### REVISIONS

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<th>SYMBOL</th>
<th>DESCRIPTION</th>
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<tr>
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### SHEET REVISION STATUS

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</tbody>
</table>

### ORIGINATOR
T.J. Perry/Paramax

### DATE
3/6/92

### FSC:
5935

### APPROVED
S.E. Archer-Davies/Paramax

### DATE
3/6/92

Contacts, Power and Coaxial, Removable, for Electrical Connectors, (Sizes 1, 2 and 3) For Space Flight Use, Detail Specification For

### CODE 311 APPROVAL
S.A. Naus/GSEC

### DATE
3/16/92

### CODE 311 SUPERVISORY APPV
G.P. Kramer, Jr./GSFC

### DATE
3/16/92

### ADDITIONAL APPROVAL
S-311-P-718/2

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

CAGE CODE: 25306 PAGE 1 OF 44
1. SCOPE

1.1 Purpose. This specification covers the detail provisions for rear-insertable and rear-removable contacts for use with electrical connectors covered by detail specification GSFC S-311-P-718/1, GSFC S-311-P-718/3, S-311-P-718/5, and S-311-P-718/6. Table I lists the contact styles and the method of conductor attachments.

Table I. Conductor - contact attachment.

<table>
<thead>
<tr>
<th>Contact Style</th>
<th>Method of Attachment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solder</td>
</tr>
<tr>
<td>Power</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>(Size 8)</td>
<td></td>
</tr>
<tr>
<td>(Size 16)</td>
<td></td>
</tr>
<tr>
<td>(Size 20)</td>
<td></td>
</tr>
<tr>
<td>(Size 22)</td>
<td></td>
</tr>
<tr>
<td>Coaxial</td>
<td>Center Contact</td>
</tr>
<tr>
<td>(Connector sizes 1 &amp; 3)</td>
<td></td>
</tr>
<tr>
<td>Triaxial</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>(Connector Size 2)</td>
<td></td>
</tr>
<tr>
<td>Data Bus</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>(Connector Size 2)</td>
<td></td>
</tr>
<tr>
<td>Coaxial</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>(Connector Size 2)</td>
<td></td>
</tr>
</tbody>
</table>

1.2 GSFC specifications. Unless otherwise noted, all contact provisions and requirements of general specifications GSFC S-311-P-718 and detail specifications GSFC S-311-P-718/1, GSFC S-311-P-718/3, GSFC S-311-P-718/5 and GSFC S-311-P-718/6 apply to this specification.

1.3 Contact-type designations. Contacts shall be ordered only by the following type designations:

\[ G \quad P \quad P \quad 10 \quad \text{Wire-size or cable-type designator (1.3.3)} \]

\[ \text{Contact type (1.3.2)} \]

\[ \text{Contact Style (1.3.1)} \]

\[ \text{GSFC prefix (standard for all contact-type designations)} \]
1.3.1 **Contact style.** Select contact style from Table I (P for power, C for coaxial, T for triaxial, D for data bus).

1.3.2 **Contact type.** (See Table II) Select the contact type from the following tabulation:

a. Power; P for pin; S for socket (Figures 1, 2, 3, 4, 7, 8, 9 and 10)

b. Coaxial, triaxial and data bus; P for pin; S for socket (Figures 5, 6, 11, 12, 13, and 14)

**NOTE**

1. The coaxial, triaxial, and data bus plugs contain the pin center contact; the receptacle (jack) contains the socket center contact.

2. All Coaxial, Connector Sizes 1 & 3, and Coaxial (RG-122/U), Connector Size 2.
   Coaxial plugs (center pin contacts) shall only be installed in plug connector halves. Coaxial receptacles (jacks) (center socket contacts) shall only be installed in receptacle connector halves.

3. All Coaxial, Triaxial and Data Bus, Connector Size 2, except Coaxial (RG-122/U).
   Coaxial, triaxial and data bus (except coaxial RG-122/U) plugs (center pin contact) shall only be installed in receptacle connector halves. Coaxial, triaxial and data bus receptacles (except RG-122/U) jacks (center socket contacts) shall only be installed in plug connector halves.

1.3.3 **Wire-size or cable-type accommodation.** Select the wire size or cable-type designator from Table II.

1.3.4 **Contact inactivation.**

a. After 1/1/87, contact-type designations GPP10; GPP11; GPP16; GPP12; and GPP13 are inactivated for new design. They are replaced by GPP17; GPP18; GPP19; GPP20 and GPP21 respectively. The replacement contacts are interchangeable and intermateable with their counterparts.

b. After 9/1/89, contact-type designations GPS12 and GPS13 are inactivated for new design. They are replaced by GPS20 and GPS21 respectively. The replacement contacts are interchangeable and intermateable with their counterparts.
2. APPLICABLE DOCUMENTS (1.2)

The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

2.1 Specifications.

2.1.1 Federal.

- L-P-403 Plastic, Molding, Polytetrafluorethylene (TFE-Fluorocarbon)
- QQ-C-530 Copper, Beryllium Alloy Bar, Rod and Wire (Copper Alloy Numbers 172 and 173)

2.1.2 Military.

- MIL-C-17 Cables, Radio Frequency; Coaxial, Dual Coaxial, Twin Conductor, and Twin Lead
- MIL-C-14550 Copper Plating (Electrodeposited)
- MIL-W-16878 Wire, Electrical, Insulated, High Temperature
- MIL-C-22520 Crimping Tools, Contact, Electric, Hand, General Specification for
- MIL-T-22910 Tools, Crimping, Hand, for Crimp Style Electric Terminals and Shield Ferrules
- MIL-C-39029 Contacts, Electrical Connector, General Specification for
- MIL-I-43553 Ink, Marking, Epoxy Base
- MIL-G-45204 Gold Plating (Electrodeposited)
- MIL-T-10727 Tin Plating; Electrodeposited or Hot-dipped for Ferrous and Nonferrous Metals

2.1.3 NASA/Goddard.

- GSFC S-311-P-718 Connectors, Electrical, Rectangular, (Power and Coaxial Contacts Including EMI Shielding) for Space Flight Use, General Specification for
2.2 Standards.

