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
- Bur 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 EPPL2,
  - 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.
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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-70-26C 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 3401/029 EPPL2 since 2006.
**GENERAL CHARACTERISTICS**

**Electrical & mechanical characteristics**

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<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>SPECIFICATION</th>
<th>TEST METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT RATING</td>
<td>2.5 A max for AWG26 &amp; uninsulated wires*</td>
<td>Para 9.1.1.3 OF ESCC 3401</td>
</tr>
<tr>
<td>CONTACT RESISTANCE</td>
<td>5 mΩ @ current rating</td>
<td>Para 9.1.1.1 OF ESCC 3401</td>
</tr>
<tr>
<td>INSULATION RESISTANCE</td>
<td>6 mΩ @ low level current</td>
<td>Para 9.1.1.1 OF ESCC 3401</td>
</tr>
<tr>
<td>DIELECTRIC WITHSTANDING VOLTAGE</td>
<td>5000 MΩ min @ 500 Vac</td>
<td>Para 9.1.1.1 OF ESCC 3401</td>
</tr>
<tr>
<td>WORKING VOLTAGE</td>
<td>600 Vess / 2 mA (leakage current)</td>
<td>Para 9.1.1.2 OF ESCC 3401</td>
</tr>
<tr>
<td>CONTACT ENGAGING &amp; SEPARATION FORCE</td>
<td>1.667 N maximum</td>
<td>Para 4.3.9 OF ESCC 3401/029</td>
</tr>
<tr>
<td>CONNECTOR MATING &amp; D-E-MATING FORCES</td>
<td>Mating: 20 N (9 ways) to 113 N (51 ways) max</td>
<td>Para 9.20 OF ESCC 3401</td>
</tr>
<tr>
<td>CONTACT RETENTION</td>
<td>22.25 N for female contacts</td>
<td>Para 9.17 OF ESCC 3401</td>
</tr>
<tr>
<td>DURABILITY</td>
<td>500 Mating cycles minimum</td>
<td>Para 9.18 OF ESCC 3401</td>
</tr>
<tr>
<td>TEMPERATURE RANGE</td>
<td>-55°C / +125°C</td>
<td>Para 9.11 OF ESCC 3401</td>
</tr>
<tr>
<td>VIBRATION</td>
<td>20g’s - no discontinuity &gt; 1µs</td>
<td>Para 9.12 OF ESCC 3401</td>
</tr>
<tr>
<td>SHOCK</td>
<td>50g’s - no discontinuity &gt; 1µs</td>
<td>Para 9.12 OF ESCC 3401</td>
</tr>
<tr>
<td>SALT SPRAY</td>
<td>48 hours</td>
<td>Para 9.22 OF ESCC 3401</td>
</tr>
</tbody>
</table>

