


| | | | |
|--|--------------------------------------|---|--------------------|
| NUMBER BUS-12-075 | TYPE PRODUCT SPECIFICATION |  | |
| TITLE Friction Latch Header Connector | | PAGE 1 of 8 | REVISION E |
| | | AUTHORIZED BY J. ZHOU | DATE 01 July 15 |
| CLASSIFICATION UNRESTRICTED | | | |

1.0 GENERAL

1.1 Scope


This specification covers the Friction Latch Header Connector, a header designed for use in low-power applications requiring a printed wiring board mounted straight or right angle disconnect. The header provides only the male half of the interconnection, using 0.025 square female Mini Latch Housing connector to complete the connection. This product can be Lead Free and meets the requirements of the European union Directive of Restrictions for Hazardous Substances (directive 2002/95/EC). The friction latch, provided by long plastic ledges, act as locking system with female housing to prevent unmating, due to vibration in operation. The specification is composed of the following sections:

| <u>Paragraph</u> | <u>Title</u> | <u>Page</u> |
|------------------|------------------------------|-------------|
| 1.0 | GENERAL | 1 |
| 1.1 | Scope | 1 |
| 1.2 | Type | 1 |
| 2.0 | APPLICABLE DOCUMENTS | 2 |
| 3.0 | REQUIREMENTS | 2 |
| 3.1 | Qualification | 2 |
| 3.2 | Material | 2 |
| 3.3 | Finish | 3 |
| 3.4 | Design and Construction | 3 |
| 3.5 | Electrical Characteristics | 4 |
| 3.6 | Mechanical Characteristics | 4 |
| 3.7 | Environmental Conditions | 5 |
| 3.8 | Solderability | 5 |
| 4.0 | QUALITY ASSURANCE PROVISIONS | 5 |
| 4.1 | Equipment Calibration | |
| 4.2 | Inspection Conditions | |
| 4.3 | Qualification Inspection | |
| 4.4 | Acceptance | |

1.2 Type

The connector shall be available in one of the following type classifications, as limited by the appropriate product drawing.

| <u>Type</u> | <u>Plating</u> |
|-------------|---|
| I | Gold Flash |
| II | 15 microinches Gold on contact and tail, optional 78~295 microinches tin on tail |
| III | 30 microinches Gold on contact and tail, optional 78~295 microinches tin on tail |
| IV | 50 microinches Gold on contact and tail, optional 78~295 microinches tin on tail |
| V | Tin-Lead |
| VI | 15 microinches Palladium Alloy on contact and tail, optional 78~295 microinches tin on tail |
| VII | 30 microinches Palladium Alloy on contact and tail, optional 78~295 microinches tin on tail |

| | | | |
|--|--------------------------------------|---|--------------------|
| NUMBER BUS-12-075 | TYPE PRODUCT SPECIFICATION |  | |
| TITLE Friction Latch Header Connector | | PAGE 2 of 8 | REVISION E |
| | | AUTHORIZED BY J. ZHOU | DATE 01 July 15 |
| CLASSIFICATION UNRESTRICTED | | | |

2.0 APPLICABLE DOCUMENTS

The following documents, of the issue in effect on the date of the latest revision of this specification, shall form a part of this specification to the extent specified herein.

Military Specifications

| | |
|-------------|---|
| MIL-F-14256 | Flux, Soldering, Liquid (Rosin Base), Activated |
| MIL-G-45204 | Gold Plating, Electrodeposited |
| MIL-P-45209 | Palladium Plating, Electrodeposited |
| MIL-P-55110 | Printed Wiring Boards |
| MIL-P-81728 | Plating, Tin-Lead (Electrodeposited) |

Federal Specifications

| | |
|----------|---|
| QQ-N-290 | Nickel Plating (Electrodeposited) |
| QQ-W-343 | Wire, Electrical and Nonelectrical, Copper (uninsulated) |
| QQ-S-571 | Solder: Lead Alloy, Tin-Lead Alloy, and Tin Alloy, Flux Cored Ribbon and Wire, and Solid Form |

Military Standards

| | |
|---------------|---|
| MIL-STD-105 | Sampling Procedures and Tables for Inspection by Attributes |
| MIL-STD-202 | Test Methods for Electrical and Electronic Component Parts |
| MIL-STD-275 | Printed Wiring for Electronic Equipment |
| MIL-STD-1130 | Connections, Electrical, Solderless Wrapped |
| MIL-STD-1344 | Test Methods for Electrical Connectors |
| MIL-STD-45662 | Calibration System Requirements |

Industry Specifications/Standards

| | |
|-------------|---|
| UL-94 | Tests for Flammability of Plastic Materials |
| ASTM B-159 | Phosphor Bronze Wire |
| ASTM D-4066 | Reinforced and Filled Nylon Injection Molding and Extrusion Materials |

FCI Labs Reports-Supporting Data

| | |
|----------|---------------------------------|
| ZA5-2625 | Lead Free Plating investigation |
|----------|---------------------------------|


3.0 REQUIREMENTS

3.1 Qualification

Connectors furnished under this specification shall be products capable of meeting the qualification test requirements specified herein.

3.2 Material

The material for each part shall be as specified herein, or equivalent. Substitute material shall meet the performance requirements of this specification.

| | | | |
|--|--------------------------------------|---|--------------------|
| NUMBER BUS-12-075 | TYPE PRODUCT SPECIFICATION |  | |
| TITLE Friction Latch Header Connector | | PAGE 3 of 8 | REVISION E |
| | | AUTHORIZED BY J. ZHOU | DATE 01 July 15 |
| CLASSIFICATION UNRESTRICTED | | | |

3.2.1 Contact. The contact shall be Phosphor Bronze Alloy UNS C51000 in accordance with ASTM B-159 or other copper alloy as specified on the product drawing.