MS3197  Gage Pin, for Socket Contact Engagement Test

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes

MIL-STD-202 Testing Methods for Electronics and Electrical Parts

2.3 Other publications

ASTM B 75 Seamless Copper Tube, Specification for

2.4 Order of precedence. The order of precedence delineated in the general specification shall apply.

3. REQUIREMENTS (1.2)

3.1 Materials, design and construction. Contacts shall be of the materials, design, construction, and physical dimension as specified herein. They shall be constructed to be used with connectors conforming to specification GSFC S-311-P-718/1, GSFC S-311-P-718/3, GSFC S-311-P-718/5, and GSFC S-311-P-718/6.

3.1.1 Power contact design. The contacts shall be so designed that they will not be damaged while inserting, removal, or by mating and unmating the connectors. They shall be designed for a maximum current rating of 46, 13, 7.5 and 5 amperes for sizes 8, 16, 20 and 22 respectively. Crimp barrels shall be designed to be crimped by the following tools:
Connector Size Contact Style Crimp Tool Positioner

<table>
<thead>
<tr>
<th>Size</th>
<th>Contact Style</th>
<th>Crimp Tool</th>
<th>Positioner</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8-1</td>
<td>*Pico No. 400</td>
<td>*Pico No. 414/DA-8N</td>
</tr>
<tr>
<td>1</td>
<td>8-2</td>
<td>with No. 4354</td>
<td>Pico No. 414/DA-12N</td>
</tr>
<tr>
<td>1</td>
<td>8-3</td>
<td></td>
<td>Pico No. 414/DA-8N</td>
</tr>
<tr>
<td>1</td>
<td>16-1</td>
<td>M22520/1-01</td>
<td>M22520/1-02</td>
</tr>
<tr>
<td>1</td>
<td>16-2</td>
<td>M22520/7-01</td>
<td>M22520/7-04</td>
</tr>
<tr>
<td>1</td>
<td>20-1</td>
<td>M22520/1-01</td>
<td>M22520/1-02</td>
</tr>
<tr>
<td>2,3</td>
<td>16-1</td>
<td>M22520/7-01</td>
<td>M22520/7-04</td>
</tr>
<tr>
<td>2,3</td>
<td>20-1</td>
<td></td>
<td>M22520/1-02</td>
</tr>
<tr>
<td>2,3</td>
<td>22-1</td>
<td>**Astro #612118</td>
<td>**Astro #615507</td>
</tr>
</tbody>
</table>

*Pico Crimping Tool Co.  
Code Ident. No. 29268

**Astro Tool Co. (Formerly Buchanan Crimp Tool Products)  
Code Ident. No. 58164

3.1.1.1 Power contact materials and finish. The contacts shall be made from beryllium copper, selected from raw materials with a minimum of impurities. The entire contact shall be heat treated to a hardness of 115,000 psi min. The crimp barrel shall be so annealed that the crimp requirements are met. (The heat treatment of the size 8 pin contact only is optional.) The contact plating shall be gold as specified in MIL-G-45204, Type II, Grade C, Class 2 over copper in accordance with MIL-C-14550. Copper shall be 0.000020 inch thick, minimum to 0.00010 inch thick maximum. A gold plating as specified in MIL-G-45204, Type I, Grade A, Class 1 shall be used as an intermediate plating. Plating thickness shall be measured in accordance with MIL-G-45204. The microscopic test shall be the referee method.

3.1.1.2 Socket-contact sleeve material and finish. The sleeve shall be 304 Cres per ASTM-A-269 or 305 Cres per QQ-S-766. The sleeve shall be passivated per MIL-S-5002 and have a finish of 63 or better. The sleeve material shall not jeopardize compliance with the residual magnetism requirement of Paragraph 3.6.11 in the basic specification, GSFC S-311-P-718.

3.1.1.3 Pin-engaging end. The entering end of pin contacts shall be either conical to form a maximum-included angle of 90 degrees, or shall be formed with a spherical radius approximately one-half the diameter of the pin.

3.1.1.4 Socket-engaging end. The engaging end of socket contacts shall be rounded or chamfered to allow for directing and centering of the entering pin contact. The socket contact shall provide the spring-action for maintaining the contact pressure.
between the pin and socket. Socket contacts shall be of the closed-entry design to exclude the entry of oversized pins.

3.1.1.5 Color identifier. (Size 1 connectors) Size 8 and 16 power contacts shall be identified by a band (s) of colored ink on the outer circumference of the wire well. Identifying colors are as follows: - Also See 3.1.1.6 and 1.3.4 (Prior to 1/1/87)

<table>
<thead>
<tr>
<th>Contact Style</th>
<th>( \text{GP-P})</th>
<th>( \text{GP-S})</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-1 Red</td>
<td>10</td>
<td>Contact Style 8-1</td>
</tr>
<tr>
<td>8-2 Yellow</td>
<td>11</td>
<td>Contact Style 8-2</td>
</tr>
<tr>
<td>8-3 White</td>
<td>16</td>
<td>Contact Style 8-3</td>
</tr>
<tr>
<td>16-1 Blue</td>
<td>12</td>
<td>Contact Style 16-1</td>
</tr>
<tr>
<td>16-2 Green</td>
<td>13</td>
<td>Contact Style 16-2</td>
</tr>
</tbody>
</table>

Ink shall be epoxy per MIL-I-43553, and the ink band location shall be as shown in Figures 1, 2, 3, and 4.