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

**Materials & Finish**

<table>
<thead>
<tr>
<th>COMPONENT</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 (1.27 µM (0.050&quot;) MIN), CODE C OVER NICKEL UNDERPLATE IN ACCORDANCE WITH SAE-AMS-QQ-N-290 CLASS 2 (1.27 µM (0.050&quot;) TO 3.81 µM (0.150&quot;)</td>
</tr>
<tr>
<td>FEMALE CONTACT</td>
<td>COPPER ALLOY</td>
<td>HIGH-PHOSPHOROUS ELECTROLESS NICKEL PLATING – 25.4 µm MIN. 2.54 µm GOLD PLATING OVER NICKEL UNDERPLATING</td>
</tr>
<tr>
<td>METAL SHELL</td>
<td>ALUMINIUM ALLOY, TYPE 6061</td>
<td></td>
</tr>
<tr>
<td>PLASTIC INSERT / PCB TRAY</td>
<td>LIQUID CRYSTAL POLYMER, 30% LOADED GLASS FIBRE POLYESTER, 940°C, IN ACCORDANCE WITH MIL-M-24519 (200°C)</td>
<td></td>
</tr>
<tr>
<td>INTERFACIAL SEAL</td>
<td>FLUOROSILICONE RUBBER</td>
<td>HEAT-CURED TO MEET ECSS-G-76-71 A OUTGASSING REQUIREMENTS</td>
</tr>
<tr>
<td>HARDWARE</td>
<td>STAINLESS STEEL, 300 SERIES</td>
<td>PASSIVATION IN ACCORDANCE WITH SAE-AMS-2700</td>
</tr>
<tr>
<td>ENCAPSULANT</td>
<td>SPACE GRADE EPOXY RESIN</td>
<td></td>
</tr>
<tr>
<td>INSULATED WIRE</td>
<td>- POLYIMIDE INSULATED WIRE IN ACCORDANCE WITH ESCC 3901/002 - PTFE INSULATED WIRE IN ACCORDANCE WITH ESCC 3901/013 - ETPC INSULATED SILVER PLATED COPPER IN ACCORDANCE WITH SAE-AS22759/33</td>
<td></td>
</tr>
<tr>
<td>UNINSULATED WIRE</td>
<td>SOLID COPPER WIRES IN ACCORDANCE WITH QQ-W-343 TYPE &quot;S&quot; GOLD PLATED ACCORDING TO MIL-G-45204, CLASS 2 GRADE C OR D</td>
<td></td>
</tr>
</tbody>
</table>

**COMPONENT**

**MATERIAL**

**FINISH**

Micro-D & Nano-D connectors

**METAL SHELL**
- Nickel or gold plated shells for space applications.
- Supplied pre-wired and fully potted.

**IDENTIFICATION CODE**

<table>
<thead>
<tr>
<th>SERIES</th>
<th>MDSA: Micro-D Space AXON® connectors.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLATING</td>
<td>2: Nickel plated. 5: Gold plated.</td>
</tr>
<tr>
<td>NUMBER OF CONTACTS</td>
<td>9, 15, 21, 25, 31, 37, 51. See pages 26 &amp; 27 for contact arrangements.</td>
</tr>
<tr>
<td>GENDER</td>
<td>P: Male crimped contacts. S: Female crimped contacts.</td>
</tr>
<tr>
<td>Uninsulated wires: gold plated AWG2501.</td>
<td></td>
</tr>
<tr>
<td>NB: Other wires upon request.</td>
<td></td>
</tr>
<tr>
<td>Uninsulated wires or ESCC wires: BLANK (see wire descriptions and wire colours page 298).</td>
<td></td>
</tr>
<tr>
<td>WIRE LENGTH (in cm)</td>
<td>XXX = length in cm.</td>
</tr>
<tr>
<td>LAT Level to be indicated when ordering - see page 299</td>
<td></td>
</tr>
</tbody>
</table>

**METAL SHELL**
- Nickel or gold plated shells for space applications.
**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.
- S: 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 - 0.109".
- 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.

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

---

MICRO-D FOR SPACE APPLICATIONS

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

LEVEL 2 - Lot Acceptance

LEVEL 3 - None

Environmental mechanical subgroup

Endurance subgroup

LEVEL 1 - 5 Mated Connector Sets + 10 Contact Sets

LEVEL 2 - 2 Mated Connector Sets + 10 Contact Sets

LEVEL 3 - None

3 Connector Sets

2 Connector Sets

10 Contact Sets

Wiring §9.10 of ESCC3401

Wiring §9.10 of ESCC3401

Engagement / Separation Forces §9.28 of ESCC3401

Climatic Sequence §9.13 of ESCC3401

Rapid change of Temperature §9.16 of ESCC3401

Permanence of marking §9.19 of ESCC3401

Contact Retention §9.17 of ESCC3401

Corrosion §9.22 of ESCC3401

Endurance §9.18 of ESCC3401

Plating thickness §9.14 of ESCC3401

No failures allowed

No failures allowed

LEVEL 2 - Lot Acceptance

LEVEL 1 - Lot Acceptance
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>
</table>
### Electrical & mechanical characteristics

