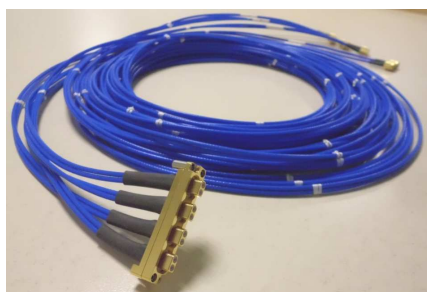
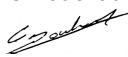
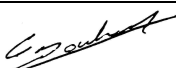


# High data rate connector and assembly "MDSA HDR" designed for space use.

## axoMach<sup>tm</sup>

Procurement specification:  
**"07072-ST-MDSA HDR -01"**



| Issue   | Date       | Author                                                                                          | Endorser                                                                                       | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------|------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Issue A | 17/11/2009 | G.Rouchaud<br> | S.Hermant<br> | Creation according to ESCC-3402 generic standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Issue B | 19/08/2010 |                |               | Corrections                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Issue C | 01/07/2011 |                |               | Corrections according to results from phase1 validation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Issue D | 25/05/2012 |                |               | <p>§ 1.2, page 4: Mass and mating-unmating forces moved to table 1(a)<br/>Working voltage increased to 250Vrms.</p> <p>§4.4.1 page27 : Nickel thickness modification for shells to 25µm Ni II.</p> <p>§4.4.3 page27 : addition of surface treatment of parallel gap contact.</p> <p>Pages 6 to 17 : Modification on Female and male connector shape (drawings)</p> <p>§ 4.5.4 page 31: Addition direct and indirect wiring.</p> <p>Add temperature correction for parameters: insertion resistance per meter, losses &amp; QF.</p> <p>Addition of figures 5(a) and 5(b).</p> |

## Table of Contents.

|                                                                                                                            |    |
|----------------------------------------------------------------------------------------------------------------------------|----|
| 1.) General .....                                                                                                          | 4  |
| 1.1) Scope : .....                                                                                                         | 4  |
| 1.2) Type variants .....                                                                                                   | 4  |
| 1.3) Maximum rating .....                                                                                                  | 4  |
| 1.4) Parameter derating information .....                                                                                  | 5  |
| 1.5) Physical dimension.....                                                                                               | 6  |
| 1.5.1) MDSA HDR connectors (Flight models).....                                                                            | 6  |
| 1.5.2) MDSA HDR SAVERS (not allowed for flight) .....                                                                      | 19 |
| 1.5.3) SMA QPL connectors & adaptor compatible.....                                                                        | 22 |
| 2.) Applicable documents : .....                                                                                           | 25 |
| 3.) Terms, Definition, Abbreviations, Symbol and Units .....                                                               | 25 |
| 4.) Requirements.....                                                                                                      | 25 |
| 4.1 General .....                                                                                                          | 25 |
| 4.2) Deviations from Generic specification ESCC 3401 .....                                                                 | 26 |
| 4.2.1) Deviations from Special in-process controls .....                                                                   | 26 |
| 4.2.2) Deviations from Final production test (Chart IIb) .....                                                             | 26 |
| 4.2.3) Deviations from burn-in and electrical measurements (Chart III) .....                                               | 26 |
| 4.2.4) Deviations from qualification tests (chart IV) .....                                                                | 26 |
| 4.2.5.) Deviations from Lot Acceptance tests (Chart V) .....                                                               | 26 |
| 4.3) Mechanical .....                                                                                                      | 27 |
| 4.3.1) Dimension Check .....                                                                                               | 27 |
| 4.3.2) Weight .....                                                                                                        | 27 |
| 4.3.3) Contact capability.....                                                                                             | 27 |
| 4.3.4) Contact retention in insert. ....                                                                                   | 27 |
| 4.3.5) Mating & Unmating Forces.....                                                                                       | 27 |
| The forces applied for the mating and unmating of the connectors shall conform to the values specified in Table 1(a). .... | 27 |
| 4.3.6) Insert retention in shell.....                                                                                      | 27 |
| 4.3.7) Engagement and separation Forces (male contact).....                                                                | 27 |
| 4.3.8) Gold plate thickness .....                                                                                          | 27 |
| 4.3.9) Jackscrew Retention .....                                                                                           | 27 |
| 4.4) Materials and finishes.....                                                                                           | 28 |
| 4.4.1) Shells .....                                                                                                        | 28 |
| 4.4.2) Contacts.....                                                                                                       | 28 |
| 4.4.3) Paralel gap terminations : .....                                                                                    | 28 |
| 4.4.4) Seals .....                                                                                                         | 28 |
| 4.4.5) Insulator .....                                                                                                     | 28 |
| 4.4.6) Shrinkable strain relief .....                                                                                      | 28 |
| 4.4.7) Cable (variant 04 to 12 only).....                                                                                  | 28 |
| 4.4.8) Magnetism level .....                                                                                               | 31 |
| 4.5) Marking .....                                                                                                         | 31 |
| 4.5.1) General.....                                                                                                        | 31 |
| 4.5.2) The ESCC Component Number.....                                                                                      | 31 |
| 4.5.3) Traceability information .....                                                                                      | 31 |
| 4.5.4) Characteristics .....                                                                                               | 31 |
| 4.5.4.1) Identification code .....                                                                                         | 32 |
| 4.5.4.2) Type of cable.....                                                                                                | 33 |
| 4.5.4.3) Terminating types on PCB .....                                                                                    | 34 |
| 4.6) Electrical requirements.....                                                                                          | 35 |
| 4.6.1) Electrical measurement at room temperature .....                                                                    | 35 |
| 4.6.2) Electrical measurements at High and low Temperatures .....                                                          | 38 |
| 4.6.3) Circuits for Electrical Measurements .....                                                                          | 38 |
| 4.6.4) Time domain measurements.....                                                                                       | 38 |
| 4.6.4.1) Uniformity of characteristic impedance. ....                                                                      | 38 |
| 4.6.4.2) Eye pattern analysis .....                                                                                        | 39 |
| 4.6.5.1) Insertion losses .....                                                                                            | 40 |
| 4.6.5.2) Return loss : VSWR.....                                                                                           | 40 |
| 4.6.5.3) Crosstalk : Far end(Fext), Near end(Next) (more than one way connector).....                                      | 40 |
| 4.7) Burn-in and electrical measurements .....                                                                             | 40 |
| 4.8) Environmental and endurance tests .....                                                                               | 42 |
| 4.8.1) Measurements and Inspections on Completion of Environmental Tests .....                                             | 42 |
| 4.8.2) Measurements and Inspections at Intermediate Points during Endurance Tests.....                                     | 42 |
| 4.8.3) Measurements and Inspections on Completion of Endurance Tests .....                                                 | 42 |
| 4.8.4) Condition for Operating Life Test (Part of Endurance Testing) .....                                                 | 42 |
| 4.8.5) Electrical Circuits for Operating Life test.....                                                                    | 42 |
| 4.8.6) Condition for High Temperature Storage Test (Part of Endurance Testing) .....                                       | 42 |



## 1.) General

### 1.1) Scope :

This specification details the rating, physical and electrical characteristics, test & inspection data for Axon' space grade high data rate micro d connector, non removable crimp type contacts. This connector is specifically designed for very high data rate assemblies.

It shall be read in conjunction with the ESCC Generic Specification N° 3401, Connectors, electrical, circular and Rectangular.

### 1.2) Type variants

The different sizes of the basic connector types are listed in the table below.

**Table 1(a) : Type variants**

| Variant | Type                              | Weight Max (g) | Contact sex | Mating Force (N Max) | Un mating force (N) |      | Accepted cable    | Comments           | Note |
|---------|-----------------------------------|----------------|-------------|----------------------|---------------------|------|-------------------|--------------------|------|
|         |                                   |                |             |                      | N Max               | Nmin |                   |                    |      |
| 01      | PCB-Panel connector female 1 way  | 3              | Female      | 5.6                  | 5.6                 | 0.4  | None              | Parallel gap       |      |
| 02      | PCB-Panel connector female 2 ways | 4              | Female      | 11.2                 | 11.2                | 0.8  | None              | Parallel gap       |      |
| 03      | PCB-Panel connector female 4 ways | 5              | Female      | 22.4                 | 22.4                | 1.6  | None              | Parallel gap       |      |
| 04      | In line connector male 1 way      | 13/5           | Male        | 5.6                  | 5.6                 | 0.4  | Ax2.4S : P840563  | In line            | (1)  |
| 05      | In line connector male 2 ways     | 23/7           | Male        | 11.2                 | 11.2                | 0.8  | Ax2.4S : P840563  | In line            | (1)  |
| 06      | In line connector male 4 ways     | 47/15          | Male        | 22.4                 | 22.4                | 1.6  | Ax2.4S : P840563  | In line            | (1)  |
| 07      | In line connector female 1 way    | 14/6           | Female      | 5.6                  | 5.6                 | 0.4  | Ax2.4S : P840563  | In line            | (1)  |
| 08      | In line connector female 2 ways   | 24/8           | Female      | 11.2                 | 11.2                | 0.8  | Ax2.4S : P840563  | In line            | (1)  |
| 09      | In line connector female 4 ways   | 49/16          | Female      | 22.4                 | 22.4                | 1.6  | Ax2.4S : P840563  | In line            | (1)  |
| 10      | PCB QFX connector female 1 way    | 5              | Female      | 5.6                  | 5.6                 | 0.4  | QFX086S : P540264 | SMD welding.       | (2)  |
| 11      | PCB QFX connector female 2 ways   | 8              | Female      | 11.2                 | 11.2                | 0.8  | QFX086S : P540264 | SMD welding.       | (2)  |
| 12      | PCB QFX connector female 4 ways   | 14             | Female      | 22.4                 | 22.4                | 1.6  | QFX086S : P540264 | SMD welding.       | (2)  |
| 13      | Saver 1 way                       | TBD            | NA          | 5.6                  | 5.6                 | 0.4  | None              | Not for flight use |      |
| 14      | Saver 2 ways                      | TBD            | NA          | 11.2                 | 11.2                | 0.8  | None              | Not for flight use |      |
| 15      | Saver 4 ways                      | TBD            | NA          | 22.4                 | 22.4                | 1.6  | None              | Not for flight use |      |

Note 1: XX / Y means:

- ✓ XX : Mass of a inline connector with an ax2.4S cable length of 300 mm. The mass of the ax2.4S cable is 15g/m max per cable e.g. 30g/m per way.
- ✓ Y : Mass of the connector alone (without cables).

Note 2: The mass of the QFX86S cable is 17g/m max per cable e.g. 8.5g/m per way.

### 1.3) Maximum rating

The maximum ratings, which shall not be exceeded at any time during use or storage, applicable to the connectors specified herein, are in Table 1(b).

**Table 1(b) : Maximum rating**

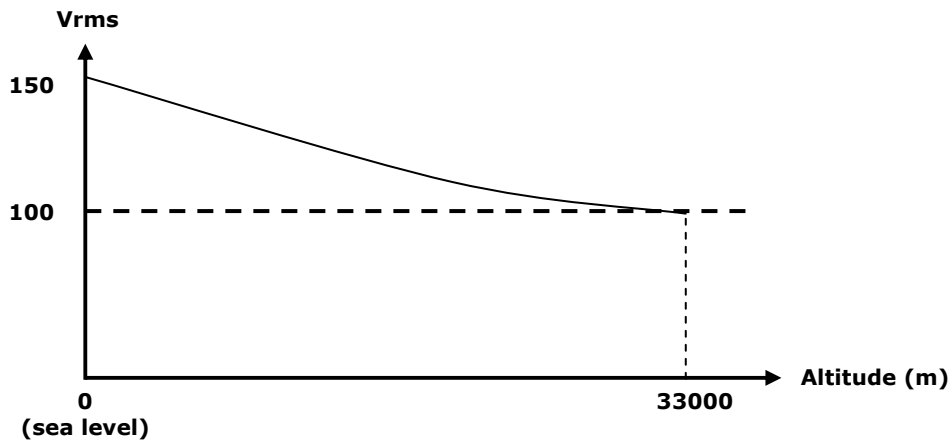
| N° | Characteristics             | Symbol | Maximum rating  |
|----|-----------------------------|--------|-----------------|
| 1  | Working voltage             | UR     | 150 Vrms        |
| 2  | Rated current :             | IR     | 3A              |
| 3  | Operating temperature range | Top    | -55°C to +125°C |
| 4  | Storage temperature range   | Tstg   | -55°C to +125°C |



#### **1.4) Parameter derating information**

The applicable derating information for the connectors specified herein is shown in figure 1

**Figure 1 – Parameter derating information**



**Working voltage versus Altitude**

**TECHNICAL SPECIFICATION  
OF MDSA HIGH DATA RATE  
CONNECTORS DESIGNED  
FOR SPACE USE  
"07072-ST-MDSA HDR-01" : Issue D**

**AXON'CABLE S.A.**

*Cable and interconnect systems  
for advanced technologies*  
ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL  
Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83  
Internet : <http://www.axon-cable.com>

**AXOBUS®**

Page 6/45

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

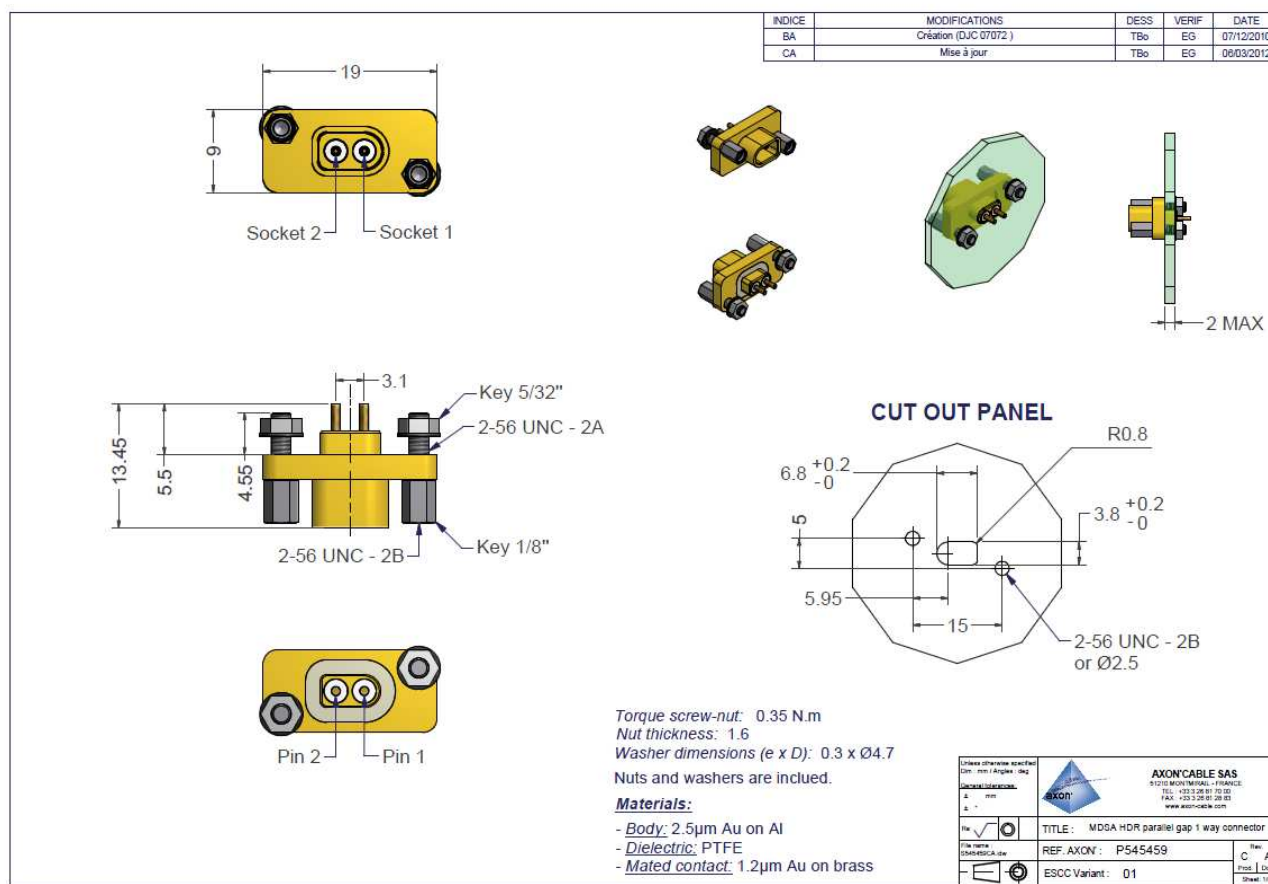
## 1.5) Physical dimension

The physical dimensions of the connectors specified herein are shown in the following figures 2x.

