
</tr>
<tr>
<td>31 P / 31 S*</td>
<td>16.51 ±.650</td>
<td>13.84 ±.545</td>
<td>23.09 ±.909</td>
<td>20.08 ±.791</td>
</tr>
<tr>
<td>37 P / 37 S</td>
<td>18.42 ±.725</td>
<td>15.75 ±.620</td>
<td>24.99 ±.984</td>
<td>21.99 ±.866</td>
</tr>
<tr>
<td>51 P / 51 S</td>
<td>22.86 ±.900</td>
<td>20.19 ±.795</td>
<td>29.43 ±1.159</td>
<td>26.43 ±1.041</td>
</tr>
</tbody>
</table>

*: not included in ESCC specification

MATERIAL & FINISH

<table>
<thead>
<tr>
<th>SHELL</th>
<th>Aluminium Alloy 6061 with nickel plating</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOULDED INSULATOR</td>
<td>Liquid Crystal Polymer (LCP)</td>
</tr>
<tr>
<td>PIN CONTACT</td>
<td>Precious gold alloy</td>
</tr>
<tr>
<td>SOCKET CONTACT</td>
<td>Precious gold alloy</td>
</tr>
<tr>
<td>ENCAPSULANT</td>
<td>Epoxy resin</td>
</tr>
<tr>
<td>HARDWARE</td>
<td>300 series stainless steel, passivated</td>
</tr>
</tbody>
</table>

DIMENSIONS
Dimensions are in millimetres (inches).

1 centimetre = 10 millimetres = 0.393 inch
1 inch = 25.4 millimetres = 2.54 centimetres
RECTANGULAR CONNECTORS FOR CABLES

EMI RANGE

SHIELDED DUAL ROW
PIGTAIL & JUMPER

- Reliability for micro-miniature operating systems.
- High performance metal connector and ETFE crosslinked wire.
- Panel mount available for receptacle connector.
- 360° screen termination.
- Operating temperature: -55°C / +200°C.
- 7 contact arrangements (9 to 51 contacts).

IDENTIFICATION CODE

**ND2SA**

P: Plug connector.

I: Indirect (usual for plug-plug jumper).

E: Shielded pigtails or harnesses, shield soldered to the backshell.

W1: Single wire ESCC 3901/012 - Variant 01 (AWG30).

W2: 2 shielded jacketed twisted pairs ESCC 3901/012 - Variant 51 with the remaining wiring being single wire per ESCC 3901/012 - Variant 01.

**COLOUR CODE**

0: Black.
1: Brown.
2: Red.
3: Orange*.
4: Yellow*.
5: Green*.
6: Blue*.
7: Violet*.
8: Grey*.
9: White.
W: 10 colour repeat*.

**WIRE LENGTH (in cm)**

Attention! Wire length in centimetres - *(1cm = 10 mm = .394")*.

**HARDWARE 1st CONNECTOR**

P: Threaded hole #0-80 UNF (non removable jackposts, receptacle only).

R: Retractable short hex socket head jackscrews #0-80 UNF (semi-captured, plug only).

L: Short hex socket head jackscrews #0-80 UNF (captivated, plug only).

V: Retractable short hex socket head jackscrews #0-80 UNF (semi-captured, plug with backshell only).

B: No hardware*.

**HARDWARE 2nd CONNECTOR**

P: Threaded hole #0-80 UNF (non removable jackposts, receptacle only).

R: Retractable short hex socket head jackscrews #0-80 UNF (semi-captured, plug only).

L: Short hex socket head jackscrews #0-80 UNF (captivated, plug only).

V: Retractable short hex socket head jackscrews #0-80 UNF (semi-captured, plug with backshell only).

X: Pigtail*.

B: No hardware*.