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<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>EA-364-70</td>
</tr>
<tr>
<td>CONTACT RESISTANCE</td>
<td>8 mΩ max.</td>
<td>EA-364-06</td>
</tr>
<tr>
<td>INSULATION RESISTANCE</td>
<td>5000 MΩ min. @ 500 Vc</td>
<td>EA-364-21</td>
</tr>
<tr>
<td>DIELECTRIC WITHSTANDING VOLTAGE</td>
<td>- SEA LEVEL 0 M - ALTITUDE 21 KM (70,000 FT)</td>
<td>EA-364-20</td>
</tr>
<tr>
<td></td>
<td>250 Vdc</td>
<td></td>
</tr>
<tr>
<td></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>EA-364-37</td>
</tr>
<tr>
<td>CONNECTOR MATING AND DE-MATING FORCE</td>
<td>283 g (10 oz) X 120</td>
<td>EA-364-13</td>
</tr>
<tr>
<td>CONTACT RETENTION</td>
<td>2.26 kg (5 lbs) for 5 seconds min.</td>
<td>EA-364-29</td>
</tr>
<tr>
<td>DURABILITY</td>
<td>500 mating cycles min.</td>
<td>EA-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>EA-364-28</td>
</tr>
<tr>
<td></td>
<td>TEST CONDITION IV</td>
<td></td>
</tr>
<tr>
<td>SHOCK</td>
<td>50 g’s - No discontinuity &gt;1µs</td>
<td>EA-364-27</td>
</tr>
<tr>
<td></td>
<td>TEST CONDITION E</td>
<td></td>
</tr>
<tr>
<td>SALT SPRAY</td>
<td>48 hours</td>
<td>EA-364-26</td>
</tr>
<tr>
<td></td>
<td>TEST CONDITION B</td>
<td></td>
</tr>
<tr>
<td>HUMIDITY</td>
<td>Insulation resistance &gt; 1MΩ</td>
<td>EA-364-31</td>
</tr>
<tr>
<td></td>
<td>TEST METHOD IV</td>
<td></td>
</tr>
</tbody>
</table>

### Materials & finish

<table>
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<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 (0.007µM (0.0003&quot;) MIN), CODE C OVER NICKEL UNDERPLATE IN ACCORDANCE WITH SAE-AMS-QQ-N290 CLASS 2 (0.027µM (0.001&quot;) TO 0.095µM (0.0035&quot;))</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, 5005 INCH MIN.</td>
</tr>
<tr>
<td>INSERTS</td>
<td>LIQUID CRYSTAL POLYMER, 30% LOADED GLASS FIBRE POLYESTER, 94V0, 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>UNSULLATED WIRE</td>
<td>AWG 28/1 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)
NANO-D FOR SPACE APPLICATIONS

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- BS (Board Straight) type .................................................. 316
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- SMV (Surface Mount Vertical) type .................................... 320
  PCB layout for BS 0.050" type ............................................. 322
  PCB layout for CBR 0.050" type ........................................ 323
  PCB layout for SMV 0.025" type ....................................... 324
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.
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.