### 1.5.1) MDSA HDR connectors (Flight models)

**Figure 2(a) – PCB panel Female 1 way**

#### Variants: 01 :



**Note:** all dimensions are in mm



**TECHNICAL SPECIFICATION  
OF MDSA HIGH DATA RATE  
CONNECTORS DESIGNED  
FOR SPACE USE  
"07072-ST-MDSA HDR-01" : Issue D**

**AXON'CABLE S.A.**

Cable and interconnect systems  
for advanced technologies  
ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL  
Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83  
Internet : <http://www.axon-cable.com>

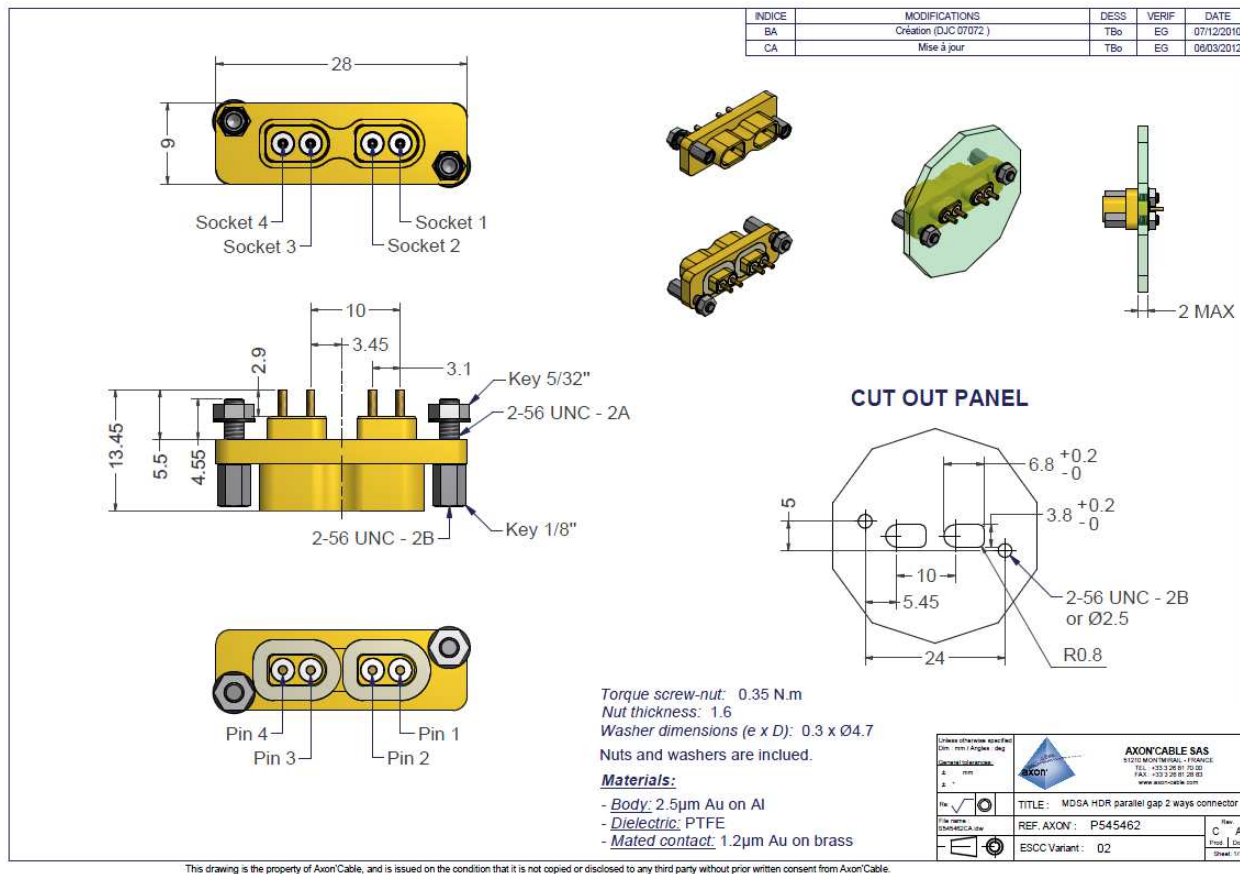
**AXOBUS°**

Page 7/45

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

**Figure 2(b) – PCB panel Female 2 ways**

**Variants: 02 :**



**Note:** all dimensions are in mm





**TECHNICAL SPECIFICATION  
OF MDSA HIGH DATA RATE  
CONNECTORS DESIGNED  
FOR SPACE USE  
"07072-ST-MDSA HDR-01" : Issue D**

**AXON'CABLE S.A.**

Cable and interconnect systems  
for advanced technologies  
ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL  
Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83  
Internet : <http://www.axon-cable.com>

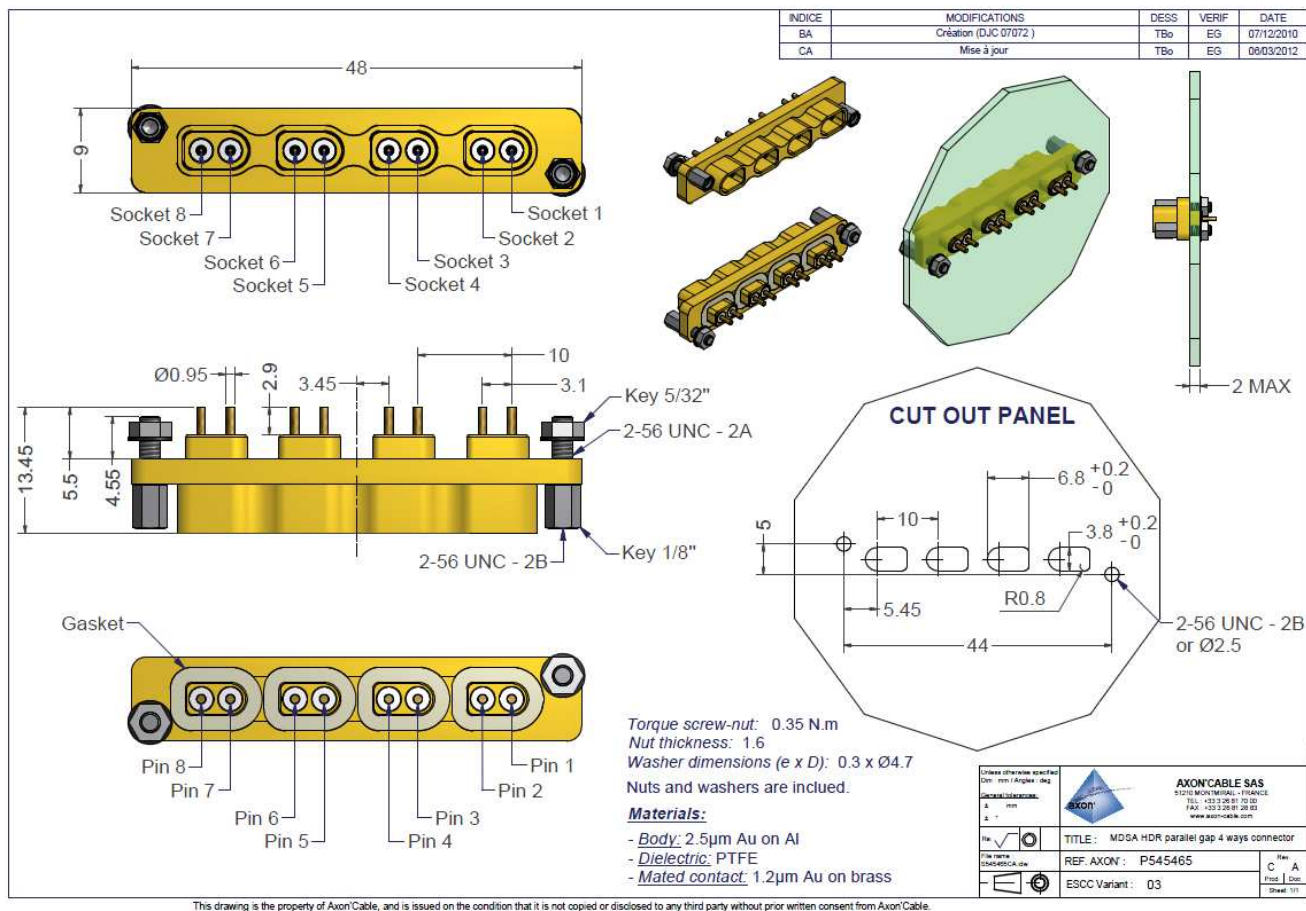
**AXOBUS°**

Page 8/45

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

**Figure 2(c) – PCB panel Female 4 ways**

**Variants: 03 :**



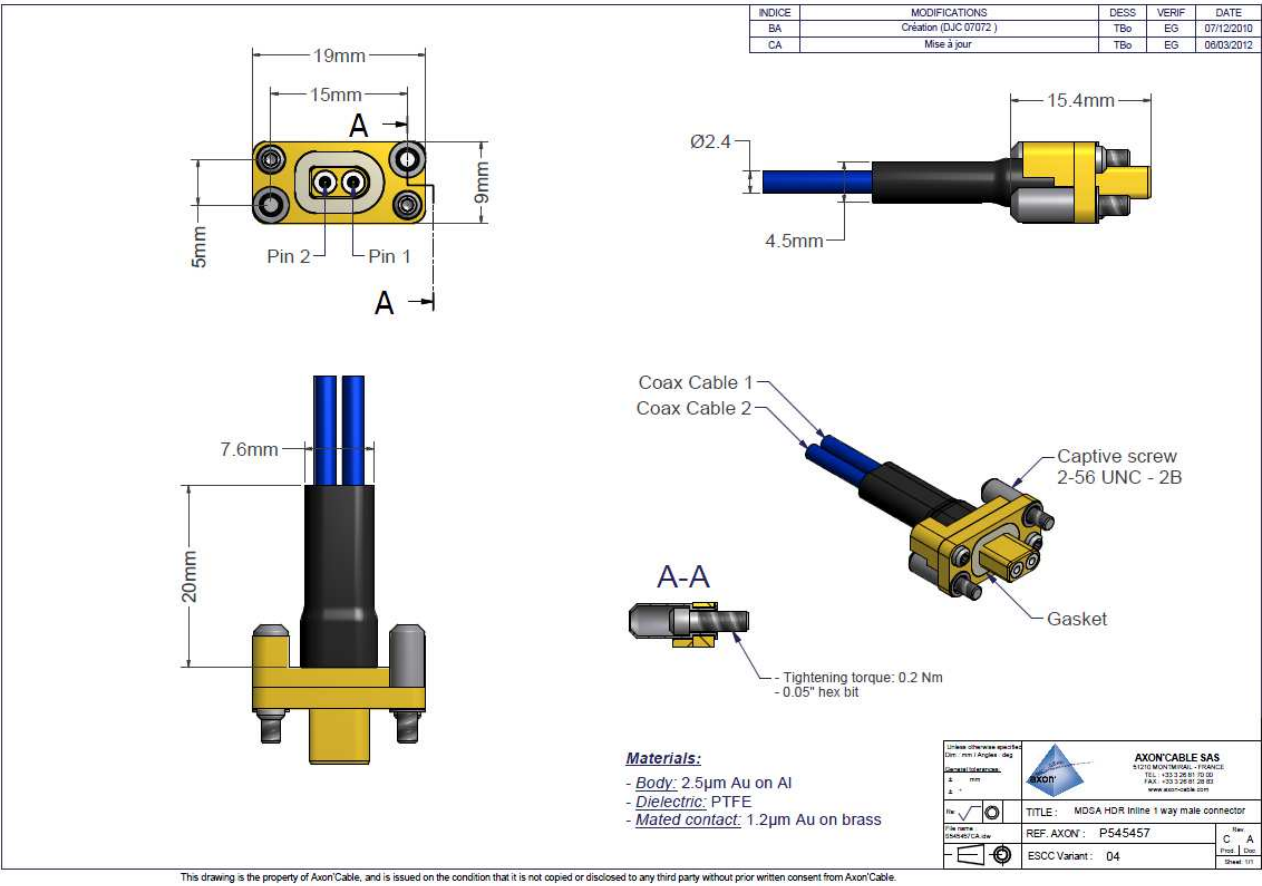
**Note:** all dimensions are in mm





**Figure 2(d) – In line connector Male 1 way**

**Variants: 04 :**



**Note:** all dimensions are in mm, the mating tightening torque is set to 0.2Nm.





**TECHNICAL SPECIFICATION  
OF MDSA HIGH DATA RATE  
CONNECTORS DESIGNED  
FOR SPACE USE  
"07072-ST-MDSA HDR-01" : Issue D**