3.1.1.6 Color identifier (size 1 connector) (after 1/1/87). Size 8 and 16 power contact pins shall be identified as follows: (Also see 3.1.1.5 and 1.3.4)

<table>
<thead>
<tr>
<th>Contact Style</th>
<th>( \text{GP-P})</th>
<th>( \text{GP-S})</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-1 Red</td>
<td>17</td>
<td>Contact Style 8-1</td>
</tr>
<tr>
<td>8-2 Yellow</td>
<td>18</td>
<td>Contact Style 8-2</td>
</tr>
<tr>
<td>8-3 White</td>
<td>19</td>
<td>Contact Style 8-3</td>
</tr>
<tr>
<td>16-1 Blue</td>
<td>20</td>
<td>Contact Style 16-1</td>
</tr>
<tr>
<td>16-2 Green</td>
<td>21</td>
<td>Contact Style 16-2</td>
</tr>
</tbody>
</table>

Ink shall be epoxy per MIL-I-43553, and the ink band locations shall be as shown in Figures 7 and 8.

3.1.1.7 Color identifier (Size 2 and 3 connectors). Size 16, 20 and 22 power contacts shall be identified as follows:

<table>
<thead>
<tr>
<th>Contact Style</th>
<th>( \text{GP-P})</th>
<th>( \text{GP-S})</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-1 Blue/yellow</td>
<td>22</td>
<td>Contact style 16-1</td>
</tr>
</tbody>
</table>

Ink shall be epoxy per MIL-I-43553, and the ink band locations shall be as shown in Figures 7 and 8.
GP P 23  Contact style 16-2  blue/red
GP P 24  Contact style 20-1  green/white
GP P 25  Contact style 22-1  blue/white

3.1.2 Coaxial contact (size 1 & 3 connectors).

3.1.2.1 Design (size 1 & 3 connectors). Coaxial contacts shall meet the applicable requirements of this specification. Center contacts shall be captivated (Figures 5 and 6). Other requirements are as follows:

a. Nominal impedance: 50 ohms.
b. Frequency range: DC to 4 GHz.
c. Voltage standing wave ratio (VSWR):

<table>
<thead>
<tr>
<th>Coaxial Designator</th>
<th>VSWR:(maximum over frequency range) (Mated Pair)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>1.10</td>
</tr>
<tr>
<td>15</td>
<td>1.20</td>
</tr>
</tbody>
</table>

d. Insulation resistance: 5,000 megohms minimum (4.1.3)
e. Dielectric withstanding voltage: 1,000 Vrms, 60 cycle at sea level. (4.1.4)
f. The coaxial connectors shall be capable of continuous operation, without degradation, while conducting RF power as follows within the frequency range specified in b above:

<table>
<thead>
<tr>
<th>Contact Designation</th>
<th>RF Power (watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

g. Coaxial contacts shall be designed to be crimped by the following tools: (Center contacts shall be solderable.)

<table>
<thead>
<tr>
<th>Contact Type</th>
<th>Crimp Tool</th>
<th>Positioner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coax (RG-393/U)</td>
<td>M22910/1</td>
<td>613807*</td>
</tr>
<tr>
<td>Coax (RG-142 B/U)</td>
<td>M22910/1</td>
<td>612700*</td>
</tr>
</tbody>
</table>
3.1.2.2 **Material and finish (contact designators 14 & 15) (connector sizes 1 & 3).** The material and finish shall be as follows:

a. Outer contact: Beryllium copper: QQ-C-530  
   Center contact: Beryllium copper: QQ-C-530

b. Dielectric: Teflon: L-P-403

c. Ferrule: ASTM-B-75 - Finish shall be Tin plated per MIL-T-10727 Type I .0001-.0004

d. The finish of all other coaxial contact metal surfaces shall be as in 3.1.1.1.

3.1.3 **Coaxial, triaxial and data bus contacts (size 2 connector).**

3.1.3.1 **Design (size 2 connector).**

(a) RG-122/U Coax Contact (Figures 13, 14) (Contact Arrangement No. 1)

1) Nominal Impedance: 50 ohms
2) Frequency Range: TBD
3) VSWR: TBD
4) Insulation Resistance: 5000 megohms minimum
5) Dielectric Withstanding Voltage: 1000 VRMS at sea level

(b) RG-142 B/U Coax Contact (Figures 11, 12) (Contact Arrangement No. 2)

1) Nominal Impedance: 50 ohms
2) Frequency Range: TBD
3) VSWR: TBD
4) Insulation Resistance: 5000 megohms minimum
5) Dielectric Withstanding Voltage: 1000 VRMS at sea level
(c) Triaxial (Figures 11, 12) (Contact Arrangement No. 2)

1) Nominal Impedance: 95 ohms
2) Frequency Range: TBD
3) VSWR: TBD
4) Insulation Resistance: 5000 megohms minimum
5) Dielectric Withstanding Voltage at sea level:
   Intermediate to Outer - 500 VRMS
   Center to Intermediate - 1000 VRMS

(d) Data Bus (Concentric Twin Ax) (Figures 11, 12) (Contact Arrangement No. 2)

1) Nominal Impedance: 77 ohms
2) Frequency Range: 0-20 MHz
3) VSWR: TBD
4) Insulation Resistance: 5000 megohms minimum
5) Dielectric Withstanding Voltage at sea level:
   Intermediate to Outer - 500 VRMS
   Center to Intermediate - 1000 VRMS

(e) Coaxial contacts shall be designed to be crimped by the following tools:

<table>
<thead>
<tr>
<th>Coax Contact</th>
<th>Contact Style</th>
<th>Crimp Tool</th>
<th>Positioner</th>
</tr>
</thead>
<tbody>
<tr>
<td>RG-122/U</td>
<td>29</td>
<td>M22520/5-01</td>
<td>M22520/5-05</td>
</tr>
<tr>
<td>Triax</td>
<td>26</td>
<td>C-M22520/2-01</td>
<td>K709*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I-M22520/5-01</td>
<td>Y631 (Closure B)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O-M22520/5-01</td>
<td>Y631 (Closure A)</td>
</tr>
<tr>
<td>Data Bus</td>
<td>27</td>
<td>C-M22520/2-01</td>
<td>K709*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I-M22520/5-01</td>
<td>Y631 (Closure B)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O-M22520/5-01</td>
<td>Y631 (Closure A)</td>
</tr>
</tbody>
</table>
3.1.3.2 Materials and finish (contact designation 26, 27, 28 and 29). The material and finish shall be as follows:

a. Outer Contact
   Intermediate Contact (as applicable)
   Center Contact
   Beryllium
   Copper per: QQ-C-530

b. Dielectric: Teflon L-P-403

c. Ferrule: Beryllium Copper per QQ-C-530, except RG 122/U (Contact Designator GCP/S 29) Aluminum per ASTM-B-75 with a tin plated finish per MIL-T-10727 Type I .0001-.0004 thick.

d. The finish of all other coaxial contact metal surfaces shall be gold per MIL-G-45204, Class 1 (.000050 minimum).

3.1.4 Contact removal. The design of all contacts shall permit individual insertion and removal from the connector with the use of manufacturer approved tools.

3.2 Performance. (1.2)

3.2.1 Crimp-tensile strength. When tested in accordance with 4.1.1, the tensile strength of crimped joints for individual contacts shall not be less than that indicated in Table III. Ten contact pairs shall be tested for each contact type.

4. QUALITY ASSURANCE PROVISIONS (1.2)

4.1 Test methods.

4.1.1 Crimp-tensile strength. Specimens of contacts crimped to wires shall be placed in a standard tensile-testing machine and an axial load shall be applied. The wire shall not pull out of the contact nor break nor become distorted to such an extent that it is unfit for use before the minimum tensile strength, as specified in Table III is reached. Wire breakage not due to crimping, at less than the tensile loads specified, shall not constitute a failure.

4.1.2 Contact engagement and separation. The maximum and minimum test pins used shall be in accordance with MS3197 except as noted. The test pin shall not bottom in the socket.
### Table III. Crimp-tensile strength.

<table>
<thead>
<tr>
<th>Contact Type</th>
<th>Test Wire or Cable</th>
<th>Tensile Strength (min) (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SIZE 1 CONNECTOR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPS 10</td>
<td>Size 8(1)</td>
<td>220</td>
</tr>
<tr>
<td>GPP 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPP 17</td>
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<td></td>
</tr>
<tr>
<td>GPS 11</td>
<td>Size 12(1)</td>
<td>110</td>
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<tr>
<td>GPP 11</td>
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</tr>
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<td>GPP 18</td>
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<td>GPS 16</td>
<td>Size 10(1)</td>
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<td>GPP 19</td>
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<td>GPS 12</td>
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<td>GPP 12</td>
<td>20</td>
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<tr>
<td>GPP 20</td>
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<tr>
<td>GPS 13</td>
<td>Size 22(1)</td>
<td>12</td>
</tr>
<tr>
<td>GPP 13</td>
<td>26</td>
<td>5</td>
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<tr>
<td>GPP 21</td>
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<tr>
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<tr>
<td>GCP 14</td>
<td>RG-393/U(2)</td>
<td>90 (Overall)</td>
</tr>
<tr>
<td>GCS 14</td>
<td></td>
<td>40 (Center contact soldered)</td>
</tr>
<tr>
<td>GCP 15</td>
<td>RG-1428/U(3)</td>
<td>50 (Overall)</td>
</tr>
<tr>
<td>GCS 15</td>
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<td>20 (Center contact soldered)</td>
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<tr>
<td><strong>SIZE 2 &amp; 3 CONNECTORS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPP 22</td>
<td>Size 16(1)</td>
<td>50</td>
</tr>
<tr>
<td>GPS 22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPP 23</td>
<td>Size 22(1)</td>
<td>12</td>
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<tr>
<td>GPS 23</td>
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<td></td>
</tr>
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<td>GPP 24</td>
<td>Size 20(1)</td>
<td>20</td>
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<tr>
<td>GPS 24</td>
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<td></td>
</tr>
<tr>
<td>GPP 25</td>
<td>Size 22(1)</td>
<td>12</td>
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<td>GPS 25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GTP 26</td>
<td>953005117(5)</td>
<td>center - 8</td>
</tr>
<tr>
<td>GTS 26</td>
<td></td>
<td>inner - 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>outer - 25</td>
</tr>
<tr>
<td>GDP 27</td>
<td>51-05091(6)</td>
<td>center - 3</td>
</tr>
<tr>
<td>GDS 27</td>
<td></td>
<td>inner - 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>outer - 25</td>
</tr>
<tr>
<td>GCP 28</td>
<td>RG-1428/U(3)</td>
<td>center - 8</td>
</tr>
<tr>
<td>GCS 28</td>
<td></td>
<td>outer - 25</td>
</tr>
<tr>
<td>GCP 29</td>
<td>RG-122/U(4)</td>
<td>center - 8</td>
</tr>
<tr>
<td>GCS 29</td>
<td></td>
<td>outer - 25</td>
</tr>
<tr>
<td>GCP 14</td>
<td>RG-393/U(2)</td>
<td>90 (Overall)</td>
</tr>
<tr>
<td>GCS 14</td>
<td></td>
<td>40 (Center contact soldered)</td>
</tr>
</tbody>
</table>
4.1.3 Insulation resistance. Coaxial contacts shall be tested in accordance with method 302, test condition B of MIL-STD-202. Measure between the center contact and body. Contacts not meeting the minimum insulation resistance in 3.1.2.1 shall be rejected.