* not included in ESCC specification
SUMMARY OF CHARACTERISTICS

<table>
<thead>
<tr>
<th>SHELL SIZE</th>
<th>L1 ±0.13 (±.005)</th>
<th>L2 ±0.13 (±.005)</th>
<th>L3 ±0.13 (±.005)</th>
<th>L4 ±0.13 (±.005)</th>
<th>L5 ±0.13 (±.005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 P / 9 S</td>
<td>9.53 .375</td>
<td>6.86 .270</td>
<td>10.16 .400</td>
<td>16.10 .634</td>
<td>13.10 .516</td>
</tr>
<tr>
<td>15 P / 15 S</td>
<td>11.43 .450</td>
<td>8.76 .345</td>
<td>12.06 .475</td>
<td>18.00 .709</td>
<td>15.00 .591</td>
</tr>
<tr>
<td>21 P / 21 S</td>
<td>13.34 .525</td>
<td>10.67 .420</td>
<td>13.97 .550</td>
<td>19.91 .784</td>
<td>16.91 .666</td>
</tr>
<tr>
<td>31 P / 31 S*</td>
<td>16.51 .650</td>
<td>13.84 .545</td>
<td>17.14 .675</td>
<td>23.09 .909</td>
<td>20.08 .791</td>
</tr>
<tr>
<td>37 P / 37 S</td>
<td>18.42 .725</td>
<td>15.75 .620</td>
<td>19.05 .750</td>
<td>24.99 .984</td>
<td>21.99 .866</td>
</tr>
<tr>
<td>51 P / 51 S</td>
<td>22.86 .900</td>
<td>20.19 .795</td>
<td>23.40 .925</td>
<td>29.43 1.159</td>
<td>26.43 1.041</td>
</tr>
</tbody>
</table>

*: not included in ESCC specification

DIMENSIONS
Dimensions are in millimetres (inches).

Panel Mount Receptacle

<table>
<thead>
<tr>
<th>SHELL SIZE</th>
<th>L1 ±0.13 (±.005)</th>
<th>L2 ±0.13 (±.005)</th>
<th>L3 ±0.13 (±.005)</th>
<th>L4 ±0.13 (±.005)</th>
<th>L5 ±0.13 (±.005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 P / 9 S</td>
<td>9.53 .375</td>
<td>6.86 .270</td>
<td>10.16 .400</td>
<td>16.10 .634</td>
<td>13.10 .516</td>
</tr>
<tr>
<td>15 P / 15 S</td>
<td>11.43 .450</td>
<td>8.76 .345</td>
<td>12.06 .475</td>
<td>18.00 .709</td>
<td>15.00 .591</td>
</tr>
<tr>
<td>21 P / 21 S</td>
<td>13.34 .525</td>
<td>10.67 .420</td>
<td>13.97 .550</td>
<td>19.91 .784</td>
<td>16.91 .666</td>
</tr>
<tr>
<td>31 P / 31 S*</td>
<td>16.51 .650</td>
<td>13.84 .545</td>
<td>17.14 .675</td>
<td>23.09 .909</td>
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<tr>
<td>37 P / 37 S</td>
<td>18.42 .725</td>
<td>15.75 .620</td>
<td>19.05 .750</td>
<td>24.99 .984</td>
<td>21.99 .866</td>
</tr>
<tr>
<td>51 P / 51 S</td>
<td>22.86 .900</td>
<td>20.19 .795</td>
<td>23.40 .925</td>
<td>29.43 1.159</td>
<td>26.43 1.041</td>
</tr>
</tbody>
</table>

*: not included in ESCC specification

NANO-D FOR SPACE APPLICATIONS

<table>
<thead>
<tr>
<th>MATERIAL &amp; FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHELL</td>
</tr>
<tr>
<td>BACKSHELL</td>
</tr>
<tr>
<td>MOULDED INSULATOR</td>
</tr>
<tr>
<td>PIN CONTACT</td>
</tr>
<tr>
<td>SOCKET CONTACT</td>
</tr>
<tr>
<td>ENCAPSULANT</td>
</tr>
<tr>
<td>HARDWARE</td>
</tr>
</tbody>
</table>

**SEE PAGE 311 FOR MORE INFORMATION**
PCB RECTANGULAR CONNECTORS

BS TYPE

2 ROW VERTICAL PCB RECEPTACLE

0.050" PITCH

- Reliability for micro-miniature operating systems.
- Several tail lengths available.
- Operating temperature: -55 / +150°C.
- 7 contact arrangements (9 to 51 contacts).

IDENTIFICATION CODE

ND2SA 25 S BS P T 1

SERIES
ND2SA: Nano-D Space application 2 row AXON®.

NUMBER OF CONTACTS
09, 15, 21, 25, 31, 37, 51.

CONNECTOR TYPE
S: Receptacle connector.

FAMILY
BS: AXON® Vertical PCB connector.
Not included in the ESCC 3401/086 specification.

HARDWARE
P: Threaded hole #0-80 UNF (non removable jackposts).

TAIL PLATING
T: Tin lead plated 1μm minimum (63-37 alloy).
G: Gold (not included in the ESCC specification).

TAIL LENGTH
1: 2.77 mm (0.109”).
2: 3.56 mm (0.140”).
3: 4.37 mm (0.172”).
4: 2.29 mm (0.090”).
Tolerance ± 0.38 mm (0.015”).