### General Characteristics

#### Electrical & mechanical characteristics

<table>
<thead>
<tr>
<th>CHARACTERISTIC</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 Vrms</td>
<td>Para 9.1.2 OF ESCC 3401</td>
</tr>
<tr>
<td></td>
<td>- ALTITUDE 21 km (70,000 ft): 100 Vrms</td>
<td></td>
</tr>
<tr>
<td>CONTACT ENGAGING AND SEPARATION FORCE</td>
<td>1.39 N max. 0.11 N min.</td>
<td>Para 4.3.9 OF ESCC 3401/086</td>
</tr>
<tr>
<td>CONNECTOR MATING AND DEMATING FORCE</td>
<td>198 g (7 oz) x number of contacts max.</td>
<td>Para 9.20 OF ESCC 3401</td>
</tr>
<tr>
<td>CONTACT RETENTION</td>
<td>2.2 N min.</td>
<td>Para 9.17 OF ESCC 3401</td>
</tr>
<tr>
<td>DURABILITY</td>
<td>200 mating cycles min.</td>
<td>Para 9.18 OF ESCC 3401</td>
</tr>
<tr>
<td>TEMPERATURE RANGES</td>
<td>-55°C / +150°C</td>
<td>Para 9.11 OF ESCC 3401</td>
</tr>
<tr>
<td>VIBRATION</td>
<td>20 g’s - No discontinuity &gt;1μs</td>
<td>Para 9.12 OF ESCC 3401</td>
</tr>
<tr>
<td>SHOCK</td>
<td>50 g’s - No discontinuity &gt;1μs</td>
<td>Para 9.13 OF ESCC 3401</td>
</tr>
<tr>
<td>SALT SPRAY</td>
<td>48 hours</td>
<td>Para 9.22 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 IN ACCORDANCE WITH ASTM-B-477 OR SAE 541 OR SAE 562</td>
<td>NONE</td>
</tr>
<tr>
<td>FEMALE CONTACT</td>
<td>PRECIOUS GOLD ALLOY IN ACCORDANCE WITH ASTM-B-477 OR SAE 541 OR SAE 562</td>
<td>NONE</td>
</tr>
<tr>
<td></td>
<td>LEADED BRASS ALLOY CuZn9Pb2</td>
<td>GOLD PLATING IN ACCORDANCE WITH ASTM-B-488, TYPE II, CLASS 1 (1.27 µm MIN. (0.005&quot;)), CODE C OVER NICKEL UNDERPLATE IN ACCORDANCE WITH SAE-AMS-QQ-N-290, CLASS 2 (1.27 µm (0.050&quot;) TO 3.81 µm (0.150&quot;))</td>
</tr>
<tr>
<td>INSERT/ PCB TRAY</td>
<td>LIQUID CRYSTAL POLYMER, 30% LOADED GLASS FIBRE POLYESTER (94%), IN ACCORDANCE WITH MIL-M-24519 (200°C)</td>
<td></td>
</tr>
<tr>
<td>HARDWARE</td>
<td>STAINLESS STEEL, 300 SERIES PASSIVATION IN ACCORDANCE WITH SAE-AMS2700</td>
<td></td>
</tr>
<tr>
<td>ENCAPSULANT</td>
<td>SPACE GRADE EPOXY RESIN</td>
<td></td>
</tr>
<tr>
<td>INSULATED WIRE</td>
<td>CROSSLINKED ETFE INSULATED SILVER PLATED COPPER ALLOY IN ACCORDANCE WITH PARA 4.4 OF ESCC 3901/012</td>
<td></td>
</tr>
<tr>
<td>INTEGRAL TAIL</td>
<td>GOLD PLATED SOLID COPPER ALLOY IN ACCORDANCE WITH ASTM-B-194</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 ESCC3401/066 specification.

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

1ST CONNECTOR TYPE
P: Plug connector.
S: Receptacle connector*.
M: Panel mount receptacle connector*.

2ND CONNECTOR TYPE
P: Plug connector.
S: Receptacle connector.
W: No second connector - free wires*.

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

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

L in cm (inches) 5 ≤ L ≤ 10 10 < L ≤ 50 50 < L ≤ 100 L > 100
TOLERANCE -0 / +0.5 -0 / +3 -0 / +5 -0 / +5

HARDWARE 1ST CONNECTOR
P: Threaded hole #0-80 UNF (non removable jackposts, receptacle only).
R: Retractable short hex socket head jackcrews #0-80 UNF (semi-captivated, plug only).
L: Short hex socket head jackcrews #0-80 UNF (captivated, plug only).
V: Retractable short hex socket head jackcrews #0-80 UNF (semi-captivated, 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 jackcrews #0-80 UNF (semi-captivated, plug only).
L: Short hex socket head jackcrews #0-80 UNF (captivated, plug only).
V: Retractable short hex socket head jackcrews #0-80 UNF (semi-captivated, plug with backshell only).
X: Pigtail*.
B: No hardware*.