4.1.4 Dielectric withstanding voltage. Coaxial contacts shall be tested in accordance with method 301 of MIL-STD-202. The magnitude of the test voltage is as stated in 3.1.2.1 and the points of application are between the center contact and body. Contacts showing evidence of damage, arcing or breakdown shall be rejected.

4.2 Final inspection. As a minimum and prior to connector qualification or shipment, individual contacts shall be 100-percent inspected for:

a. Workmanship as delineated in the general specification (1.2)

b. All socket contacts shall be tested by inserting a weighted, minimum diameter test pin one time into each contact. The gage test pin shall be per MS3197 except as noted. The weight shall be as specified in Table IV. Contacts failing to retain the weighted test pin shall be rejected.

c. Each contact (part number) shall be checked for critical dimensions. The examination shall be performed using statistical sampling in accordance with MIL-STD-105, special inspection level S-4; the acceptable quality level (normal) (AQL) shall be one percent.

5. PREPARATION FOR DELIVERY (1.2)

6. NOTES (1.2)
### Table IV
Minimum Contact Separation Forces

<table>
<thead>
<tr>
<th>Contact Type</th>
<th>Weight in Ounces</th>
<th>Min. Test Pin Dia in In.</th>
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</thead>
<tbody>
<tr>
<td>CONNECTOR SIZE 1</td>
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<tr>
<td>Size 8</td>
<td>5.0</td>
<td>MS3197 - 8X1</td>
</tr>
<tr>
<td>Size 16</td>
<td>2.0</td>
<td>MS3197 - 16X1</td>
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<tr>
<td>Coaxial RG393/U Center Contact</td>
<td>1.0</td>
<td>0.0630 +0.0001 -0.0000</td>
</tr>
<tr>
<td>Coaxial RG142B/U Center Contact</td>
<td>1.0</td>
<td>0.0480 +0.0001 -0.0000</td>
</tr>
<tr>
<td>CONNECTOR SIZE 2 and SIZE 3</td>
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<td></td>
</tr>
<tr>
<td>Size 16</td>
<td>2.0</td>
<td>MS3197-16X1</td>
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<td>Size 20</td>
<td>0.7</td>
<td>MS3197-20X1</td>
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<td>Size 22</td>
<td>0.7</td>
<td>MS3197-22X1</td>
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<tr>
<td>Triaxial (Center Contact)</td>
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<td>Data Bus (Center Contact)</td>
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<td>0.0235 +0.0001 -0.0000</td>
</tr>
<tr>
<td>Coaxial (RG-142B/U) (Center Contact)</td>
<td>0.5</td>
<td>0.0235 +0.0001 -0.0000</td>
</tr>
<tr>
<td>Coaxial (RG-122/U) (Center Contact)</td>
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<td>0.0235 +0.0001 -0.0000</td>
</tr>
<tr>
<td>Coaxial RG393/U (Center Contact)</td>
<td>1.0</td>
<td>0.0630 +0.0001 -0.0000</td>
</tr>
</tbody>
</table>

Custodian:

Code 311.2  
Goddard Space Flight Center  
Greenbelt, MD 20771
NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.

2. ALL DIAMETERS [A] 0.003

3. PAINT STRIPE INDICATED TO BE COLORED AS FOLLOWS:
   RED FOR GPP 10; YELLOW FOR GPP 11; WHITE FOR GPP 16.
   0.268 MAX OVER PAINT FOR GPP 10 AND GPP 16.

4. MACHINED DIMENSIONS ARE BEFORE PLATING.

FIGURE 1 - PIN CONTACT CONFIGURATION SIZE 8
(CONNECTOR SIZE 1)
(GPP 10; GPP 11; GPP 16)
(PAGE 1 OF 2)
FIGURE 1 - PIN CONTACT CONFIGURATION SIZE 8 (CONT'D)
(CONNECTOR SIZE 1)
(GPP 10; GPP 11; GPP 16)
(PAGE 2 OF 2)
NOTES: UNLESS OTHERWISE SPECIFIED
1. INTERPRET PER DOD-STD-100.
2. ALL DIAMETERS ⊗ A ⊘ .003
   △ DIAMETER OVER LENGTH INDICATED TO BE COLORED AS FOLLOWS:
   RED FOR GPS 10; YELLOW FOR GPS 11; WHITE FOR GPS 16.
   COLOR BAND LOCATIONS ARE TYPICAL.
   .268 MAX OVER PAINT FOR GPS 10 AND GPS 16.
4. MACHINED DIMENSIONS ARE BEFORE PLATING.

FIGURE 2 - SOCKET CONTACT CONFIGURATION SIZE 8
(CONNECTOR SIZE 1).
(GPS 10; GPS 11; GPS 16)
(PAGE 1 OF 2)
FIGURE 2 – SOCKET CONTACT CONFIGURATION SIZE 8 (CONT'D)
(CONNECTOR SIZE 1)
(GPS 10; GPS 11; GPS 16)
(PAGE 2 OF 2)
ENGAGING END
APPROX SPHERICAL
WITH $\phi_{\text{0.032}} - \phi_{\text{0.017}}$
FLAT

$\phi_{\text{0.0628}}$
.0612
-A-

.0612
.0628

.32

.0628
.0612

.130
.132

.048
.048

.044
.048

.1007
.1023

R .003
MAX

R .003
MAX

.248
.257

.260
.260

.0510
.520

.050
.048

.005
.005

.003
.003

.002
.002

.010 X 47°
.010 X 47°

.005 X 43°
.005 X 43°

CHAMFER

COLOR CODE TYP VIEW

NOTES: UNLESS OTHERWISE SPECIFIED
1. INTERPRET PER DOD-STD-100.
2. ALL DIAMETERS $\bigcirc A \phi_{\text{0.003}}$

$\triangle$ DIAMETER OVER LENGTH INDICATED TO BE COLORED AS FOLLOWS:
BLUE FOR GPP 12; GREEN FOR GPP 13.
$\phi_{\text{0.104}}$ MAX OVER PAINT.