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

**AXON'CABLE S.A.**

*Cable and interconnect systems  
for advanced technologies*

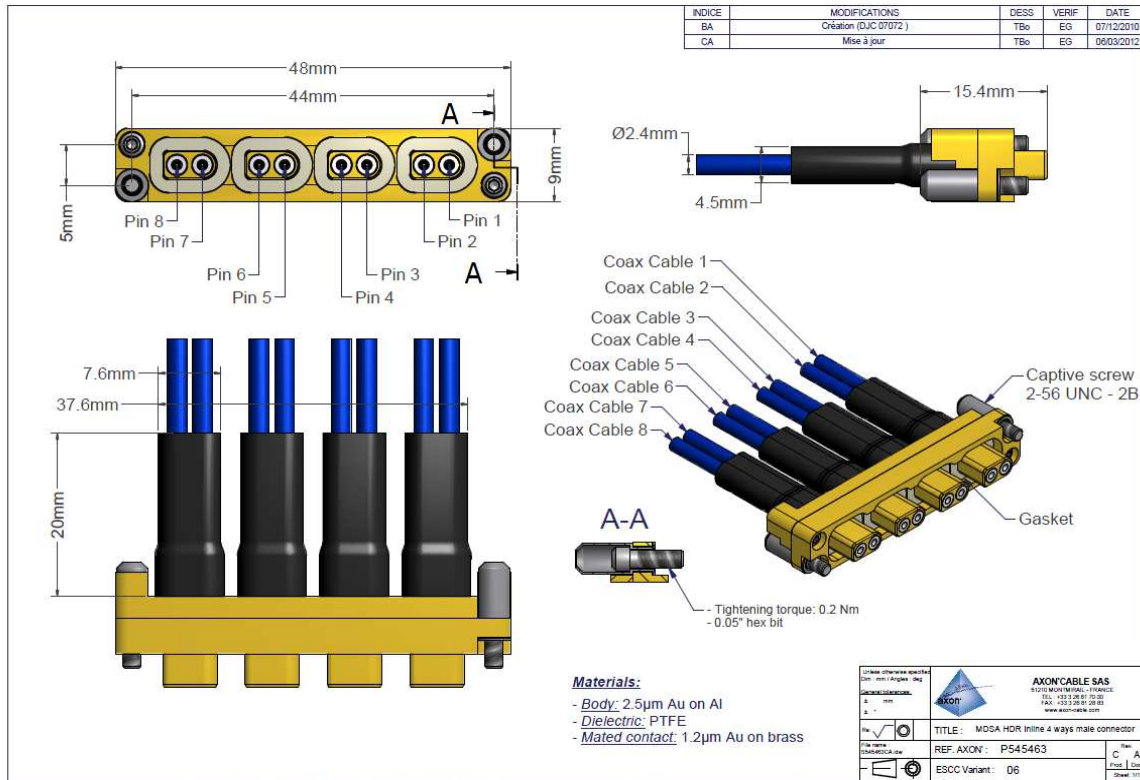
ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL  
Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83  
Internet : <http://www.axon-cable.com>

**AXOBUS°**

Page 11/45

**Figure 2(f) – In line connector Male 4 ways**

**Variants: 06 :**



**Note:** all dimensions are in mm, the mating tightening torque is set to 0.2Nm.



**TECHNICAL SPECIFICATION  
OF MDSA HIGH DATA RATE  
CONNECTORS DESIGNED  
FOR SPACE USE  
"07072-ST-MDSA HDR-01" : Issue D**

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

**AXON'CABLE S.A.**

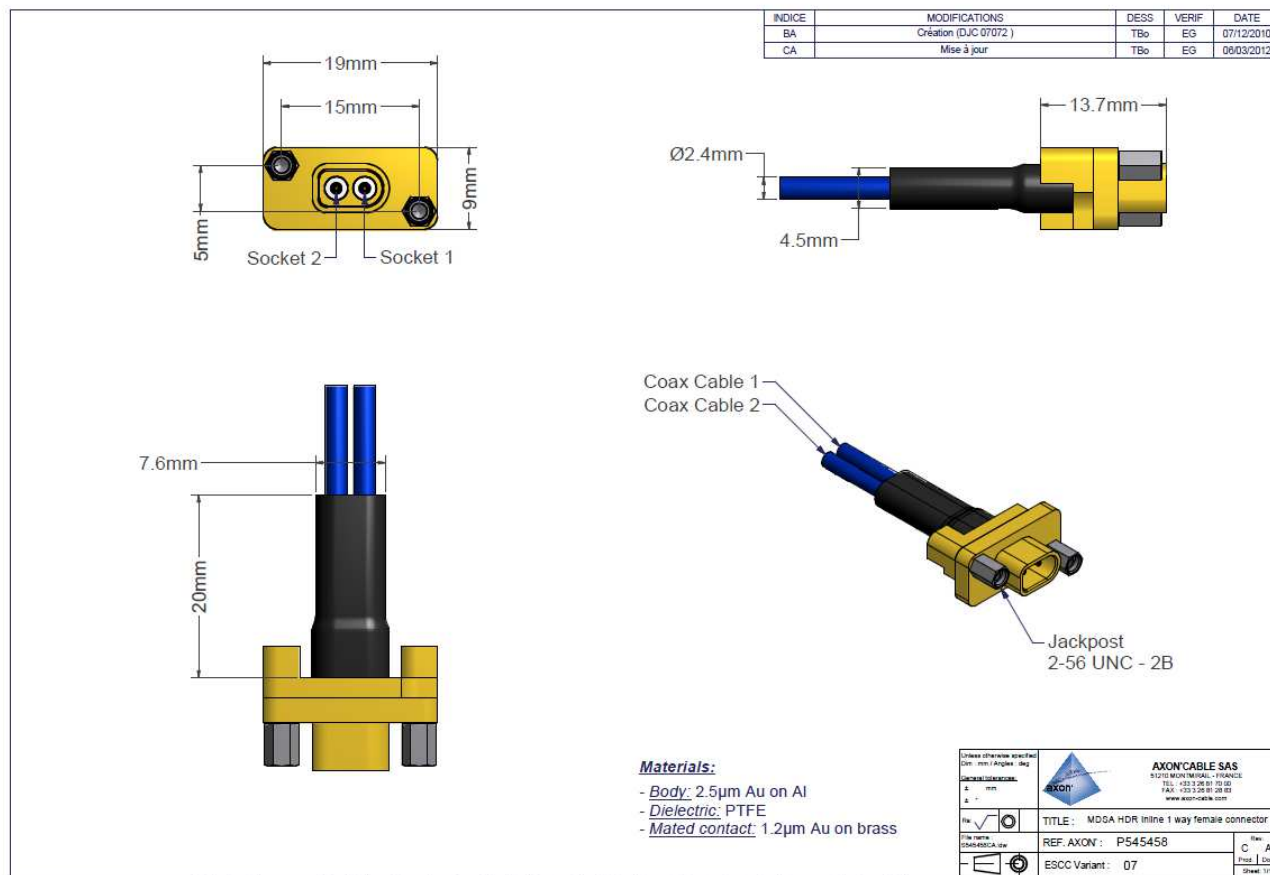
*Cable and interconnect systems  
for advanced technologies*  
ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL  
Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83  
Internet : <http://www.axon-cable.com>

**AXOBUS®**

Page 12/45

**Figure 2(q) – In line connector female 1 way**

**Variants: 07 :**



**Note:** all dimensions are in mm



**TECHNICAL SPECIFICATION  
OF MDSA HIGH DATA RATE  
CONNECTORS DESIGNED  
FOR SPACE USE**

**"07072-ST-MDSA HDR-01" : Issue D**

**AXON'CABLE S.A.**

*Cable and interconnect systems  
for advanced technologies*

ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL

Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83

Internet : <http://www.axon-cable.com>

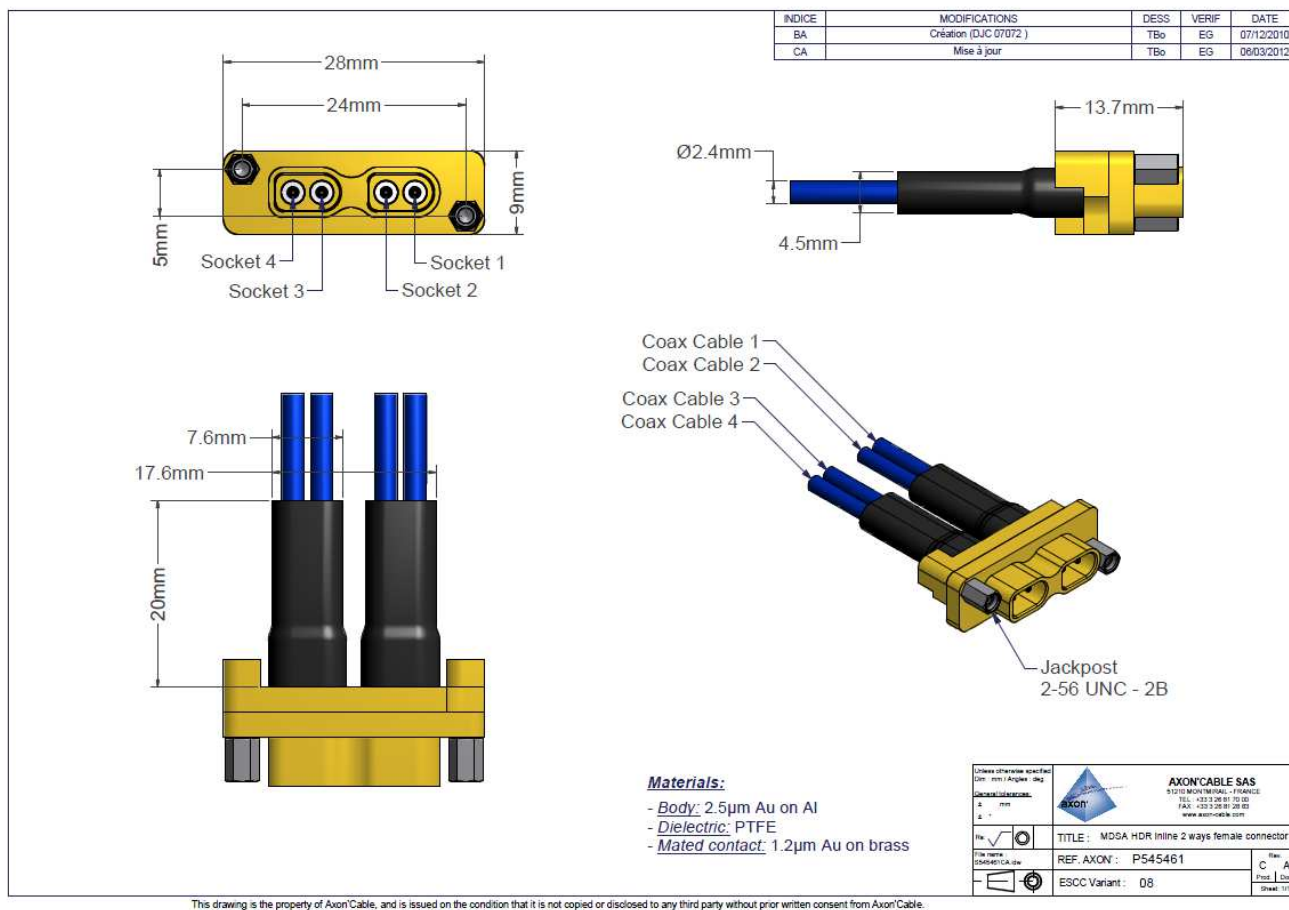
**AXOBUS®**

Page 13/45

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

**Figure 2(h) – In line connector female 2 ways**

**Variants: 08 :**



**Note:** all dimensions are in mm

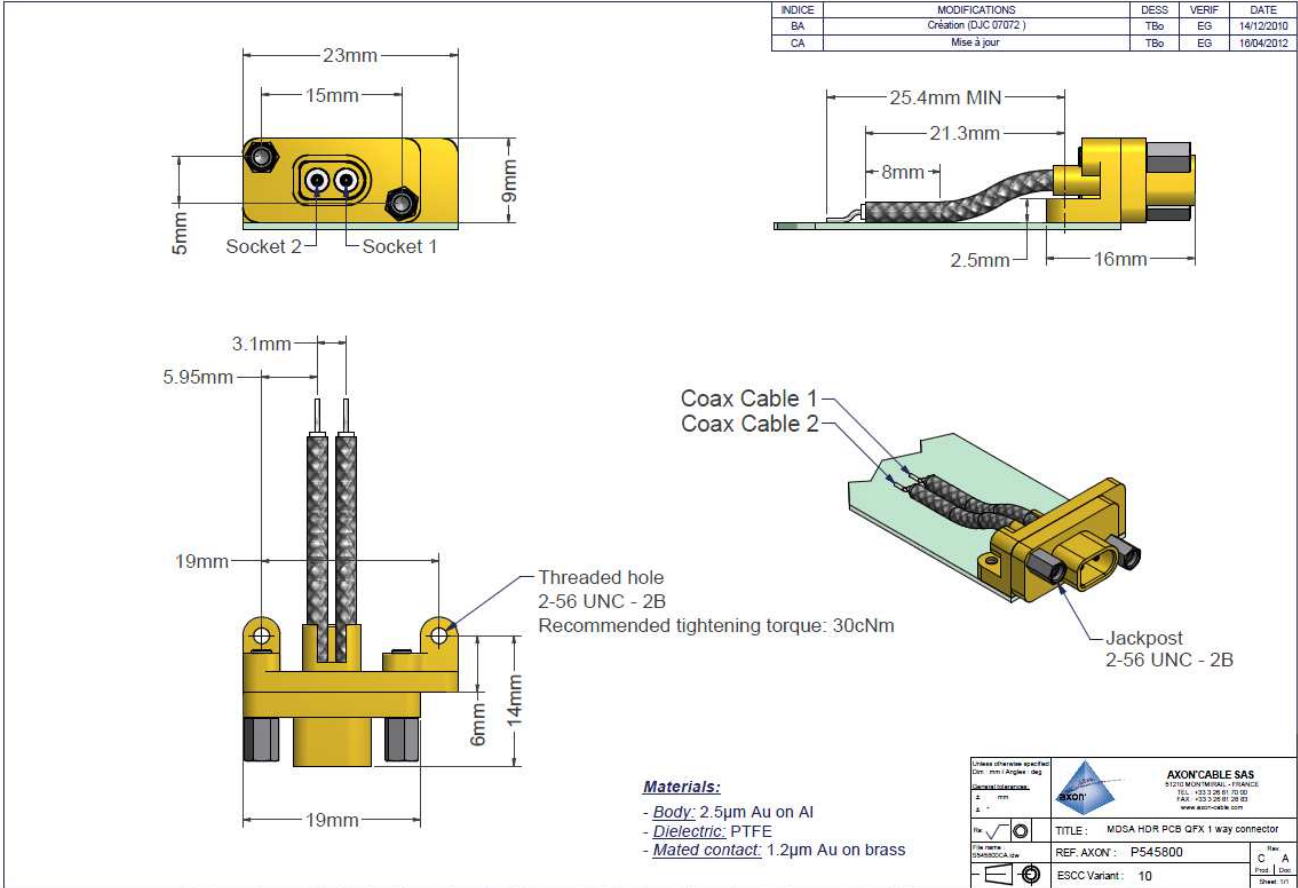






Figure 2(j) – PCB QFX connector female 1 way

Variants: 10 :