Connectors are supplied with #0-80 UNF screws 1/4” ±0.004” long (for PCB mounting).
SUMMARY OF CHARACTERISTICS

<table>
<thead>
<tr>
<th>SHELL SIZE</th>
<th>L1 ±0.13 (±.005)</th>
<th>L2 ±0.13 (±.005)</th>
<th>L3 ±0.13 (±.005)</th>
<th>L4 ±0.13 (±.005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 S</td>
<td>9.53 .375</td>
<td>8.66 .270</td>
<td>4.14 .163</td>
<td>4.32 .170</td>
</tr>
<tr>
<td>15 S</td>
<td>11.43 .450</td>
<td>8.76 .345</td>
<td>6.05 .238</td>
<td>6.22 .245</td>
</tr>
<tr>
<td>21 S</td>
<td>13.34 .525</td>
<td>10.67 .420</td>
<td>7.95 .313</td>
<td>8.13 .320</td>
</tr>
<tr>
<td>37 S</td>
<td>18.42 .725</td>
<td>15.75 .620</td>
<td>13.03 .513</td>
<td>13.21 .520</td>
</tr>
<tr>
<td>51 S</td>
<td>22.86 .900</td>
<td>20.19 .795</td>
<td>17.48 .688</td>
<td>17.65 .695</td>
</tr>
</tbody>
</table>

ELECTRICAL & MECHANICAL PERFORMANCE

- CURRENT RATING: 1 A max.
- CONTACT RESISTANCE: 71 mΩ max.
- INSULATION RESISTANCE: 1000 MO min. @ 250 V RMS
- DIELLECTRIC WITHSTANDING VOLTAGE: Sea level: 250 V RMS; Altitude 21 km (70,000 ft); 100 Vac
- CONTACT ENGAGING FORCE: 1.39 N max.
- CONTACT SEPARATING FORCE: 0.11 N min.
- CONTACT RETENTION: 2.2 N min.
- DURABILITY: 200 mating cycles min.
- VIBRATION: 20g’s – No discontinuity > 1 µs
- SHOCK: 50g’s – No discontinuity > 1 µs

MATERIAL & FINISH

- SHELL: Aluminium alloy 6061 with nickel plating
- MOULDED INSULATOR: Liquid Crystal Polymer (LCP)
- CONTACT: Copper alloy, gold over nickel plating
- ENCAPSULANT: Epoxy Resin
- PCB TERMINALS: Gold plated solid copper alloy wire
- HARDWARE: 300 series stainless steel, passivated
PCB RECTANGULAR CONNECTORS

CBR TYPE

2 ROW RIGHT ANGLE PCB RECEPTACLE

0.050" PITCH

- Reliability for micro-miniature operating systems.
- Several tail lengths available.
- Operating temperature: -55 / +150°C.
- 7 contact arrangements (9 to 51 contacts).

IDENTIFICATION CODE

| SERIES | ND2SA. Nano-D Space application 2 row AXON*. ESCC 3401/086 EPLL2. |
| NUMBER OF CONTACTS | 09, 15, 21, 25, 31*, 37, 51. |
| CONNECTOR TYPE | S: Receptacle connector. |
| FAMILY | CBR: AXON® Right Angle PCB connector. |
| HARDWARE | P: Threaded hole #0-80 UNF (non-removable jackposts). |
| | B: None. |
| TAIL PLATING | T: Tin lead plated 1µm minimum (63-37 alloy). |
| | G*: Gold (not included in the ESCC specification). |
| TAIL LENGTH | 1: 2.77 mm (0.109"). |
| | 2: 3.56 mm (0.140"). |
| | 3: 4.37 mm (0.172"). |
| | 4: 2.20 mm (0.086"). |
| | Tolerance ± 0.38 mm (0.015"). |

*: not included in ESCC specification

Connectors are supplied with #0-80 UNF screws 1/4" ±0.004" long (for PCB mounting).

IN BOLD: FACTORY STANDARD
DIMENSIONS
Dimensions are in millimetres (inches).

<table>
<thead>
<tr>
<th>SHELL SIZE</th>
<th>L1 ±0.13 (±.005)</th>
<th>L2 ±0.13 (±.005)</th>
<th>L3 ±0.13 (±.005)</th>
<th>L4 ±0.13 (±.005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 S</td>
<td>9.53 .375</td>
<td>6.86 .270</td>
<td>4.14 .163</td>
<td>4.32 .170</td>
</tr>
<tr>
<td>15 S</td>
<td>11.43 .450</td>
<td>8.76 .345</td>
<td>6.05 .238</td>
<td>6.22 .245</td>
</tr>
<tr>
<td>21 S</td>
<td>13.34 .525</td>
<td>10.67 .420</td>
<td>7.95 .313</td>
<td>8.13 .320</td>
</tr>
<tr>
<td>37 S</td>
<td>18.42 .725</td>
<td>15.75 .620</td>
<td>13.03 .513</td>
<td>13.21 .520</td>
</tr>
<tr>
<td>51 S</td>
<td>22.86 .900</td>
<td>20.19 .795</td>
<td>17.48 .688</td>
<td>17.65 .695</td>
</tr>
</tbody>
</table>