*: 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><strong>SHELL SIZE</strong></td>
<td><strong>L1 ±0.13 (±.005)</strong></td>
</tr>
<tr>
<td>9 P / 9 S</td>
<td>9.53</td>
</tr>
<tr>
<td>15 P / 15 S</td>
<td>11.43</td>
</tr>
<tr>
<td>21 P / 21 S</td>
<td>13.34</td>
</tr>
<tr>
<td>25 P / 25 S</td>
<td>14.61</td>
</tr>
<tr>
<td>31 P / 31 S*</td>
<td>16.51</td>
</tr>
<tr>
<td>37 P / 37 S</td>
<td>18.42</td>
</tr>
<tr>
<td>51 P / 51 S</td>
<td>22.86</td>
</tr>
</tbody>
</table>

*: Not included in ESCC specification

---

**DIMENSIONS**

Dimensions are in millimetres (inches).

1 centimetre = 10 millimetres = 0.393 inch
1 inch = 25.4 millimetres = 2.54 centimetres

**ELECTRICAL & MECHANICAL PERFORMANCE**

- **CURRENT RATING**: 1 A max.
- **CONTACT RESISTANCE**: 71 mΩ max.
- **INSULATION RESISTANCE**: 1000 MΩ min. @ 250 Vrms
- **DIELECTRIC WITHSTANDING VOLTAGE**: Sea level: 250 Vrms; 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)
- **PIN CONTACT**: Precious gold alloy
- **SOCKET CONTACT**: Precious gold alloy
- **ENCAPSULANT**: Epoxy resin
- **HARDWARE**: 300 series stainless steel, passivated

See page 311 for more information.
**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**

<table>
<thead>
<tr>
<th>SERIES</th>
<th>ND2SA: Nano-D Space application 2 row AXON. See below variants included in the ESCC3401/066 specification.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF CONTACTS</td>
<td>09, 15, 21, 25, 31*, 37, 51.</td>
</tr>
<tr>
<td>1st CONNECTOR TYPE</td>
<td>P: Plug connector.</td>
</tr>
<tr>
<td></td>
<td>S: Receptacle connector*.</td>
</tr>
<tr>
<td></td>
<td>M: Panel mount receptacle connector*.</td>
</tr>
<tr>
<td>2nd CONNECTOR TYPE</td>
<td>P: Plug connector.</td>
</tr>
<tr>
<td></td>
<td>S: Receptacle connector.</td>
</tr>
<tr>
<td></td>
<td>W: No second connector - free wires*.</td>
</tr>
</tbody>
</table>

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

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

**EMI FAMILY**

- E: Shielded pigtails or harnesses, shield soldered to the backshell.
- X: No shield (see page 312).

**WIRE CODE**

- W1: Single wire ESCC 3901/012 - Variant 07 (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*.

For colour code “W” see page 30

**WIRE LENGTH (in cm)**

Attention! Wire length in centimetres - (1cm = 10 mm = 0.394”).

**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 (captured, 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 (captured, 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
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>
<th>L5 ±0.13 (±.005)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 P / 9 S</td>
<td>9.53 .375</td>
<td>6.86 .345</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>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>23.49 .925</td>
<td>29.34 .159</td>
<td>26.43 .1041</td>
</tr>
</tbody>
</table>