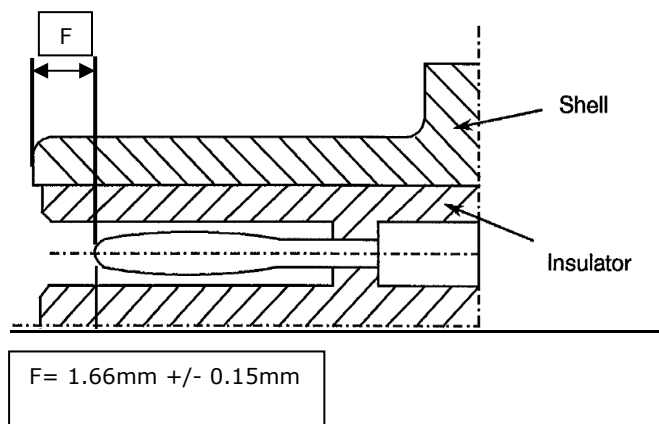




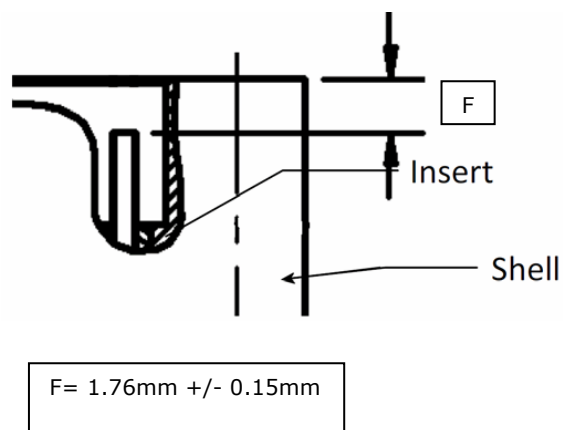




**Figure 3(a) – Plug male contact**



**Figure 3(b) – Receptacle female contact**



|                                                                                                                                                           |                                                                                                                                                                                                                                                                                               |                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <p><b>TECHNICAL SPECIFICATION<br/>OF MDSA HIGH DATA RATE<br/>CONNECTORS DESIGNED<br/>FOR SPACE USE</b></p> <p><b>"07072-ST-MDSA HDR-01" : Issue D</b></p> | <p><b>AXON'CABLE S.A.</b><br/> <i>Cable and interconnect systems<br/>for advanced technologies</i><br/> ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL<br/> Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83<br/> Internet : <a href="http://www.axon-cable.com">http://www.axon-cable.com</a></p> | <p><b>AXOBUS°</b><br/> Page 19/45</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

#### 1.5.2) MDSA HDR SAVERS (not allowed for flight)

#### **Figure 4(a) – Saver 1 way**

Variants 13 (1 way saver compatible with variants MDSA HDR 10-7-4-1)  
P549308 Draft version

Design not yet available



|                                                                                                                                                           |                                                                                                                                                                                                                                                                                               |                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <p><b>TECHNICAL SPECIFICATION<br/>OF MDSA HIGH DATA RATE<br/>CONNECTORS DESIGNED<br/>FOR SPACE USE</b></p> <p><b>"07072-ST-MDSA HDR-01" : Issue D</b></p> | <p><b>AXON'CABLE S.A.</b><br/> <i>Cable and interconnect systems<br/>for advanced technologies</i><br/> ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL<br/> Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83<br/> Internet : <a href="http://www.axon-cable.com">http://www.axon-cable.com</a></p> | <p><b>AXOBUS°</b><br/> Page 20/45</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

### **Figure 4(b) – Saver 2 ways**

Variants 14 (2 ways saver compatible with variants MDSA HDR 11-8-5-2)  
P549309 Draft version

Design not yet available



|                                                                                                                                                |                                                                                                                                                                                                                                                                                |                              |
|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>TECHNICAL SPECIFICATION<br/>OF MDSA HIGH DATA RATE<br/>CONNECTORS DESIGNED<br/>FOR SPACE USE</b><br><b>"07072-ST-MDSA HDR-01" : Issue D</b> | <b>AXON'CABLE S.A.</b><br><i>Cable and interconnect systems<br/>for advanced technologies</i><br>ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL<br>Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83<br>Internet : <a href="http://www.axon-cable.com">http://www.axon-cable.com</a> | <b>AXOBUS°</b><br>Page 21/45 |
|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

### **Figure 4(c) – Saver 4 ways**

Variants 15 (4 ways saver compatible with variants MDSA HDR 12-9-6-3)  
P549310 Draft version

Design not yet available



**TECHNICAL SPECIFICATION  
OF MDSA HIGH DATA RATE  
CONNECTORS DESIGNED  
FOR SPACE USE**

**"07072-ST-MDSA HDR-01" : Issue D**

**AXON'CABLE S.A.**

*Cable and interconnect systems  
for advanced technologies*

ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL

Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83

Internet : <http://www.axon-cable.com>

**AXOBUS°**

Page 22/45

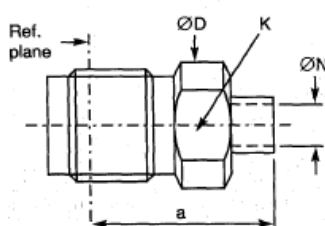
W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

1.5.3) SMA QPL connectors & adaptor compatible

**Figure 5(a) – SMA straigh Jack solder : type ESCC3402/002 variant 01**

SMA straigh Jack solder : type ESCC3402/002 variant 01

**VARIANT 01 - STRAIGHT JACK, SOLDER TYPE, FOR SEMI-RIGID CABLE Ø2.20mm (0.085")**

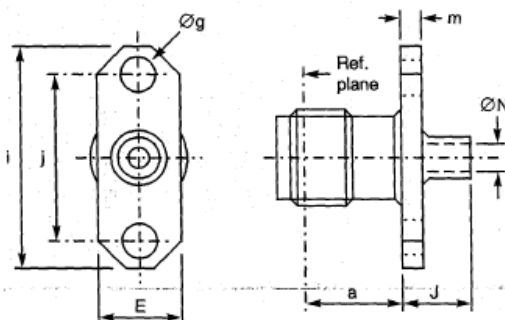


| SYMBOL | MILLIMETRES |       | NOTES   |
|--------|-------------|-------|---------|
|        | MIN.        | MAX.  |         |
| a      | 10.50       | 11.00 |         |
| ØD     | 6.60        | 6.80  |         |
| K      | -           | 6.00  | 2 flats |
| ØN     | 2.25        | 2.35  |         |

**Figure 5(b) – SMA straigh Jack solder : type ESCC3402/002 variant 09**

type ESCC3402/002 variant 09

**VARIANT 09 - STRAIGHT JACK, SOLDER TYPE, BACK MOUNTING, 2-HOLE, FLANGE-MOUNTED,  
FOR SEMI-RIGID CABLE Ø2.20mm (0.085")**



| SYMBOL | MILLIMETRES |       | NOTES   |
|--------|-------------|-------|---------|
|        | MIN.        | MAX.  |         |
| a      | 5.87        | 6.12  |         |
| E      | 5.50        | 5.80  |         |
| Øg     | 2.55        | 2.70  | 2 holes |
| i      | 15.90       | 16.10 |         |
| j      | 12.10       | 12.30 |         |
| J      | 4.60        | 5.00  |         |
| m      | 1.40        | 1.80  |         |
| ØN     | 2.25        | 2.35  |         |

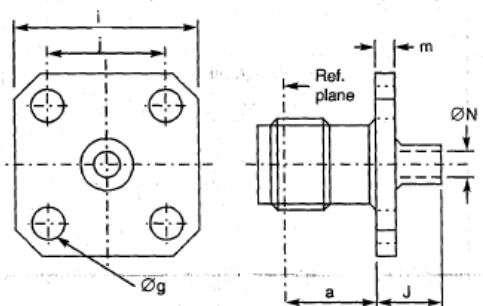
**NOTES**

1. Maximum panel thickness: 2.30mm.

**Figure 5(C) – SMA straigh Jack solder : type ESCC3402/002 variant 68**

type ESCC3402/002 variant 68

**VARIANT 68 - STRAIGHT JACK, SOLDER TYPE, BACK MOUNTING, FLANGE-MOUNTED,  
FOR SEMI-RIGID CABLE Ø2.20mm (0.085")**



| SYMBOL | MILLIMETRES |       | NOTES   |
|--------|-------------|-------|---------|
|        | MIN.        | MAX.  |         |
| a      | 5.87        | 6.12  |         |
| Øg     | 2.55        | 2.70  | 4 holes |
| i      | 12.60       | 12.80 |         |
| j      | 8.69        | 8.69  |         |
| J      | 4.60        | 5.00  |         |
| m      | 1.40        | 1.80  |         |
| ØN     | 2.25        | 2.35  |         |

**NOTES**

1. Maximum panel thickness: 2.30mm.



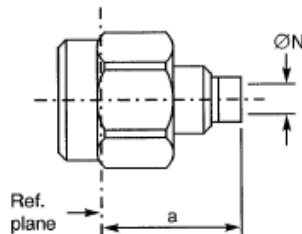


W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

**Figure 5(d) – SMA straight plug solder : type ESCC3402/001 variant 01**

SMA plug solder : type ESCC3402/001 variant 01

VARIANT 01 - STRAIGHT PLUG, SOLDER TYPE, FOR SEMI-RIGID CABLE Ø2.20mm (0.085")



| SYMBOL | MILLIMETRES |      |
|--------|-------------|------|
|        | MIN.        | MAX. |
| a      | 8.40        | 8.70 |
| ØN     | 2.25        | 2.35 |

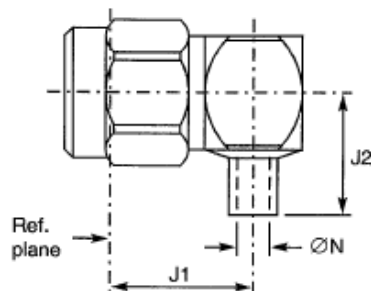
**NOTES**

1. Removable coupling nut.

**Figure 5(e) – SMA straight plug solder : type ESCC3402/001 variant 09**

type ESCC3402/001 variant 09

VARIANT 09 - RIGHT ANGLE PLUG, SOLDER TYPE FOR SEMI-RIGID CABLE Ø2.20mm (0.085")

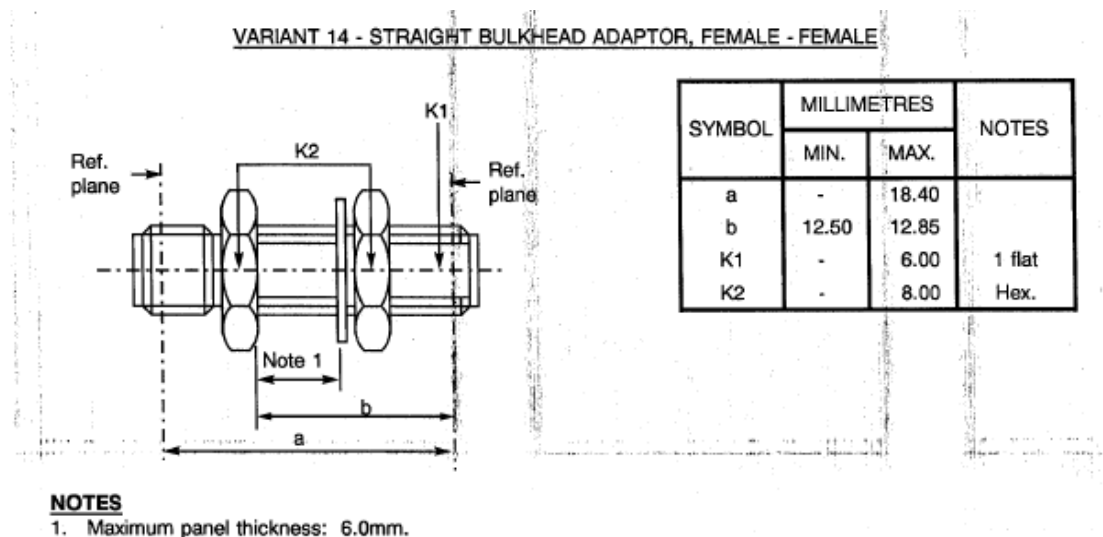


| SYMBOL | MILLIMETRES |       |
|--------|-------------|-------|
|        | MIN.        | MAX.  |
| J1     | 10.00       | 10.40 |
| J2     | 7.25        | 7.70  |
| ØN     | 2.25        | 2.35  |

**Figure 5(f) – Straigth bulkhead adaptor female-female : type ESCC3402/003 variant 14**

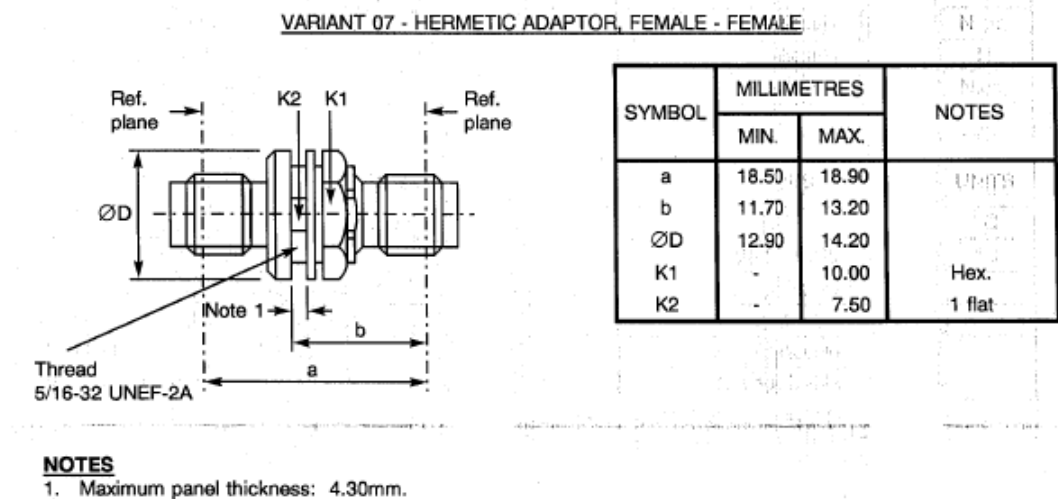
**Adaptors:**

Straight bulkhead adaptor female-female type ESCC3402/003 variant 14



**Figure 5(g) – Straigth bulkhead adaptor female-female : type ESCC3402/003 variant 07**

Straight bulkhead hermetic adaptor female-female type ESCC3402/003 variant 07



## 2.) Applicable documents :

The documents given in the table below form part of this specification and shall be read in conjunction with it:

|    |                                |                                                                         |
|----|--------------------------------|-------------------------------------------------------------------------|
| a) | ESCC 3401                      | Connectors, Electrical, Circular and Rectangular                        |
| b) | ESCC 3401/029                  | Connectors, Electrical, Rectangular, Microminiature based on type MDM.  |
| c) | ESCC 3402                      | Connectors RF coaxial.                                                  |
| d) | ESCC 3401/032                  | Accessories for Connectors, Microminiature for 3401/029                 |
| e) | IEC 96-1                       | Generic specification for radio frequency and coaxial cable assemblies. |
| f) | MIL-G-45204                    | Gold plating, Electro-deposited                                         |
| g) | MIL-C-14550                    | Copper plating, Electro-deposited                                       |
| h) | MIL-PRF-83513                  | Connectors, Electrical, Rectangular, Microminiature, polarised shell    |
| i) | MIL-STD-1344                   | General environmental tests                                             |
| j) | MIL-STD-202 F                  | Test methods for electronic and electrical component parts              |
| k) | AFNOR NF A02-009 or ASM C38500 | Surface treatment for body and ferule                                   |
| l) | MIL-G-45204,                   | Gold plating, electro-deposited                                         |
| m) | ASTM B488                      | Surface treatment for contact                                           |

## 3.) Terms, Definition, Abbreviations, Symbol and Units

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic specification N° 21300 shall apply.