*: not included in ESCC specification

SUMMARY OF CHARACTERISTICS

<table>
<thead>
<tr>
<th>ELECTRICAL &amp; MECHANICAL PERFORMANCE</th>
<th>MATERIAL &amp; FINISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT RATING</td>
<td>SHELL</td>
</tr>
<tr>
<td>1 A max.</td>
<td>Aluminium alloy 6061 with nickel plating</td>
</tr>
<tr>
<td>CONTACT RESISTANCE</td>
<td>MOULDED INSULATOR</td>
</tr>
<tr>
<td>71 mΩ max.</td>
<td>Liquid Crystal Polymer (LCP)</td>
</tr>
<tr>
<td>INSULATION RESISTANCE</td>
<td>CONTACT</td>
</tr>
<tr>
<td>1000 MΩ min. @ 250 Vrms</td>
<td>Copper alloy, gold over nickel plating</td>
</tr>
<tr>
<td>DIELECTRIC WITHSTANDING VOLTAGE</td>
<td>ENCAPSULANT</td>
</tr>
<tr>
<td>Sea level: 250 Vrms</td>
<td>Epoxy Resin</td>
</tr>
<tr>
<td>Altitude 21 km (70,000 ft); 100 Vac</td>
<td></td>
</tr>
<tr>
<td>CONTACT ENGAGING FORCE</td>
<td>PCB TERMINALS</td>
</tr>
<tr>
<td>1.39 N max.</td>
<td>Gold plated solid copper alloy wire</td>
</tr>
<tr>
<td>CONTACT SEPARATING FORCE</td>
<td>HARDWARE</td>
</tr>
<tr>
<td>0.11 N min.</td>
<td>300 series stainless steel, passivated</td>
</tr>
<tr>
<td>CONTACT RETENTION</td>
<td></td>
</tr>
<tr>
<td>2.2 N min.</td>
<td></td>
</tr>
<tr>
<td>DURABILITY</td>
<td></td>
</tr>
<tr>
<td>200 mating cycles min.</td>
<td></td>
</tr>
<tr>
<td>VIBRATION</td>
<td></td>
</tr>
<tr>
<td>20g’s – No discontinuity &gt; 1 µs</td>
<td></td>
</tr>
<tr>
<td>SHOCK</td>
<td></td>
</tr>
<tr>
<td>50g’s – No discontinuity &gt; 1 µs</td>
<td></td>
</tr>
</tbody>
</table>

SEE CONTACT LAYOUT ON PCB PAGE 323

SEE PAGE 311 FOR MORE INFORMATION
**PCB RECTANGULAR CONNECTORS**

**SMV TYPE**

**2 ROW VERTICAL SURFACE MOUNT PCB RECEPTACLE**

**0.025" PITCH**

- Reliability for micro-miniature operating systems.
- Surface Mount.
- Several tail lengths available.
- Operating temperature: -55°C or +150°C.
- 7 contact arrangements (9 to 51 contacts).

### IDENTIFICATION CODE

<table>
<thead>
<tr>
<th>ND2SA</th>
<th>25</th>
<th>S</th>
<th>SMV</th>
<th>P</th>
<th>T</th>
<th>1</th>
</tr>
</thead>
</table>

**SERIES**

ND2SA: Nano-D Space application 2 row AXON®
ESCC 3401/086 EPPL2.

**NUMBER OF CONTACTS**

09, 15, 21, 25, 31*, 37, 51.

**CONNECTOR TYPE**

S: Receptacle connector.

**FAMILY**

SMV: AXON® Vertical surface mount PCB connector.

**HARDWARE**

P: Threaded hole #0-80 UNF (non-removable jackposts).

**TAIL PLATING**

T: Tin lead plated 1µm minimum (63-37 alloy).

G*: Gold (not included in the ESCC specification).

**TAIL LENGTH**

1: 0.51 mm (0.020").

2: 1.02 mm (0.040").

Tolerance ± 0.25 mm (0.010").

* not included in ESCC specification

Connectors are supplied with #0-80 UNF screws 1/4" ±0.004" long (for PCB mounting).
**DIMENSIONS**

Dimensions are in millimetres (inches).