4. MACHINED DIMENSIONS ARE BEFORE PLATING.

FIGURE 3 — PIN CONTACT CONFIGURATION SIZE 16
(CONNECTOR SIZE 1)
(GPP 12; GPP 13)
NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.

2. THE CRIMP JOINT OF THE HOOD TO CONTACT BODY SHALL WITHSTAND A 5 LB. MINIMUM AXIAL PULL.

3. PAINT DIAMETER OVER LENGTH NOTED USING INK AS FOLLOWS:
   - BLUE FOR GPS 12;
   - GREEN FOR GPS 13.
   - Ø.104 MAX OVER PAINT.

4. MACHINED DIMENSIONS ARE BEFORE PLATING.

FIGURE 4 - SOCKET CONTACT CONFIGURATION SIZE 16
(CONNECTOR SIZE 1)
(GPS 12; GPS 13)
NOTES: UNLESS OTHERWISE SPECIFIED
1. INTERPRET PER DOD-STD-100.
GCP 14-2 AND GCP 15-2
2. ALL DIAMETERS
\[ A \phi 0.003 \]
3. FOR MATERIALS AND FINISHES, SEE PARA 3.1.2.2.
RG-393/U-MIL-C-17/127
RG-142 B/U-MIL-C-17/60
5. MACHINED DIMENSIONS ARE BEFORE PLATING.

SECTION Z-Z
FRONT SHELL

FIGURE 5 - PIN CONTACT COAX PLUG
(GCP 14 AND GCP 15)
(CONNECTOR SIZE 1)
(RG-393/U AND RG-142 B/U)
(PAGE 1 OF 5)
FIGURE 5 - PIN CONTACT COAX PLUG (CONTD)
(GCP 14 AND GCP 15)
(CONNECTOR SIZE 1)
(RG-393/U AND RG-142 B/U)
(PAGE 2 OF 5)
SECTION Y-Y
FRONT DIELECTRIC

<table>
<thead>
<tr>
<th>PART NO.</th>
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<th>ØB</th>
<th>ØC</th>
<th>ØD</th>
<th>ØE</th>
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<tr>
<td>GCP 14-4</td>
<td>RG 393</td>
<td>.420</td>
<td>.331</td>
<td>.252</td>
<td>.125</td>
<td>.145</td>
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<tr>
<td>GCP 15-4</td>
<td>RG 142</td>
<td>.278</td>
<td>.201</td>
<td>.141</td>
<td>.095</td>
<td>.114</td>
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SECTION W-W
REAR DIELECTRIC

GCP 14-5 AND GCP 15-5

FIGURE 5 - PIN CONTACT COAX PLUG (CONT'D)
(GCP 14 AND GCP 15)
(CONNECTOR SIZE 1)
(RG-393/U AND RG-142 B/U)
(PAGE 3 OF 5)
### Center Pin Contact

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>USAGE</th>
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<th>ØC</th>
<th>ØD</th>
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<th>F</th>
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<tr>
<td>GCP 14-1</td>
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<td>.123</td>
<td>.101</td>
<td>.064</td>
<td>.200</td>
<td>.160</td>
</tr>
<tr>
<td>GCP 15-1</td>
<td>RG 142</td>
<td>.111</td>
<td>.094</td>
<td>.044</td>
<td>.049</td>
<td>.190</td>
<td>.150</td>
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</table>

**Figure 5 - Pin Contact Coax Plug (Contd)**

(GCP 14 and GCP 15)

(Connector Size 1)

(RG-393/U and RG-142 B/U)

(PAGE 4 OF 5)
GCP 14-6 AND GCP 15-6

CRIMP FERULE

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>USAGE</th>
<th>( \phi_A )</th>
<th>( \phi_B )</th>
<th>( \phi_C )</th>
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<td>GCP 14-6</td>
<td>RG-393</td>
<td>.488</td>
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<td>.453</td>
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<tr>
<td>GCP 15-6</td>
<td>RG-142</td>
<td>.255</td>
<td>.224</td>
<td>.214</td>
<td>.094</td>
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</table>

FIGURE 5 - PIN CONTACT COAX PLUG (CONTD)
(GCP 14 AND GCP 15)
(CONNECTOR SIZE 1)
(RG-393/U AND RG-142 B/U)
(PAGE 5 OF 5)
FIGURE 6 - SOCKET CONTACT COAX
(GCS 14 AND GCS 15)
(CONNECTOR SIZE 1)
(RG-393/U AND RG-142 B/U)
(PAGE 1 OF 5)
FIGURE 6 - SOCKET CONTACT COAX (CONT'D)
(GCS 14 AND GCS 15)
(CONNECTOR SIZE 1)
(RG-393/U AND RG-142 B/U)
(PAGE 2 OF 5)
Y - Y SECTION
FRONT DIELECTRIC

GCS 14-4 AND GCS 15-4

<table>
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<th>PART USAGE</th>
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<td>.095</td>
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SECTION Z - Z
REAR DIELECTRIC

GCS 14-5 AND GCS 15-5

FIGURE 6 - SOCKET CONTACT COAX (CONTD)
(GCS 14 AND GCS 15)
(CONNECTOR SIZE 1)
(RG-393/U AND RG-142 B/U)
(PAGE 3 OF 5)
SECTION U - U
GCS 14-1