MDSA : axon' micro D range of connector for space applications.

HDR : High Data Rate.

HDR tests: Test relative to high data rate assembly : Eye pattern see §4.6.4, Zc, insertion losses return loss.

## 4.) Requirements

### 4.1 General

The complete requirements for procurement of the connectors specified herein are stated in this specification and ESCC Generic specification N° 3401 for Connectors, Electrical, Circular and Rectangular. Deviations from the generic specifications are listed below.



#### **4.2) Deviations from Generic specification ESCC 3401**

MDSA HDR connectors are used for high data rate signals therefore some tests or requirements are not applicable. Working voltage and current levels are very low.

##### **4.2.1) Deviations from Special in-process controls**

(a) § 9.15 :

For variant 04 to 09, the contacts shall be crimped to the inner conductor of coaxial cable Ax 2.4 (axon' part number P840563).

For variant 01 to 03, the contacts shall be crimped to special uninsulated solid copper alloy piece (parallel gap termination).

For variant 10 to 12, the contacts shall be crimped to the inner conductor of a coaxial cable QFX 086S (axon' part number P540264).

The two cables shields are tin welded in the backshell input funnel with ESA ECSS Q70-08-A.

The value of failure shall be recorded together with the information as to whether the failure was pull-out, break in crimp or break in wire. The minimum tensile strength will be as follows :

|                      |                                                |                     |
|----------------------|------------------------------------------------|---------------------|
| Wire                 | AWG2401 inner conductor of<br>Ax2.4 & QFX 0.86 | Copper alloy piece. |
| Tensile strength (N) | 30N                                            | 30N                 |

##### **4.2.2) Deviations from Final production test (Chart IIb)**

(a) §. 9.4, Contact capability: this test is done on the male contacts. For details see §4.3.3 of this specification

(b) §. 9.5, magnetism level: not applicable

(e) §. 9.8: Installation of contacts into inserts: Not applicable for non removable contacts.

(c) §. 9.9: Seal test: Not applicable

##### **4.2.3) Deviations from burn-in and electrical measurements (Chart III)**

None : chart III is not applicable.

##### **4.2.4) Deviations from qualification tests (chart IV)**

(a) § 9.9 : seal test: not applicable (not hermetic connector)

(b) § 9.15 : Joint Strength : Not applicable.

(c) § 9.17 : Contact retention in insert : Not applicable for male contact (twist pin technology).

(d) § 9.19 : Permanence of marking: not applicable.

(e) §9.26 : Overload test : not applicable .

(f) § 9.27 : Maintenance aging : Not applicable for non removable contacts.

(g) § 9.29 : Oversize pin exclusion : Not applicable.

(h) § 9.30 : Probe damage : Not applicable.

Addition of HDR tests: See §4.6.4, §4.6.5 & table 2.

- on group I : after wiring and after climatic sequence
- on group 2 : after wiring and after endurance
- on group 3 : after wiring and after corrosion
- on group 4 : after wiring and maintenance aging.

##### **4.2.5.) Deviations from Lot Acceptance tests (Chart V)**

a) § 9.9 : seal test: not applicable (not hermetic connector)

b) § 9.15 : Joint Strength : Not applicable

c) § 9.17 : Contact retention in insert. Not applicable for male contact (twist pin technology) and for female on lat 3 (too fragile).

d) § 9.19 : Permanence of marking: not applicable

e) § 9.27 : Maintenance aging : Not applicable for non removable contacts.

f) § 9.29 : Oversize pin exclusion : Not applicable.

g) § 9.30 : Probe damage : Not applicable.

h) Addition of HDR tests: See §4.6.4 & table 2.



### **4.3) Mechanical**

#### **4.3.1) Dimension Check**

The dimension of the connectors specified herein shall be verified in accordance with the requirements set out in Para. 9.6 of ESCC Generic Specification N° 3401 and shall conform to those shown in figure 2.

#### **4.3.2) Weight**

The maximum weight of the connectors specified herein shall be calculated on the basis of, and be in accordance with the values given in table 1 (a) of this specification

#### **4.3.3) Contact capability**

| Measurements              | Pick-up Weight | Drop Weight |
|---------------------------|----------------|-------------|
| Weight (g)                | 14             | 170         |
| Inner gauge diameter (mm) | 0.582-0.587    | 0.559-0.564 |
| Insertion Depth (mm)      | 1.5            | 1.5         |

#### **4.3.4) Contact retention in insert.**

Contact retention within the insert is more than 22.25N with no displacement of contact.  
Not applicable for male contact (twist pin technology).  
Not applicable for male and female for LAT 3.

#### **4.3.5) Mating & Unmating Forces**

The forces applied for the mating and unmating of the connectors shall conform to the values specified in Table 1(a).

#### **4.3.6) Insert retention in shell**

Connectors shall withstand a pressure of 34.4N/cm<sup>2</sup> applied on the mating side of the rear side. Each PTFE insert is around 0.051cm<sup>2</sup>, so the requirement is 1.8N for each insert.

#### **4.3.7) Engagement and separation Forces (male contact)**

The contact engagement and separation forces of the male contact shall be tested to a depth of 1.4mm with the applicable test gauge fixtures specified in the figure 4 of ESCC3401/029 and shall not exceed the values of the table below.

| Measurements      | Inner diameter (mm) |       | Force (N) |
|-------------------|---------------------|-------|-----------|
|                   | Min.                | Max.  |           |
| Max gauge fixture | 0.559               | 0.564 | 1.667 Max |
| Min gauge fixture | 0.582               | 0.587 | 0.140 Min |

#### **4.3.8) Gold plate thickness**

The thickness of the gold plate deposited on the contacts specified herein shall be checked and meet the requirements of Subpara.4.4.2. Measurements shall be performed on active parts as specified in Figure 2(f).

#### **4.3.9) Jackscrew Retention**

Not applicable.



|                                                                                                                                                                                         |                                                                                                                                                                                                                                                                      |                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <p align="center"><b>TECHNICAL SPECIFICATION<br/>OF MDSA HIGH DATA RATE<br/>CONNECTORS DESIGNED<br/>FOR SPACE USE</b></p> <p align="center"><b>"07072-ST-MDSA HDR-01" : Issue D</b></p> | <p align="center"><b>AXON'CABLE S.A.</b><br/> <i>Cable and interconnect systems<br/>for advanced technologies</i><br/> ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL<br/> Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83<br/> Internet : http://www.axon-cable.com</p> | <p align="center"><b>AXOBUS°</b><br/> Page 28/45</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

#### **4.4) Materials and finishes**

Materials and finishes shall be as specified herein. Where a definite material is not specified, a material, which will enable the connectors, specified herein to meet the performance requirements of this specification shall be used. Acceptance or approval of any constituent material does not guarantee acceptance of the finished product.

##### **4.4.1) Shells**

Shells are done with aluminium alloy 6061 in accordance with SAE AMS-QQ-A-200/8 or 250/11.

The plating is gold over an electroless nickel underlay.

The gold plating thickness shall be 2.54 µm minimum.

The electroless nickel plating thickness shall be 25µm minimum.

##### **4.4.2) Contacts**

###### **Female contact :**

The contact body shall be made of copper alloy with an underplate of 1 µm minimum of copper to MIL-C-14550, gold plated with 1.27µm minimum of gold, type 2 Grade C of MIL-G-45204.

Measurements of thickness shall be performed at a distance of 1.5mm from the engagement end.

###### **Male contact :**

The contact body and the bundle shall be made of copper alloy with an underplate of 1.0 µm minimum of copper to MIL-c-14550, gold plated with 1.27 minimum of gold, Type 2, grade C of MIL-G-45020.

Measurements of thickness shall be performed at a distance of 1.5mm from the engagement end.

##### **4.4.3) Parallel gap terminations :**

The contact body shall be made of copper alloy CuZn39Pb2 with a first underplate of 1.0 µm minimum of copper to MIL-C-14550, with a underplate of 2µm minimum of Nickel gold plated with 1.27µm minimum of gold, type 2 Grade C of MIL-G-45204.

Measurements of thickness shall be performed at a distance of 1.5mm from the engagement end.

##### **4.4.4) Seals**

Interfacial seals shall be made of conductive (base copper + silver) silicone base rubber.

Connector to backshell interface seal is made of conductive (base copper + silver) silicone base rubber.

Resistivity shall be less than 5mΩcm. Continuous operating temperature -55°C to + 125°C.

##### **4.4.5) Insulator**

The insulator parts shall be made of PTFE.

##### **4.4.6) Shrinkable strain relief**

The shrinkable strain relief shall be made of VITON

##### **4.4.7) Cable (variant 04 to 12 only)**

For variant 04 to 09 the cable used is expanded PTFE coaxial cable AX2.4S (axon' part number : P840563). PFA jacketed, silver plated braid and tape over expanded PTFE insulated conductor. Silver plated copper conductor.

The plating thickness of inner conductors shall be greater than 2µm.

For variant 10 to 12 the cable used is a PTFE coaxial cable QFX086 (axon' part number P540264). Lead tin plated according to ECSS-Q-70-71 on silver plated braid and tape over solid PTFE insulated conductor. Silver plated copper clad steel single conductor.

The silver plating thickness of all conductors shall be greater than 2µm.



**TECHNICAL SPECIFICATION  
OF MDSA HIGH DATA RATE  
CONNECTORS DESIGNED  
FOR SPACE USE  
"07072-ST-MDSA HDR-01" : Issue D**

**AXON'CABLE S.A.**

*Cable and interconnect systems  
for advanced technologies*  
ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL  
Tel : 03 26 81 70 00 : Fax : 03 26 81 28 83  
Internet : <http://www.axon-cable.com>

**AXOBUS®**

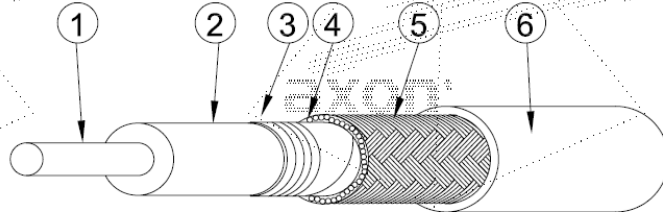
Page 29/45

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

Drawing of the expanded PTFE coaxial cable AX2.4S (axon' part number : P840563)

**COAXIAL COMPOSITION :**

1. Conductor AWG 2401
  - Material: silver plated copper, 2 µm mini
  - Single strand Ø0.51 mm
  - Area: 0.205 sqmm nom.
  - Resistance : 10 Ω/100.m max @ 20°C
2. Dielectric: extruded CELLOFLON®
  - Diameter: 1.51 mm nom.
  - Color: natural
3. Silver plated copper tape
4. Polyimide tape
5. Silver plated copper shielding braid, 2 µm mini
  - Strands Ø0.063 mm
  - Diameter over braid=1.92 mm nom
6. PFA jacket
  - diameter: 2.40 mm nom
  - color: blue



**GENERAL CHARACTERISTICS:**

Outer diameter: 2.40 mm nom.  
Approximate weight: 16 g/m  
Nominal impedance: 50 ohms  
Nominal capacitance: 87 pF/m  
Temperature rating: -65°C à +150°C  
Attenuation: 0.70 dB/m @ 1GHz Max  
1.20 dB/m @ 5 GHz Max  
2.20 dB/m @ 10 GHz Max  
3.05 dB/m @ 18 GHz Max

**DOCUMENT NOT VALID FOR MANUFACTURING**

|                                                        |                            |                                                                                                                                                                       |                                                       |
|--------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| SAUF INDICATION CONTRAIRE<br>DIMENSIONS EN MILLIMÈTRES |                            | <b>AXON'CABLE SA</b><br>51210 MONTMIRAIL - FRANCE<br>TEL : +33 3 26 81 70 00<br>FAX : +33 3 26 81 28 83<br><a href="http://www.axon-cable.com">www.axon-cable.com</a> |                                                       |
| N client<br>XXXXX                                      | CAO N°<br>S840563A_ENG.dwg | Titre :<br><b>Coaxial AXOWAVE 2.4 2 microns</b><br><b>P840563</b>                                                                                                     |                                                       |
|                                                        |                            | Format :<br>A4                                                                                                                                                        | N. AXON'<br>Indice<br>B Prod.<br>A Doc.<br>Page : 1/1 |

Ce document est la propriété de la société Axon'Cable et ne peut être ni reproduit ni communiqué à des tiers sans autorisation écrite d'une personne mandatée spécialement à cet effet par la dite société.