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**NANO-D FOR SPACE APPLICATIONS**

**SUMMARY OF CHARACTERISTICS**

<table>
<thead>
<tr>
<th>SHELL SIZE</th>
<th>L1 ±0.13 (±.005)</th>
<th>L2 ±0.13 (±.005)</th>
<th>L3 ±0.13 (±.005)</th>
<th>L4 ±0.13 (±.005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 S</td>
<td>9.53 ±.375</td>
<td>6.86 ±.270</td>
<td>4.14 ±.163</td>
<td>4.32 ±.170</td>
</tr>
<tr>
<td>15 S</td>
<td>11.43 ±.450</td>
<td>8.76 ±.345</td>
<td>6.05 ±.238</td>
<td>6.22 ±.245</td>
</tr>
<tr>
<td>21 S</td>
<td>13.34 ±.525</td>
<td>10.67 ±.420</td>
<td>7.95 ±.313</td>
<td>8.13 ±.320</td>
</tr>
<tr>
<td>37 S</td>
<td>18.42 ±.725</td>
<td>15.75 ±.620</td>
<td>13.03 ±.513</td>
<td>13.21 ±.520</td>
</tr>
<tr>
<td>51 S</td>
<td>22.86 ±.900</td>
<td>20.19 ±.795</td>
<td>17.48 ±.688</td>
<td>17.65 ±.695</td>
</tr>
</tbody>
</table>

*: not included in ESCC specification

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**DIMENSIONS**

Dimensions are in millimetres (inches).

---

**ELECTRICAL & MECHANICAL PERFORMANCE**

<table>
<thead>
<tr>
<th>CURRENT RATING</th>
<th>1 A max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTACT RESISTANCE</td>
<td>71 mΩ max.</td>
</tr>
<tr>
<td>INSULATION RESISTANCE</td>
<td>1000 MΩ min. @ 250 Vrms</td>
</tr>
<tr>
<td>DIELECTRIC WITHSTANDING VOLTAGE</td>
<td>Sea level: 250 Vrms</td>
</tr>
<tr>
<td>CONTACT ENGAGING FORCE</td>
<td>1.39 N max.</td>
</tr>
<tr>
<td>CONTACT SEPARATING FORCE</td>
<td>0.11 N min.</td>
</tr>
<tr>
<td>DURABILITY</td>
<td>200 mating cycles min.</td>
</tr>
<tr>
<td>VIBRATION</td>
<td>20g’s – No discontinuity &gt; 1 μs</td>
</tr>
<tr>
<td>SHOCK</td>
<td>50g’s – No discontinuity &gt; 1 μs</td>
</tr>
</tbody>
</table>

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**MATERIAL & FINISH**

<table>
<thead>
<tr>
<th>SHELL</th>
<th>Aluminium alloy 6061 with nickel plating</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOULDED INSULATOR</td>
<td>Liquid Crystal Polymer (LCP)</td>
</tr>
<tr>
<td>CONTACT</td>
<td>Copper alloy, gold over nickel plating</td>
</tr>
<tr>
<td>ENCAPSULANT</td>
<td>Epoxy Resin</td>
</tr>
<tr>
<td>PCB TERMINALS</td>
<td>Gold plated solid copper alloy wire</td>
</tr>
<tr>
<td>HARDWARE</td>
<td>300 series stainless steel, passivated</td>
</tr>
</tbody>
</table>

SEE PAGE 311 FOR MORE INFORMATION
Space Micro-D & Nano-D connectors

PCB LAYOUT FOR BS TYPE
0.050" PITCH - FEMALE CONNECTORS

VIEW A

CONNECTOR MATING FACE

9 CONTACTS - VIEW A

PCB BOARD LAYOUT

15 CONTACTS - VIEW A

21 CONTACTS - VIEW A

25 CONTACTS - VIEW A

31 CONTACTS - VIEW A

37 CONTACTS - VIEW A

51 CONTACTS - VIEW A

1.27 mm (0.05") contact spacing - 1.27 mm (0.05") spacing between rows - contact diameter: AWG 30

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PCB LAYOUT FOR SMV TYPE
0.025" PITCH - FEMALE CONNECTORS

9 CONTACTS - VIEW A
15 CONTACTS - VIEW A
21 CONTACTS - VIEW A
25 CONTACTS - VIEW A

0.635 mm (0.25") pad spacing - contact diameter: AWG 30
PCB LAYOUT FOR SMV TYPE
0.025" PITCH - FEMALE CONNECTORS

31 CONTACTS - VIEW A

37 CONTACTS - VIEW A

51 CONTACTS - VIEW A

LAYOUT

Suggested PAD configuration

*: For .040" tail length, add .020" to noted dimensions