*: not included in ESCC specification

**SUMMARY OF CHARACTERISTICS**

**ELECTRICAL & MECHANICAL PERFORMANCE**

- **CURRENT RATING**: 1 A max.
- **CONTACT RESISTANCE**: 71 mΩ max.
- **INSULATION RESISTANCE**: 1000 MO min. @ 250 V RMS
- **DIELECTRIC WITHSTANDING VOLTAGE**: Sea level: 250 Vrms, Altitude 21 km (70,000 ft); 100 V ac
- **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
- **BACKSHELL**: Aluminium alloy 6061 with nickel plating
- **MOULDED INSULATOR**: Liquid Crystal Polymer (LCP)
- **PIN CONTACT**: Precious gold alloy
- **SOCKET CONTACT**: Precious gold alloy
- **ENCAPSULANT**: Epoxy resin
- **HARDWARE**: 300 series stainless steel, passivated

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

<table>
<thead>
<tr>
<th>SERIES</th>
<th>ND2SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF CONTACTS</td>
<td>09, 15, 21, 25, 31, 37, 51.</td>
</tr>
<tr>
<td>CONNECTOR TYPE</td>
<td>S: Receptacle connector.</td>
</tr>
<tr>
<td>FAMILY</td>
<td>BS: AXON® Vertical PCB connector. Not included in the ESCC 3401/086 specification.</td>
</tr>
<tr>
<td>HARDWARE</td>
<td>P: Threaded hole #0-80 UNF (non removable jackposts).</td>
</tr>
<tr>
<td>TAIL PLATING</td>
<td>T: Tin lead plated 1µm minimum (63-37 alloy). G: Gold (not included in the ESCC specification).</td>
</tr>
<tr>
<td>TAIL LENGTH</td>
<td>1: 2.77 mm (0.109&quot;). 2: 3.56 mm (0.140&quot;). 3: 4.37 mm (0.172&quot;). 4: 2.29 mm (0.090&quot;). Tolerance ± 0.38 mm (0.015&quot;).</td>
</tr>
</tbody>
</table>

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 ±0.13 (.005)</td>
<td>6.86 ±0.27 (.010)</td>
<td>4.14 ±0.163 (.005)</td>
<td>4.32 ±0.17 (.005)</td>
</tr>
<tr>
<td>15 S</td>
<td>11.43 ±0.13 (.005)</td>
<td>8.76 ±0.345 (.013)</td>
<td>6.05 ±0.238 (.005)</td>
<td>6.22 ±0.245 (.005)</td>
</tr>
<tr>
<td>21 S</td>
<td>13.34 ±0.13 (.005)</td>
<td>10.67 ±0.420 (.013)</td>
<td>7.95 ±0.313 (.005)</td>
<td>8.13 ±0.320 (.005)</td>
</tr>
<tr>
<td>25 S</td>
<td>14.61 ±0.13 (.005)</td>
<td>11.94 ±0.470 (.013)</td>
<td>9.22 ±0.363 (.005)</td>
<td>9.40 ±0.370 (.005)</td>
</tr>
<tr>
<td>31 S</td>
<td>16.51 ±0.13 (.005)</td>
<td>13.84 ±0.545 (.013)</td>
<td>11.12 ±0.438 (.005)</td>
<td>11.30 ±0.445 (.005)</td>
</tr>
<tr>
<td>37 S</td>
<td>18.42 ±0.13 (.005)</td>
<td>15.75 ±0.620 (.013)</td>
<td>13.03 ±0.513 (.005)</td>
<td>13.21 ±0.520 (.005)</td>
</tr>
<tr>
<td>51 S</td>
<td>22.86 ±0.13 (.005)</td>
<td>20.19 ±0.795 (.013)</td>
<td>17.48 ±0.688 (.005)</td>
<td>17.65 ±0.695 (.005)</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.
- **DIELECTRIC WITHSTANDING VOLTAGE**: Sea level: 250 V rms. 
  Altitude 21 km (70,000 ft): 100 V ac.
- **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

**DIMENSIONS**

Dimensions are in millimetres (inches).
# 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

<table>
<thead>
<tr>
<th>ND2SA</th>
<th>25</th>
<th>S</th>
<th>CBR</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 EPL012.