**TECHNICAL SPECIFICATION  
OF MDSA HIGH DATA RATE  
CONNECTORS DESIGNED  
FOR SPACE USE  
"07072-ST-MDSA HDR-01" : Issue D**

**AXON'CABLE S.A.**

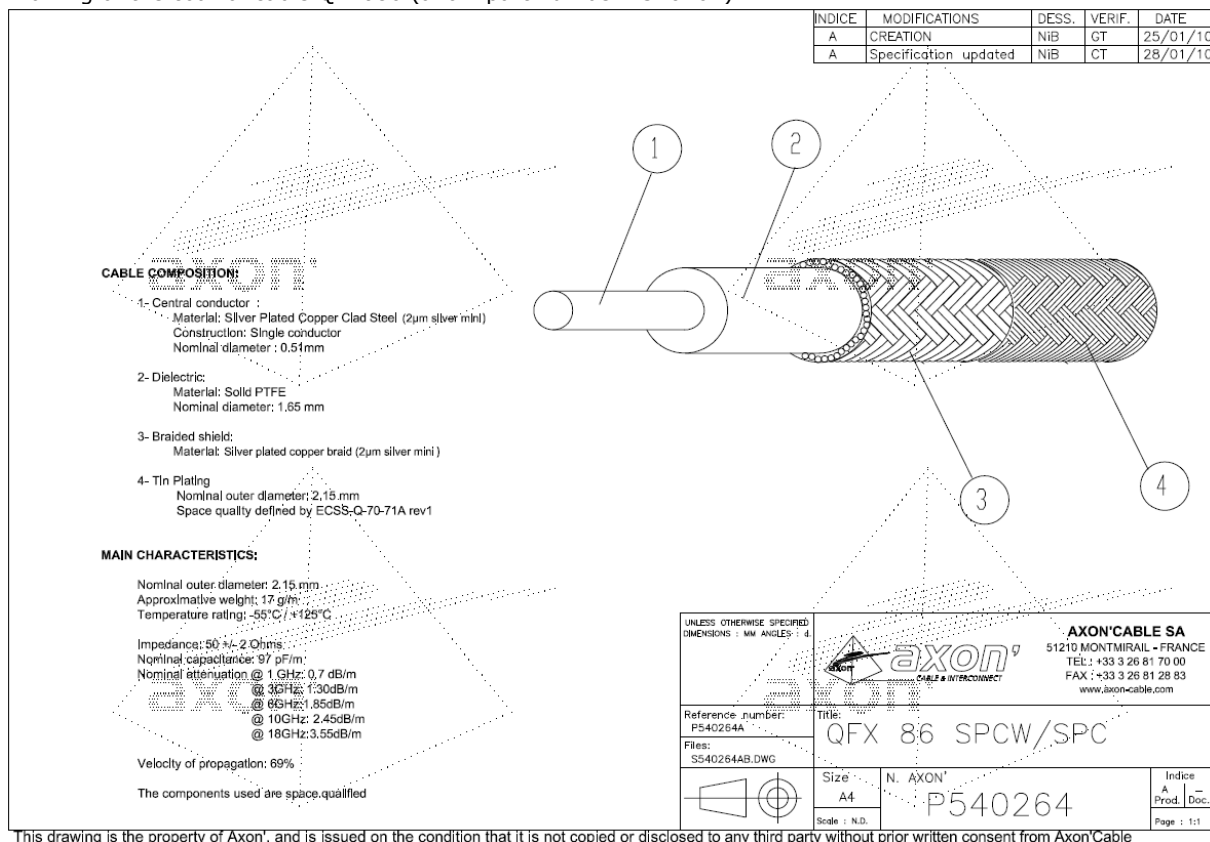
*Cable and interconnect systems  
for advanced technologies*  
ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL  
Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83  
Internet : <http://www.axon-cable.com>

**AXOBUS°**

Page 30/45

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

Drawing of the coaxial cable QFX086 (axon' part number P540264)



This drawing is the property of Axon', and is issued on the condition that it is not copied or disclosed to any third party without prior written consent from Axon'Cable



#### 4.4.8) Magnetism level

No maximum value is specified.

### 4.5) Marking

#### 4.5.1) General

The marking of all components delivered to this specification shall be in accordance with the requirements of ESCC Basic specification N° 21700 and the following subparagraphs. These components are too small to accommodate the marking as specified hereafter; the marking requirements in full shall accompany each lot of components in its primary package. Such marking shall comprise:

- (a) The part number
- (b) Traceability Information
- (c) Quantity of components

#### 4.5.2) The ESCC Component Number

None.

#### 4.5.3) Traceability information

Traceability information shall be marked in accordance with the requirements of ESCC Basic Specification N° 21700.

#### 4.5.4) Characteristics

The characteristics to be marked in the following order of precedence are:

- (a) 1<sup>st</sup> connector variant
- (b) Wiring

D=Direct wiring (Pin N°1 of the 1<sup>st</sup> connector is connected to pin N°1 of the 2<sup>nd</sup> connector.)

I=Indirect wiring applicable to jumpers only(variants 04 to 06). The table below details the wiring configuration for each variant:

| Variant | Connector                 | Pin numbers |   |   |   |   |   |   |   |
|---------|---------------------------|-------------|---|---|---|---|---|---|---|
| 04      | 1 <sup>st</sup> connector | 1           | 2 |   |   |   |   |   |   |
|         | 2 <sup>nd</sup> connector | 2           | 1 |   |   |   |   |   |   |
| 05      | 1 <sup>st</sup> connector | 1           | 2 | 3 | 4 |   |   |   |   |
|         | 2 <sup>nd</sup> connector | 4           | 3 | 2 | 1 |   |   |   |   |
| 06      | 1 <sup>st</sup> connector | 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|         | 2 <sup>nd</sup> connector | 8           | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

- (c) Length of cable
- (d) 2<sup>nd</sup> connector variant
- (e) Testing level



The information shall be constituted and marked as follows :

➤ **For variant 04 to 09**

4.5.4.1) Identification code

| IDENTIFICATION CODE                                                                                                             |                                       | axoMach | 05 | D | 300 | 05 | L3 |
|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------|----|---|-----|----|----|
| <b>Series</b>                                                                                                                   |                                       |         |    |   |     |    |    |
|                                                                                                                                 | axoMach space high data rate assembly |         |    |   |     |    |    |
| <b>Connector 1 variant :</b>                                                                                                    |                                       |         |    |   |     |    |    |
| 04 : connector male 1 way                                                                                                       |                                       |         |    |   |     |    |    |
| 05 : connector male 2 ways                                                                                                      |                                       |         |    |   |     |    |    |
| 06 : connector male 4 ways                                                                                                      |                                       |         |    |   |     |    |    |
| 07 : connector female 1 way                                                                                                     |                                       |         |    |   |     |    |    |
| 08 : connector female 2 ways                                                                                                    |                                       |         |    |   |     |    |    |
| 09 : connector female 4 ways                                                                                                    |                                       |         |    |   |     |    |    |
| 20 : ESCC3402/002 variant 01                                                                                                    |                                       |         |    |   |     |    |    |
| 21 : ESCC3402/002 variant 09                                                                                                    |                                       |         |    |   |     |    |    |
| 22 : ESCC3402/002 variant 68                                                                                                    |                                       |         |    |   |     |    |    |
| 23 : ESCC3402/001 variant 01                                                                                                    |                                       |         |    |   |     |    |    |
| 24 : ESCC3402/001 variant 09                                                                                                    |                                       |         |    |   |     |    |    |
| <b>Wiring :</b>                                                                                                                 |                                       |         |    |   |     |    |    |
| I : Indirect wiring (see §4.5.4)                                                                                                |                                       |         |    |   |     |    |    |
| D: Direct wiring                                                                                                                |                                       |         |    |   |     |    |    |
| <b>Option 2 : Length of cable :</b>                                                                                             |                                       |         |    |   |     |    |    |
| xxx : Length in cm. (>10cm for 1 way: variants 04 & 07, >20cm for 2 ways: variants 05 & 08, >50cm for 4 ways: variants 06 & 09) |                                       |         |    |   |     |    |    |
| <b>Connector 2 variant * :</b>                                                                                                  |                                       |         |    |   |     |    |    |
| 04 : connector male 1 way                                                                                                       |                                       |         |    |   |     |    |    |
| 05 : connector male 2 ways                                                                                                      |                                       |         |    |   |     |    |    |
| 06 : connector male 4 ways                                                                                                      |                                       |         |    |   |     |    |    |
| 07 : connector female 1 way                                                                                                     |                                       |         |    |   |     |    |    |
| 08 : connector female 2 ways                                                                                                    |                                       |         |    |   |     |    |    |
| 09 : connector female 4 ways                                                                                                    |                                       |         |    |   |     |    |    |
| 20 : ESCC3402/002 variant 01                                                                                                    |                                       |         |    |   |     |    |    |
| 21 : ESCC3402/002 variant 09                                                                                                    |                                       |         |    |   |     |    |    |
| 22 : ESCC3402/002 variant 68                                                                                                    |                                       |         |    |   |     |    |    |
| 23 : ESCC3402/001 variant 01                                                                                                    |                                       |         |    |   |     |    |    |
| 24 : ESCC3402/001 variant 09                                                                                                    |                                       |         |    |   |     |    |    |
| *if connector 2 is not specified, the assembly is a pig tail link.                                                              |                                       |         |    |   |     |    |    |
| <b>Testing level.</b>                                                                                                           |                                       |         |    |   |     |    |    |
| L1: LAT1 (ESCC3401-chart V)                                                                                                     |                                       |         |    |   |     |    |    |
| L2: LAT2 (ESCC3401-chart V)                                                                                                     |                                       |         |    |   |     |    |    |
| L3: LAT3 (ESCC3401-chart V)                                                                                                     |                                       |         |    |   |     |    |    |



➤ **For variant 01 to 03 & 10 to 12.**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |       |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------|----|
| IDENTIFICATION CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | axoMach | PCB10 | L3 |
| <b>Series</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |       |    |
| axoMach space high data rate connector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |       |    |
| <b>PCB connector female :</b><br><b>01</b> : PCB connector female 1 way set up on panel, parallel gap welding<br><b>02</b> : PCB connector female 2 ways set up on panel, parallel gap welding<br><b>03</b> : PCB connector female 4 ways set up on panel, parallel gap welding<br><b>10</b> : PCB connector female 1 way set up on PCB, SMD mount<br><b>11</b> : PCB connector female 2 ways set up on PCB, SMD mount<br><b>12</b> : PCB connector female 4 ways set up on PCB, SMD mount<br><b>13</b> : Saver connector 1 way.<br><b>14</b> : Saver connector 2 ways.<br><b>15</b> : Saver connector 4 ways. |         |       |    |
| <b>Testing level.</b><br><b>L1:</b> LAT1 (ESCC3401-chart V)<br><b>L2:</b> LAT2 (ESCC3401-chart V)<br><b>L3:</b> LAT3 (ESCC3401-chart V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |       |    |

4.5.4.2) Type of cable

The cables are described in § 4.4.6

For variant 04 to 09, the length of AX2.4S is to be specified in **centimeter (Cm)**.

For variant 10 to 12, the QFX cable length is frozen by design (see drawing).

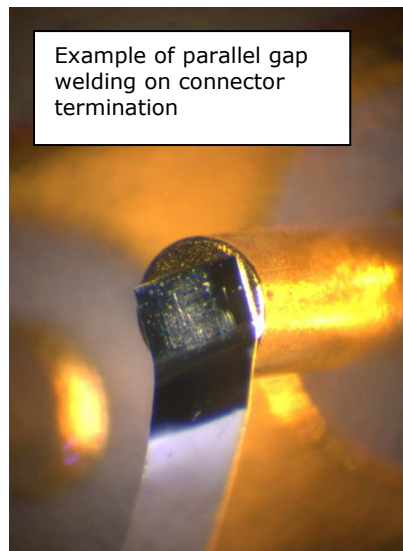
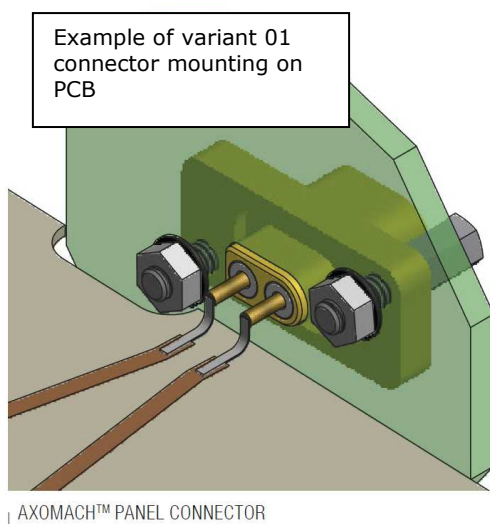


#### 4.5.4.3) Terminating types on PCB

For variant 01, 02 & 03 connection to PCB is done by using Parallel gap technology by welding a plated tape on the connector termination. Then the tapes are soldered on the PCB traces.

PCB PAD drawing :

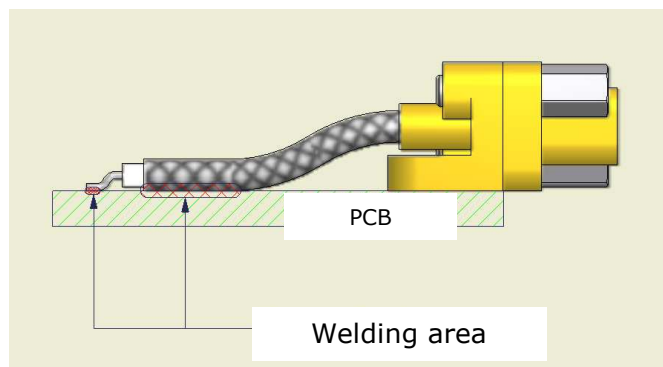
Refer to figures 2 to get the dimensions of parallel gap connector for PCB layout design.



For variant 10, 11 & 12 connection to PCB is done by welding the coaxial cables QFX 086 to the PCB. The mechanical fixation is performed by screws tightened through equipment walls.

PCB SMD drawing:

Refer to figures 2 to get the dimensions of QFX cable exits for PCB layout design.



#### 4.6) Electrical requirements

##### 4.6.1) Electrical measurement at room temperature

The parameters to be measured in respect of electrical characteristics are scheduled in Table 2.  
Unless otherwise specified these measurements shall be performed at  $T_{amb} = 22 \pm 3 \text{ }^{\circ}\text{C}$ .