GCS 15-1
(CONFIGURATION SAME AS GCS 14-1 EXCEPT AS NOTED)

CENTER SOCKET CONTACT

<table>
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<th>PART NO.</th>
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<th>( \phi A )</th>
<th>( \phi B )</th>
<th>( \phi C )</th>
<th>( \phi D )</th>
<th>E</th>
<th>F</th>
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<td>RG 393</td>
<td>.142</td>
<td>.123</td>
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<td>GCS 15-1</td>
<td>RG 142</td>
<td>.111</td>
<td>.094</td>
<td>.044</td>
<td>.055</td>
<td>.295</td>
<td>.020</td>
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<td>.150</td>
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</table>

FIGURE 6 - SOCKET CONTACT COAX (CONTD)
(GCS 14 AND GCS 15)
(CONNECTOR SIZE 1)
(RG-393/U AND RG-142 B/U)
(PAGE 4 OF 5)
GCS 14-6 AND GCS 15-6
CRIMP FERULE

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>USAGE</th>
<th>ØA</th>
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<th>ØC</th>
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<tr>
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<td>RG 393</td>
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<td>.437</td>
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<td>GCS 15-6</td>
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<td>.224</td>
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</table>

FIGURE 6 – SOCKET CONTACT COAX (CONTD)
(GCS 14 AND GCS 15)
(CONNECTOR SIZE 1)
(RG-393/U AND RG-142 B/U)
(PAGE 5 OF 5)
NOTE: UNLESS OTHERWISE SPECIFIED
1. INTERPRET PER DOD-STD-100.
2. ALL DIAMETERS [O A $\phi.003$]
3. PAINT STRIPE INDICATED TO BE COLORED AS FOLLOWS: RED FOR GPP 17; YELLOW FOR GPP 18; WHITE FOR GPP 19. $\phi.268$ MAX OVER PAINT FOR GPP 17 AND GPP 19.
4. MACHINED DIMENSIONS ARE BEFORE PLATING.

FIGURE 7 - PIN CONTACT CONFIGURATION SIZE 8
(CONNECTOR SIZE 1)
(GPP 17; GPP 18; GPP 19)
(PAGE 1 OF 2)
FIGURE 7 - PIN CONTACT CONFIGURATION SIZE 8 (CONT'D)
(CONNECTOR SIZE 1)
(GPP 17; GPP 18; GPP 19)
(PAGE 2 OF 2)
ENGAGING END
APPROX SPHERICAL
WITH Ø.032 - Ø.017
FLAT

Φ.0628
Φ.0612
32

Φ.0683
Φ.0667

R .020
MAX

R .025
MAX

.035
.026
THRU
ONE SIDE ONLY

.048
.044

.050
.025

.040
.005

.050
.025

2X .045

GPP 20

COLOR CODE TYP VIEW
GPP 20 AND GPP 21

NOTE: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.
2. ALL DIAMETERS [A Ø.003]

GPP 20 AND GPP 21 TO BE COLORED WITH 2 COLOR BANDS AS SHOWN.
BLUE FOR GPP 20; GREEN FOR GPP 21.
Ø.104 MAX OVER CURED PAINT.

4. MACHINED DIMENSIONS ARE BEFORE PLATING.

FIGURE 8 - PIN CONTACT CONFIGURATION SIZE 16
(CONNECTOR SIZE 1)
(GPP 20; GPP 21)
GPP 22, GPP 23, GPP 24 AND GPP 25 EXCEPT AS NOTED BELOW

FIGURE 9 - PIN CONTACT CONFIGURATION SIZES 16–20–22
(CONNECTOR SIZE 2 AND SIZE 3)
(GPP 22, GPP 23, GPP 24 AND GPP 25)
(PAGE 1 OF 2)
### TABLE I

<table>
<thead>
<tr>
<th>CONTACT SIZE</th>
<th>A REF</th>
<th>B</th>
<th>C</th>
<th>ØD</th>
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<th>ØF</th>
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<th>ØJ</th>
<th>ØK</th>
<th>ØL</th>
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<th>GSFC TYPE DESIGNATION</th>
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<td>.186</td>
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<td>.0772</td>
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</tr>
<tr>
<td>16-2</td>
<td>.865</td>
<td>.257</td>
<td>.608</td>
<td>.0627</td>
<td>.047</td>
<td>.0428</td>
<td>.270</td>
<td>.032</td>
<td>.1022</td>
<td>.1320</td>
<td>.0378</td>
<td>.0513</td>
<td>BLUE/RED</td>
<td>GPP23</td>
</tr>
<tr>
<td></td>
<td>MAX</td>
<td>.248</td>
<td>.602</td>
<td>.0612</td>
<td>.044</td>
<td>.0382</td>
<td>.250</td>
<td>.026</td>
<td>.1007</td>
<td>.1297</td>
<td>.0668</td>
<td>.0497</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:** UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.
2. MACHINED DIMENSION BEFORE PLATING.
   △ COLOR BAND INFORMATION PER TABLE.

**FIGURE 9** - PIN CONTACT CONFIGURATION SIZES 16-20-22 (CONTD)
(CONNECTOR SIZE 2 AND SIZE 3)
(GPP 22, GPP 23, GPP 24 AND GPP 25)
(PAGE 2 OF 2)
NOTES: UNLESS OTHERWISE SPECIFIED
1. INTERPRET PER DOD-STD-100.
   \[\Delta\] THE CRIMP JOINT OF THE HOOD TO THE BODY SHALL WITHSTAND A 5 LB PULL. 3 OR 4 INDENTATIONS 120° OR 90° APART (AS APPLICABLE).
2. MACHINED DIMENSIONS ARE BEFORE PLATING.
   \[\Delta\] COLOR BAND IDENTIFICATION PER TABLE I.