**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.
  - Other versions available on request.

**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 (0.090"").
- 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).
**SUMMARY OF CHARACTERISTICS**

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<td>4.14 .163</td>
<td>4.32 .170</td>
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<td>6.05 .238</td>
<td>6.22 .245</td>
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</tbody>
</table>

*: not included in ESCC specification

**DIMENSIONS**

Dimensions are in millimetres (inches).

**ELECTRICAL & MECHANICAL PERFORMANCE**

<table>
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<tr>
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<th>VALUE</th>
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<td>MOULDED INSULATOR</td>
<td>Liquid Crystal Polymer (LCP)</td>
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<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
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>SERIES</th>
<th>ND2SA: Nano-D Space application 2 row AXON®. ESCC 3401/086 EPPL2.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF CONTACTS</td>
<td>09, 15, 21, 25, 31*, 37, 51.</td>
</tr>
<tr>
<td>CONNECTOR TYPE</td>
<td>S: Receptacle connector.</td>
</tr>
<tr>
<td>FAMILY</td>
<td>SMV: AXON® Vertical surface mount PCB connector.</td>
</tr>
<tr>
<td>HARDWARE</td>
<td>P: Threaded hole #0-80 UNF (non removable jackposts).</td>
</tr>
<tr>
<td>TAIL PLATING</td>
<td>T: Tin lead plated 1µm minimum (63-37 alloy). G*: Gold (not included in the ESCC specification).</td>
</tr>
<tr>
<td>TAIL LENGTH</td>
<td>1: 0.51 mm (0.020&quot;). 2: 1.02 mm (0.040&quot;). Tolerance ± 0.25 mm (0.010&quot;).</td>
</tr>
</tbody>
</table>

* not included in ESCC specification

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

**DIMENSIONS**
Dimensions are in millimetres (inches).

### SHELL SIZE

<table>
<thead>
<tr>
<th></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>9S</td>
<td>9.53 .375</td>
<td>6.86 .270</td>
<td>4.14 .163</td>
<td>4.32 .170</td>
</tr>
<tr>
<td>15S</td>
<td>11.43 .450</td>
<td>8.76 .345</td>
<td>6.05 .238</td>
<td>6.22 .245</td>
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<tr>
<td>21S</td>
<td>13.34 .525</td>
<td>10.67 .420</td>
<td>7.95 .313</td>
<td>8.13 .320</td>
</tr>
<tr>
<td>37S</td>
<td>18.42 .725</td>
<td>15.75 .620</td>
<td>13.03 .513</td>
<td>13.21 .520</td>
</tr>
<tr>
<td>51S</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

### 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

**ELECTRICAL & MECHANICAL PERFORMANCE**

- **CURRENT RATING**: 1 A max.
- **CONTACT RESISTANCE**: 71 mΩ max.
- **INSULATION RESISTANCE**: 1000 MΩ min. @ 250 Vrms
- **DIELECTRIC WITHSTANDING VOLTAGE**: Sea level: 250 Vrms, 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

**SEE CONTACT LAYOUT ON PCB PAGE 324 & 325**

[Diagram of connector dimensions]
### PCB Layout for CBR Type 0.050" Pitch - Female Connectors

**View A**

**Connector Mating Face**

**View B**

- **9 Contacts - View B**
- **21 Contacts - View B**
- **25 Contacts - View B**
- **31 Contacts - View B**
- **37 Contacts - View B**
- **51 Contacts - View B**

---

### Dimensions

<table>
<thead>
<tr>
<th>Contacts</th>
<th>View B</th>
<th>Dimensions</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td></td>
<td>2.16 (.085) REF</td>
<td>0.46 (.018) REF</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>2.16 (.085) REF</td>
<td>0.46 (.018) REF</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>2.16 (.085) REF</td>
<td>0.46 (.018) REF</td>
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<td>51</td>
<td></td>
<td>2.16 (.085) REF</td>
<td>0.46 (.018) REF</td>
</tr>
</tbody>
</table>

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**Front Face of the Flange**

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

SUGGESTED PAD CONFIGURATION

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