**Table 2 : Electrical measurements at room temperature**

Static measurements :

Notes are at the end of table 2

| N° | CHARACTERISTIC                                | Applica-<br>bility                                     | SYMBOL   | TEST METHOD       | TEST<br>CONDITION                                    | LIMITS |      | UNIT        |
|----|-----------------------------------------------|--------------------------------------------------------|----------|-------------------|------------------------------------------------------|--------|------|-------------|
|    |                                               |                                                        |          |                   |                                                      | MIN.   | MAX. |             |
| 1  | Insulation Resistance                         | All<br>variants                                        | $R_i$    | ESCC3401 §9.1.1.1 | 500 Vdc                                              | 5000   | -    | $M\Omega$   |
| 2  | Voltage proof<br>Leakage current              | All<br>variants                                        | $I_L$    | ESCC3401 §9.1.1.2 | 600 Vrms                                             | -      | 2    | mA          |
| 3  | Contact resistance (1)<br>(Low level current) | All<br>variants                                        | $R_{cl}$ | ESCC3401 §9.1.1.3 | $I_{test} = 10\text{mA}$                             | -      | 6    | $m\Omega$   |
| 4  | Contact resistance (1)<br>(Rated current)     | All<br>variants                                        | $R_{cr}$ | ESCC3401 §9.1.1.3 | $I_{test} = 1 \text{ A}$                             | -      | 5    | $m\Omega$   |
| 5  | Coaxial conductor<br>resistance               | Not for<br>Variants<br>1,2,3,10,<br>11,12,13,<br>14,15 | $R_{cc}$ | ESCC3902 §9.5     | $I_{test} = 1 \text{ A}$                             | -      | 110  | $m\Omega/m$ |
| 6  | Coaxial shielding resistance<br>(2)           | Not for<br>Variants<br>1,2,3,10,<br>11,12,<br>13,14,15 | $R_{cs}$ | ESCC3902 §9.5     | ECSS-Q-70-<br>26A, §6.2.<br>$I_{test} = 1 \text{ A}$ | -      | 45   | $m\Omega/m$ |
| 7  | Metal shell conductivity<br>(1) (2) (3)       | Not for<br>Variants<br>1,2,3,<br>13,14,<br>15          | $R_{sh}$ | ESCC3401 §9.1.1.3 | ECSS-Q-70-<br>26A, §6.2.<br>$I_{test} = 1 \text{ A}$ | -      | 50   | $m\Omega$   |

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

**Table 2 : Electrical measurements at room temperature (continuation)**

Time domain measurements :

| N° | CHARACTERISTIC                  | Applica-bility                               | SYMBOL           | TEST METHOD                  | TEST CONDITION | LIMITS |      | UNIT |
|----|---------------------------------|----------------------------------------------|------------------|------------------------------|----------------|--------|------|------|
|    |                                 |                                              |                  |                              |                | MIN.   | MAX. |      |
| 8  | Characteristic Impedance        | All variants                                 | Z <sub>c</sub>   | IEC966-1 § 8.2               | TDR            | 90     | 110  | Ω    |
| 9  | Skew between coaxial cables (4) | All variants                                 | Sk               | 07072-TP-MDSA HDR-01§4.2.2.3 | TDR            | -      | 20   | ps   |
| 10 | Jitter PP (4)                   | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>pp</sub>  | 07072-TP-MDSA HDR-01§4.2.2.2 | 1Gb/s          | -      | 20   | ps   |
| 11 | Jitter PP (4)                   | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>pp</sub>  | 07072-TP-MDSA HDR-01§4.2.2.2 | 3 Gb/s         | -      | 20   | Ps   |
| 12 | Jitter PP (4)                   | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>pp</sub>  | 07072-TP-MDSA HDR-01§4.2.2.2 | 5 Gb/s         | -      | 20   | Ps   |
| 13 | Jitter PP (4)                   | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>pp</sub>  | 07072-TP-MDSA HDR-01§4.2.2.2 | 6 Gb/s         | -      | 20   | Ps   |
| 14 | Jitter PP (4)                   | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>pp</sub>  | 07072-TP-MDSA HDR-01§4.2.2.2 | 8 Gb/s         | -      | 20   | Ps   |
| 15 | Jitter PP (4)                   | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>pp</sub>  | 07072-TP-MDSA HDR-01§4.2.2.2 | 10 Gb/s        | -      | 20   | Ps   |
| 16 | Jitter rms (4)                  | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>rms</sub> | 07072-TP-MDSA HDR-01§4.2.2.2 | 1 Gb/s         | -      | 5    | ps   |
| 17 | Jitter rms (4)                  | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>rms</sub> | 07072-TP-MDSA HDR-01§4.2.2.2 | 3 Gb/s         | -      | 5    | Ps   |
| 18 | Jitter rms (4)                  | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>rms</sub> | 07072-TP-MDSA HDR-01§4.2.2.2 | 5 Gb/s         | -      | 5    | Ps   |
| 19 | Jitter rms (4)                  | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>rms</sub> | 07072-TP-MDSA HDR-01§4.2.2.2 | 6 Gb/s         | -      | 5    | Ps   |
| 20 | Jitter rms (4)                  | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>rms</sub> | 07072-TP-MDSA HDR-01§4.2.2.2 | 8 Gb/s         | -      | 5    | Ps   |
| 21 | Jitter rms (4)                  | Not for variants:<br>1,2,3,10,11,12,13,14,15 | J <sub>rms</sub> | 07072-TP-MDSA HDR-01§4.2.2.2 | 10 Gb/s        | -      | 5    | ps   |
| 22 | Quality factor (4)              | Not for variants:<br>1,2,3,10,11,12,13,14,15 | Q <sub>f</sub>   | 07072-TP-MDSA HDR-01§4.2.2.2 | 1 Gb/s         | 20     | -    | -    |
| 23 | Quality factor (4)              | Not for variants:<br>1,2,3,10,11,12,13,14,15 | Q <sub>f</sub>   | 07072-TP-MDSA HDR-01§4.2.2.2 | 3 Gb/s         | 15     | -    | -    |
| 24 | Quality factor (4)              | Not for variants:<br>1,2,3,10,11,12,13,14,15 | Q <sub>f</sub>   | 07072-TP-MDSA HDR-01§4.2.2.2 | 5 Gb/s         | 10     | -    | -    |
| 25 | Quality factor (4)              | Not for variants:<br>1,2,3,10,11,12,13,14,15 | Q <sub>f</sub>   | 07072-TP-MDSA HDR-01§4.2.2.2 | 6 Gb/s         | 10     | -    | -    |
| 26 | Quality factor (4)              | Not for variants:<br>1,2,3,10,11,12,13,14,15 | Q <sub>f</sub>   | 07072-TP-MDSA HDR-01§4.2.2.2 | 8 Gb/s         | 10     | -    | -    |
| 27 | Quality factor (4)              | Not for variants:<br>1,2,3,10,11,12,13,14,15 | Q <sub>f</sub>   | 07072-TP-MDSA HDR-01§4.2.2.2 | 10 Gb/s        | 10     | -    | -    |





**Table 2 : Electrical measurements at room temperature (continuation)**

Frequency domain measurements :

| N° | CHARACTERISTIC     | Applicability                                    | SYMBOL | TEST METHOD                  | TEST CONDITION | LIMITS |      | UNIT |
|----|--------------------|--------------------------------------------------|--------|------------------------------|----------------|--------|------|------|
|    |                    |                                                  |        |                              |                | MIN.   | MAX. |      |
| 28 | Insertion Loss     | Not for variants:<br>1,2,3,10,11,12,<br>13,14,15 | IL     | 07072-TP-MDSA HDR-01§4.2.2.4 | 0 to 5Ghz      | -      | -1   | dB   |
| 29 | Insertion Loss     | Not for variants:<br>1,2,3,10,11,12,<br>13,14,15 | IL     | 07072-TP-MDSA HDR-01§4.2.2.4 | 0 to 10Ghz     | -      | -2   | dB   |
| 30 | Return Loss        | Not for variants:<br>1,2,3,10,11,12,<br>13,14,15 | RL     | 07072-TP-MDSA HDR-01§4.2.2.5 | 0 to 5Ghz      | -      | -12  | dB   |
| 31 | Return Loss        | Not for variants:<br>1,2,3,10,11,12,<br>13,14,15 | RL     | 07072-TP-MDSA HDR-01§4.2.2.5 | 0 to 10Ghz     | -      | -9   | dB   |
| 32 | Crosstalk far end  | Not for variants:<br>1,2,3,10,11,12,<br>13,14,15 | xTf    | 07072-TP-MDSA HDR-01§4.2.2.6 | 0 to 5Ghz      | -      | -45  | dB   |
| 33 | Crosstalk far end  | Not for variants:<br>1,2,3,10,11,12,<br>13,14,15 | xTf    | 07072-TP-MDSA HDR-01§4.2.2.6 | 0 to 10Ghz     | -      | -35  | dB   |
| 34 | Crosstalk near end | Not for variants:<br>1,2,3,10,11,12,<br>13,14,15 | xTn    | 07072-TP-MDSA HDR-01§4.2.2.6 | 0 to 5Ghz      | -      | -45  | dB   |
| 35 | Crosstalk near end | Not for variants:<br>1,2,3,10,11,12,<br>13,14,15 | xTn    | 07072-TP-MDSA HDR-01§4.2.2.6 | 0 to 10Ghz     | -      | -35  | dB   |

Notes:

(1) Applicable for a connector couple as per ESCC 3401 §9.1.1.3 figure I(a) "contact inaccessible from the rear. Resistance shall be calculated by deduction from the actually measured ohmic resistance values of the wires.

Test only applicable to wired samples (e.g. during production test controls). Test not applicable to variants 04 and 09.

(2) This requirement is valid for the shield resistance of one AX2.4 cable. To get the exact requirements the resistances of the relevant used numbers of cable must be put in parallel; e.g. for a variant 04 requirement is 22.5 mΩ/m.

(3) Test to be done between the two backshells of an assembly: From the male backshell to the female backshell.

(4) Measurements on MDSA HDR assemblies of 1 m cable length (at a rate of 10Gb/s for a 2<sup>7-1</sup> PRBS pattern with 1V<sub>pp</sub> differential amplitude) refer to table 4 for others lengths.



#### 4.6.2) Electrical measurements at High and low Temperatures

Not applicable

#### 4.6.3) Circuits for Electrical Measurements

Not applicable

#### 4.6.4) Time domain measurements

##### 4.6.4.1) Uniformity of characteristic impedance.

Applicable test : IEC966-1 § 8.2

The impedance of connector transition measured in time domain with a reflectometer equipment shall be with the tolerance of table 3.1. (the TDR rise time must be less than 20ps from 10% to 90%.)

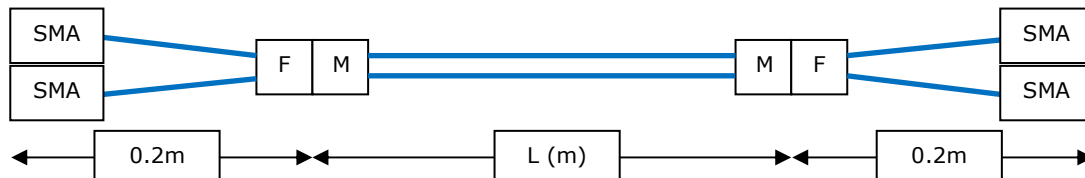
**Table 3.1 : Impedance mismatching at room temperature**

| Measurements | Min  | Max   |
|--------------|------|-------|
| Impedance Z  | 90 Ω | 110 Ω |



#### 4.6.4.2) Eye pattern analysis

Measurements on MDSA HDR assemblies of 1 m cable length (at a rate of 10Gb/s for a 2<sup>7</sup>-1 PRBS pattern with 1Vpp differential amplitude) shall be in accordance with the values of table 3.2.



**Table 3.2 : Time analysis (jitter and quality factor) at room temperature**

| Data rate<br>(Gb/s)               |               | 1    | 3    | 5    | 6   | 8   | 10  |
|-----------------------------------|---------------|------|------|------|-----|-----|-----|
| Jitter PP<br>(in ps)              | L < or = 1m   | <20  | <20  | <20  | <20 | <20 | <20 |
|                                   | L < or = 2.5m | <20  | <20  | <20  | <20 | <20 | <20 |
|                                   | L < or = 4m   | <30  | <30  | <30  | NA  | NA  | NA  |
|                                   | L < or = 10m  | <170 | <170 | <170 | NA  | NA  | NA  |
| Jitter rms<br>(in ps)             | L < or = 1m   | <5   | <5   | <5   | <5  | <5  | <5  |
|                                   | L < or = 2.5m | <5   | <5   | <5   | <5  | <5  | <5  |
|                                   | L < or = 4m   | <5   | <5   | <5   | NA  | NA  | NA  |
|                                   | L < or = 10m  | <30  | <30  | <30  | NA  | NA  | NA  |
| Quality factor                    | L < or = 1m   | >20  | >15  | >10  | >10 | >10 | >10 |
|                                   | L < or = 2.5m | >15  | >7   | >7   | >5  | >5  | >5  |
|                                   | L < or = 4m   | >10  | >4   | >4   | NA  | NA  | NA  |
|                                   | L < or = 10m  | >4.5 | >2   | >2   | NA  | NA  | NA  |
| Skew between coaxial cables <20ps |               |      |      |      |     |     |     |

#### 4.6.5) Frequency domain measurements

##### 4.6.5.1) Insertion losses

Applicable test : ESCC3402 § 9.19

The insertion losses of MDSA HDR assemblies of 1 m of length shall be less than the values of table 3.3.

**Table 3.3 : Insertion losses at room temperature**

| Measurement        | Worst measurements from<br>0 to 5Ghz in in dB | Worst measurement from 0 to<br>10Ghz in dB |
|--------------------|-----------------------------------------------|--------------------------------------------|
| S21 or S12 max (+) | 1dB                                           | 2dB                                        |
| S21 or S12 max (-) | 1dB                                           | 2dB                                        |

##### 4.6.5.2) Return loss : VSWR

Applicable test : ESCC3402 § 9.16.

The insertion losses of MDSA HDR assemblies of 1 m of length shall be less than the values of table 3.4.

**Table 3.4 : Return loss : VSWR at room temperature**

| Measurement        | Worst measurements from<br>0 to 5Ghz in dB | Worst measurement from 0 to<br>10Ghz in dB |
|--------------------|--------------------------------------------|--------------------------------------------|
| S11 or S22 max (+) | -12dB                                      | -8dB                                       |
| S11 or S22 max (-) | -12dB                                      | -8dB                                       |

##### 4.6.5.3) Crosstalk : Far end(Fext), Near end(Next) (more than one way connector)

Applicable test : SERIAL ATA2 §6.6.2.5 Table 15

Crosstalk of MDSA HDR assemblies of 1 m of length shall be less than the values of table 3.5.

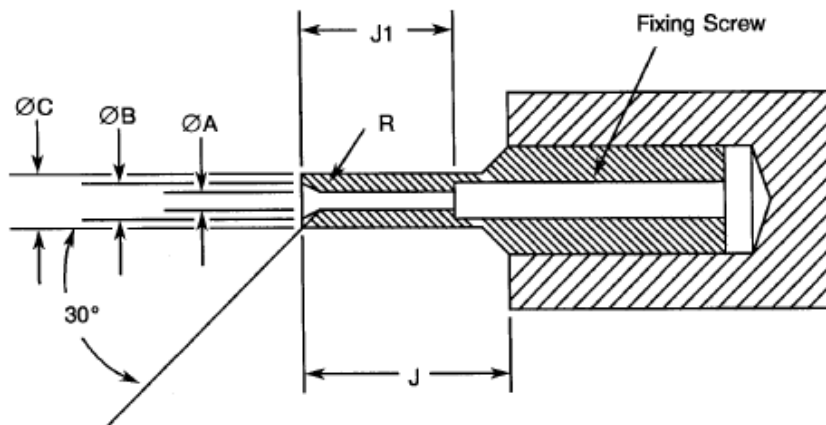
**Table 3.5 : Crosstalk at room temperature**

| Measurement | Worst measurements from<br>0 to 5Ghz in dB | Worst measurement from 0 to<br>10Ghz in dB |
|-------------|--------------------------------------------|--------------------------------------------|
| Far end     | -45dB                                      | -35dB                                      |
| Near end    | -45dB                                      | -35dB                                      |

#### **4.7) Burn-in and electrical measurements**

Not applicable

**Figure 6 : Gauge fixture**



**MAXIMUM GAUGE**

| WEIGHT (g) 170 |       |       | REMARKS |
|----------------|-------|-------|---------|
|                | MIN.  | MAX.  |         |
| ØA             | 0.559 | 0.564 | -       |
| ØB             | 0.749 | 0.775 | -       |
| ØC             | 0.813 | 0.825 | -       |
| J              | 4.0   | -     | -       |
| J1             | 3.13  | 3.23  | -       |
| R              | 0.381 | 0.483 | Note 1  |

**MINIMUM GAUGE**

| WEIGHT (g) 14 |       |       | REMARKS |
|---------------|-------|-------|---------|
|               | MIN.  | MAX.  |         |
| ØA            | 0.582 | 0.587 | -       |
| ØB            | 0.749 | 0.775 | -       |
| ØC            | 0.813 | 0.825 | -       |
| J             | 4.0   | -     | -       |
| J1            | 3.13  | 3.23  | -       |
| R             | 0.381 | 0.483 | Note 1  |

**NOTES**

- Radius 'R', must be tangent to entry chamfer and ØA.
- ØA and entry chamfer must be polished to  $\nabla_{N8}$ .

|                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                              |                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <p align="center"><b>TECHNICAL SPECIFICATION<br/>OF MDSA HIGH DATA RATE<br/>CONNECTORS DESIGNED<br/>FOR SPACE USE</b></p> <p align="center"><b>"07072-ST-MDSA HDR-01" : Issue D</b></p> | <p align="center"><b>AXON'CABLE S.A.</b><br/> <i>Cable and interconnect systems<br/>for advanced technologies</i><br/> ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL<br/> Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83<br/> Internet : <a href="http://www.axon-cable.com">http://www.axon-cable.com</a></p> | <p align="center"><b>AXOBUS°</b><br/> Page 42/45</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

#### **4.8) Environmental and endurance tests**

##### 4.8.1) Measurements and Inspections on Completion of Environmental Tests

The parameters to be measured and inspections to be performed on completion of environmental testing shall be those specified in Table 6. Unless otherwise specified, these measurements shall be performed at  $T_{amb} = +22^{±3} °C$ .