FIGURE 10 - SOCKET CONTACT CONFIGURATION SIZES 16-20-22
(CONNECTOR SIZE 2 AND SIZE 3)
(GPS 22, GPS 23, GPS 24 AND GPS 25)
(PAGE 1 OF 2)
TABLE I. POWER SOCKET CONTACTS (SIZE 2 AND SIZE 3)

<table>
<thead>
<tr>
<th>CONTACT SIZE</th>
<th>ØA</th>
<th>ØB</th>
<th>ØC</th>
<th>ØD</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>COLOR BAND</th>
<th>GSFC TYPE DESIGNATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-1</td>
<td>.133</td>
<td>.113</td>
<td>.068</td>
<td>.103</td>
<td>.048</td>
<td>.500</td>
<td>.767</td>
<td>.284</td>
<td>BLUE/</td>
<td>GPS22</td>
</tr>
<tr>
<td></td>
<td>.130</td>
<td>.110</td>
<td>.065</td>
<td>.101</td>
<td>.044</td>
<td>.493</td>
<td>.730</td>
<td>.250</td>
<td>YELLOW</td>
<td></td>
</tr>
<tr>
<td>16-2</td>
<td>.133</td>
<td>.113</td>
<td>.0378</td>
<td>.0513</td>
<td>.048</td>
<td>.510</td>
<td>.757</td>
<td>.284</td>
<td>BLUE/</td>
<td>GPS23</td>
</tr>
<tr>
<td></td>
<td>.130</td>
<td>.110</td>
<td>.0362</td>
<td>.0497</td>
<td>.044</td>
<td>.483</td>
<td>.740</td>
<td>.250</td>
<td>RED</td>
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<tr>
<td>20-1</td>
<td>.103</td>
<td>.078</td>
<td>.050</td>
<td>.078</td>
<td>.048</td>
<td>.500</td>
<td>.656</td>
<td>.186</td>
<td>GREEN/</td>
<td>GPS24</td>
</tr>
<tr>
<td></td>
<td>.100</td>
<td>.076</td>
<td>.048</td>
<td>.076</td>
<td>.044</td>
<td>.493</td>
<td>.636</td>
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<td>WHITE</td>
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<tr>
<td>22-1</td>
<td>.0702</td>
<td>.062</td>
<td>.0378</td>
<td>.0513</td>
<td>.032</td>
<td>.488</td>
<td>.721</td>
<td>.157</td>
<td>BLUE/</td>
<td>GPS25</td>
</tr>
<tr>
<td></td>
<td>.0687</td>
<td>.061</td>
<td>.0362</td>
<td>.0497</td>
<td>.029</td>
<td>.478</td>
<td>.708</td>
<td>.142</td>
<td>WHITE</td>
<td></td>
</tr>
</tbody>
</table>

FIGURE 10 - SOCKET CONTACT CONFIGURATION SIZES 16-20-22 (CONT'D)
(CONNECTOR SIZE 2 AND SIZE 3)
(GPS 22, GPS 23, GPS 24 AND GPS 25)
(PAGE 2 OF 2)
\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)

<table>
<thead>
<tr>
<th>GSFC TYPE DESIGNATION</th>
<th>NOMENCLATURE</th>
<th>COLOR BAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCP 28</td>
<td>CONTACT PIN, COAX</td>
<td>GREEN</td>
</tr>
<tr>
<td>GTP 26</td>
<td>CONTACT PIN, TRIAX</td>
<td>YELLOW</td>
</tr>
<tr>
<td>GDP 27</td>
<td>CONTACT PIN, DATA BUS</td>
<td>BLACK</td>
</tr>
</tbody>
</table>

\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)

\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)

\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)

\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)

\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)

\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)

\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)

\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)

\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)

\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)

\( \text{\textDelta \ APPROPRIATE \ COLOR \ BAND \ (SEE \ TABLE) \ TO \ BE \ LOCATED \ ON \ .273 - .275 \ DIAMETER.} \)
FIGURE 11 - PIN CONTACT CONFIGURATION (PLUG) (CONT'D)
TRIAXIAL, COAXIAL (RG-142 B/U)
DATA BUS
(GTP 26, GCP 28 AND GDP 27)
(PAGE 2 OF 2)
FIGURE 12 - SOCKET CONTACT CONFIGURATION (JACK)
TRIAxIAL, COAXIAL (RG-142 B/U)
DATA BUS
(GTS 26, GCS 28 AND GDS 27)
(PAGE 1 OF 2)
SECTION A-A

FIGURE 12 - SOCKET CONTACT CONFIGURATION (JACK) (CONTD)
TRIAXIAL, COAXIAL (RG-142 B/U)
DATA BUS
(GTS 26, GCS 28 AND GDS 27)
(PAGE 2 OF 2 )
FIGURE 13 - PIN CONTACT CONFIGURATION (COAXIAL PLUG)
(RG-122/U)
(GCP 29)
FIGURE 14 - SOCKET CONTACT CONFIGURATION (COAXIAL JACK)
(RG-122/U)
(GCS 29)
NOTE: UNLESS OTHERWISE SPECIFIED

1. INTERPRET PER DOD-STD-100.

THE CRIMP JOINT OF THE HOOD TO CONTACT BODY SHALL
WITHSTAND A 5 LB MINIMUM AXIAL PULL.

DIAMETER OVER LENGTH NOTED USING INK AS FOLLOWS:
2 BLUE FOR GPS 20; 2 GREEN FOR GPS 21.
Ø.104 MAX OVER PAINT.

4. MACHINED DIMENSIONS ARE BEFORE PLATING.

FIGURE 15 — SOCKET CONTACT CONFIGURATION SIZE 16
(CONNECTOR SIZE 1)
(GPS 20; GPS 21)