##### 4.8.2) Measurements and Inspections at Intermediate Points during Endurance Tests

Not applicable

##### 4.8.3) Measurements and Inspections on Completion of Endurance Tests

The parameters to be measured and inspections to be performed on completion of endurance testing shall be those specified in Table 6. Unless otherwise specified, these measurements shall be performed at  $T_{amb} = +22^{±3} °C$ .

##### 4.8.4) Condition for Operating Life Test (Part of Endurance Testing)

Not applicable

##### 4.8.5) Electrical Circuits for Operating Life test

Not applicable

##### 4.8.6) Condition for High Temperature Storage Test (Part of Endurance Testing)

The requirements for the high temperature storage test are specified in Section 9 of ESCC Generic Specification n° 3401. The conditions for high temperature storage testing shall be the maximum storage temperature specified in Table 1(b) of this specification.



|                                                                                                                                                |                                                                                                                                                                                                                                        |                              |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>TECHNICAL SPECIFICATION<br/>OF MDSA HIGH DATA RATE<br/>CONNECTORS DESIGNED<br/>FOR SPACE USE</b><br><b>"07072-ST-MDSA HDR-01" : Issue D</b> | <b>AXON'CABLE S.A.</b><br><i>Cable and interconnect systems<br/>for advanced technologies</i><br>ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL<br>Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83<br>Internet : http://www.axon-cable.com | <b>AXOBUS®</b><br>Page 43/45 |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

**Table 6 – Measurements and Inspections on Completion of Environmental and Endurance Testing**

| Nº          | ESCC 3401 GENERIC Nº 3401             |                                          | Measurements and Inspections     |                                      | SYMBOL | Limits                          |      | Unit |
|-------------|---------------------------------------|------------------------------------------|----------------------------------|--------------------------------------|--------|---------------------------------|------|------|
|             | Environmental and Endurance Tests (1) | Test Method and Conditions               | Identification                   | Conditions                           |        | Min.                            | Max. |      |
| 1           | Wiring                                | §9.10 & Table 1(a) of this spec.         | Insulation resistance            | Table 2 Item 1                       | Ri     | Table 2 Item 1                  |      |      |
|             |                                       |                                          | Voltage Proof                    | Table 2 Item 2                       | Il     | Table 2 Item 2                  |      |      |
|             |                                       |                                          | Low Level contact resistance     | Table 2 Item 3                       | Rcl    | Table 2 Item 3                  |      |      |
|             |                                       |                                          | Rated current contact resistance | Table 2 Item 4                       | Rcr    | Table 2 Item 4                  |      |      |
|             |                                       |                                          | Voltage drop                     | Table 2 Item 5                       | Vd     | Table 2 Item 5                  |      |      |
| 2           | HDR Control                           | IEC966-1 § 9.2                           | Uniformity of Impedance          | Table 3.1                            | Z      | Table 3.1                       |      |      |
|             |                                       |                                          | Time analysis                    | Table 3.2                            | J      | Table 3.2                       |      |      |
|             |                                       | ESCC3402 §9.19                           | Insertion losses                 | Table 3.3                            | att    | Table 3.3                       |      |      |
|             |                                       | ESCC3402 §9.19                           | Return losses                    | Table 3.4                            | VSWR   | Table 3.4                       |      |      |
| 2           | Vibration                             | §9.11<br>§9.10 & Table 1(a) of this spec | Initial measurements             |                                      |        |                                 |      |      |
|             |                                       |                                          | Coupling screws                  |                                      | -      | Record value                    |      |      |
|             |                                       |                                          | Unlocking torque                 |                                      | -      | Record value                    |      |      |
|             |                                       |                                          | Wiring                           | Table 2                              | -      | Record values                   |      |      |
|             |                                       |                                          | HDR                              | Tables 3.1, 3.2, 3.3, 3.4 & 3.5      | -      | Record values                   |      |      |
|             |                                       |                                          | Final measurements               |                                      |        |                                 |      |      |
|             |                                       |                                          | Full engagement                  | -                                    | -      | -                               | -    | -    |
|             |                                       |                                          | Coupling screws                  |                                      | -      | -25                             | +25  | %    |
|             |                                       |                                          | Unlocking torque                 |                                      | -      | -25                             | +25  | %    |
|             |                                       |                                          | Visual examination               | -                                    | -      | -                               | -    | -    |
|             |                                       |                                          | Wiring                           | Table 2                              | -      | -                               | +25  | %    |
|             |                                       |                                          | HDR control                      | Tables 3.1, 3.2, 3.3, 3.4 & 3.5      | -      |                                 | +25  | %    |
| 3           | Shock or bump                         | §9.12                                    | Full engagement                  | -                                    | -      | -                               | -    | -    |
|             |                                       |                                          | Visual examination               | -                                    | -      | -                               | -    | -    |
| 4           | Climatic Sequence                     | §9.13                                    | Dry heat                         |                                      |        |                                 |      |      |
|             |                                       |                                          | Insulation resistance            | At high temperature , Table 2 item 1 | Ri     | 5000                            | -    | MΩ   |
|             |                                       |                                          | HDR Control                      | Tables 3.1, 3.2, 3.3, 3.4 & 3.5      |        | Tables 3.1, 3.2, 3.3, 3.4 & 3.5 |      |      |
|             |                                       |                                          | Low air pressure                 |                                      |        |                                 |      |      |
|             |                                       |                                          | Voltage proof                    | Figure 1                             | Il     | -                               | 1    | mA   |
|             |                                       |                                          | Damp heat                        | Immediately after test               |        |                                 |      |      |
|             |                                       |                                          | Insulation resistance            | Table 2 Item 1                       | Ri     | 100                             | -    | MΩ   |
|             |                                       |                                          | Final measurement                | After 1-24 hrs Recovery              |        |                                 |      |      |
|             |                                       |                                          | Visual examination               | -                                    | -      | -                               | -    | -    |
|             |                                       |                                          | Insulation resistance            | Table 2 Item 1                       | Ri     | Table 2 Item 1                  |      |      |
|             |                                       |                                          | Voltage proof                    | Table 2 Item 2                       | Il     | Table 2 Item 2                  |      |      |
| HDR Control | Tables 3.1, 3.2, 3.3, 3.4 & 3.5       |                                          | Tables 3.1, 3.2, 3.3, 3.4 & 3.5  |                                      |        |                                 |      |      |
| 5           | Plating thickness                     | §9.14                                    | Thickness                        | -                                    | -      | §4.3.8 of this spec.            |      |      |

**Notes:**

(1) The tests in this table refer to either Chart IV or V and shall be used as applicable



|                                                                                                                                                |                                                                                                                                                                                                                                         |                              |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>TECHNICAL SPECIFICATION<br/>OF MDSA HIGH DATA RATE<br/>CONNECTORS DESIGNED<br/>FOR SPACE USE</b><br><b>"07072-ST-MDSA HDR-01" : Issue D</b> | <b>AXON' CABLE S.A.</b><br><i>Cable and interconnect systems<br/>for advanced technologies</i><br>ROUTE DE CHALONS-SUR-MARNE : 51210 MONTMIRAIL<br>Tel : 0.3 26 81 70 00 : Fax : 03 26 81 28 83<br>Internet : http://www.axon-cable.com | <b>AXOBUS®</b><br>Page 44/45 |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|

W:\DJC07\DJC-07072 - Liaison 10Gbps COAX µD Twinax\Documents Axon\qualification ESA\SPEC ESA\07072-ST-MDSA HDR-01-D.doc

**Table 6 – Measurements and Inspections on Completion of Environmental and Endurance Testing (following)**

| N° | ESCC 3401 GENERIC N° 3401             |                              | Measurements and Inspections     |                                 | SYMBOL | Limits                          |      | Unit |
|----|---------------------------------------|------------------------------|----------------------------------|---------------------------------|--------|---------------------------------|------|------|
|    | Environmental and Endurance Tests (1) | Test Method and Conditions   | Identification                   | Conditions                      |        | Min.                            | Max. |      |
| 6  | Rapid change of temperature           | §9.16                        | Insulation resistance            | Table 2 Item 1                  | Ri     | Table 2 Item 1                  |      |      |
|    |                                       |                              | Voltage Proof                    | Table 2 Item 2                  | Il     | Table 2 Item 2                  |      |      |
|    |                                       |                              | Low Level contact resistance     | Table 2 Item 3                  | Rcl    | Table 2 Item 3                  |      |      |
|    |                                       |                              | Rated current contact resistance | Table 2 Item 4                  | Rcr    | Table 2 Item 4                  |      |      |
|    |                                       |                              | Voltage drop                     | Table 2 Item 5                  | Vd     | Table 2 Item 5                  |      |      |
|    |                                       |                              | HDR Control                      | Tables 3.1, 3.2, 3.3, 3.4 & 3.5 |        | Tables 3.1, 3.2, 3.3, 3.4 & 3.5 |      |      |
| 7  | Contact retention (in insert)         | §9.17 & §4.3.6 of this spec. | Contact displacement             | §4.3.6 of this spec.            | D      | §4.3.6 of this spec.            |      |      |
| 8  | Endurance                             | §9.18                        | Initial measurements             |                                 |        |                                 |      |      |
|    |                                       |                              | Mating / Unmating forces         | -                               | Fm     | §4.3.5 of this spec.            |      |      |
|    |                                       |                              | Low Level contact resistance     | Table 2 Item 3                  | Rcl    | Table 2 Item 3                  |      |      |
|    |                                       |                              | Rated current contact resistance | Table 2 Item 4                  | Rcr    | Table 2 Item 4                  |      |      |
|    |                                       |                              | Metal shell conductivity         | Table 2 Item 5                  | Rsh    | Table 2 Item 5                  |      |      |
|    |                                       |                              | Final measurements               |                                 |        |                                 |      |      |
|    |                                       |                              | Visual examination               | -                               | -      | -                               | -    | -    |
|    |                                       |                              | Mating / Unmating forces         | -                               | Fm     | §4.3.5 of this spec.            |      |      |
|    |                                       |                              | Low Level contact resistance     | Table 2 Item 3                  | ΔRcl   | Max 3 mΩ                        |      |      |
|    |                                       |                              | Rated current contact resistance | Table 2 Item 4                  | ΔRcr   | Max 3 mΩ                        |      |      |
|    |                                       |                              | Insulation resistance            | Table 2 Item 1                  | Ri     | Table 2 Item 1                  |      |      |
|    |                                       |                              | Voltage proof                    | Table 2 Item 2                  | Il     | Table 2 Item 2                  |      |      |
|    |                                       |                              | HDR Control                      | Tables 3.1, 3.2, 3.3, 3.4 & 3.5 |        | Tables 3.1, 3.2, 3.3, 3.4 & 3.5 |      |      |
| 9  | Mating / Unmating forces              | §9.20                        | -                                | -                               | Fm     | §4.3.5 of this spec.            |      |      |
| 10 | High temperature storage              | §9.21                        | Initial measurements             |                                 |        |                                 |      |      |
|    |                                       |                              | Low Level contact resistance     | Table 2 Item 3                  | Rcl    | Table 2 Item 3                  |      |      |
|    |                                       |                              | Rated current contact resistance | Table 2 Item 4                  | Rcr    | Table 2 Item 4                  |      |      |
|    |                                       |                              | Final measurements               |                                 |        |                                 |      |      |
|    |                                       |                              | Visual examination               | -                               | -      | -                               | -    | -    |
|    |                                       |                              | Mating / Unmating forces         | -                               | Fm     | §4.3.7 of this spec.            |      |      |
|    |                                       |                              | Low Level contact resistance     | Table 2 Item 3                  | ΔRcl   | Max 3 mΩ                        |      |      |
|    |                                       |                              | Rated current contact resistance | Table 2 Item 4                  | ΔRcr   | Max 3 mΩ                        |      |      |
|    |                                       |                              | Insulation resistance            | Table 2 Item 1                  | Ri     | Table 2 Item 1                  |      |      |
|    |                                       |                              | Voltage proof                    | Table 2 Item 2                  | Il     | Table 2 Item 2                  |      |      |
|    |                                       |                              | HDR Control                      | Tables 3.1, 3.2, 3.3, 3.4 & 3.5 |        | Tables 3.1, 3.2, 3.3, 3.4 & 3.5 |      |      |
| 11 | Corrosion                             | §9.22                        | Visual examination               | -                               | -      | -                               | -    | -    |
| 12 | Insertion retention (in shell)        | §9.23 & §4.3.6 of this spec  | Visual examination               | -                               | -      | §4.3.6 of this spec.            |      |      |
| 13 | Jackscrew retention                   | §9.24 & §4.3.9 of this spec  | Visual examination               | -                               | -      | Not applicable                  |      |      |





**Table 6 – Measurements and Inspections on Completion of Environmental and Endurance Testing (following)**

| N° | ESCC 3401 GENERIC N° 3401             |                                 | Measurements and Inspections |                     | SYMBOL | Limits              |      | Unit |
|----|---------------------------------------|---------------------------------|------------------------------|---------------------|--------|---------------------|------|------|
|    | Environmental and Endurance Tests (1) | Test Method and Conditions      | Identification               | Conditions          |        | Min.                | Max. |      |
| 14 | High temperature measurement          | §9.25                           | Insulation resistance        | Table 2 item 1      | Ri     | 10                  | -    | MΩ   |
| 15 | Engagement / Separation Forces        | §9.28 &<br>§4.3.7 of this spec. | Force                        | §4.3.7 of this spec | F      | §4.3.7 of this spec |      |      |

Notes:

(1) The tests in this table refer to either Chart IV or V and shall be used as applicable