3.2.2 Insulator. The insulator shall be glass- or mineral-filled nylon in accordance with ASTM D-4066. All plastic material shall be rated V-0 in accordance with UL-94.

3.3 Finish

3.3.1 Types I through IV. The contact shall be plated with the specified minimum thickness (see 1.2) of gold over 50 microinches, minimum, of nickel. The gold deposit shall meet the requirements of MIL-G-45204, Type II, Grade C and the nickel deposit shall meet the requirements of QQ-N-290, Class 2. Noncritical areas, such as the sheared pin tip, may have exposed base metal.


3.3.2 Type V. The contact shall be plated with 150 microinches, minimum, of 93/7 tin-lead or 100-150 microinches pure tin for lead free option over 50 microinches of nickel. The tin-lead deposit shall meet the requirements of MIL-P-81728. Noncritical areas, such as the sheared pin tip, may have exposed base metal.

3.3.3 Type VI and VII. The contact shall be plated with a thin gold flash over the specified minimum thickness (see 1.2) of palladium alloy over 50 microinches, minimum, of nickel. The palladium alloy deposit shall meet the requirements of MIL-P-45209 and the nickel deposit shall meet the requirements of QQ-N-290, Class 2. Noncritical areas, such as the sheared pin tip, may have exposed base metal. Tin plated "LF" product has 100% tin plating in the interface and has not been tested for whisker growth in all interconnect environments.

3.4 Design and Construction

The connector shall be a multi-piece assembly having one or two rows of contacts with solder tail terminations for installation in .040 inch diameter holes in printed wiring boards of standard thickness. The connector contacts shall be insert molded or post-inserted in the insulator on a grid of .100 inches and shall be available in straight or right-angle configurations. The contacts shall be available in various above- and below-board lengths suitable for use as 0.025 inch square male disconnects and soldertail lengths for various board thicknesses connections in accordance with MIL-STD-1130.

3.4.1 Workmanship. Connectors shall be uniform in quality and shall be free from burrs, scratches, cracks, voids, chips, blisters, holes, sharp edges, or other defects that will adversely affect life or serviceability.

| | | | |
|--|--------------------------------------|---|--------------------|
| NUMBER BUS-12-075 | TYPE PRODUCT SPECIFICATION |  | |
| TITLE Friction Latch Header Connector | | PAGE 4 of 8 | REVISION E |
| | | AUTHORIZED BY J. ZHOU | DATE 01 July 15 |
| CLASSIFICATION UNRESTRICTED | | | |

3.5 Electrical Characteristics

3.5.1 Insulation Resistance. The insulation resistance of the unmated and unterminated connector shall be not less than 5000 megohms when measured in accordance with MIL-STD-1344, Method 3003. The following details shall apply:

- a. Test Condition: 500 volts DC applied for 1 minute
- b. Points of Measurement: Between individually paired adjacent and opposing contacts

3.5.2 Dielectric Withstanding Voltage. There shall be no evidence of arc-over, insulation breakdown, or excessive leakage current (> 1 milliampere) when the unmated and unterminated connector is tested in accordance with MIL-STD-1344, Method 3001. The following details shall apply:

- a. Test Potential: See Table I
- b. Test Duration: 50 seconds
- c. Test Condition: 1 (760 Torr - sea level)
- d. Points of Measurement: Between individually paired adjacent and opposing contacts.


TABLE I - DIELECTRIC WITHSTANDING VOLTAGE

| Contact Spring (inch) | Test Voltage (VRMS) |
|--------------------------|------------------------|
| .100 | 1500 |

3.5.3 Capacitance. The capacitance between adjacent or opposing contacts in an unmated and unterminated connector shall not exceed 2.0 picofarads when measured in accordance with MIL-STD-202, Method 305, at a frequency of 100 kilohertz.

3.6 Mechanical Characteristics

3.6.1 Contact Retention. Individual contacts in an unterminated connector shall withstand a load of 3.0 pounds applied in either direction, along the contact axis, without dislodgement from the insulator.

| | | | |
|--|--------------------------------------|---|--------------------|
| NUMBER BUS-12-075 | TYPE PRODUCT SPECIFICATION |  | |
| TITLE Friction Latch Header Connector | | PAGE 5 of 8 | REVISION E |
| | | AUTHORIZED BY J. ZHOU | DATE 01 July 15 |
| CLASSIFICATION UNRESTRICTED | | | |

3.7 Environmental Conditions

3.7.1 Thermal Shock. After exposure of an unmated and unterminated connector to alternate periods of extreme high and low temperature, there shall be no evidence of cracking or crazing of the insulator or other physical damage to the connector. The dielectric withstanding voltage shall be not less than 750 volts RMS 60 Hz (see 3.5.2). The test shall be in accordance with MIL-STD-202, Method 107. The following details shall apply:

- a. Test Conditions: B (1 hour cycles)
- b. Temperature Range: -65° to 125° C

3.7.2 High Temperature Life. After exposure of an unmated and unterminated connector to a high temperature operating environment, the insulation resistance of the connector shall be not less than 5,000 megohms (see 3.5.1). The test shall be in accordance with MIL-STD-202, Method 108. The following details shall apply:

- a. Test Chamber Temperature: 125° C
- b. Test Condition (Duration): B (250 hours)
- c. Operating Conditions: No current

3.8 Solderability


No less than 90% of the dipped surface of the solder leg shall be wet when each solder leg is dipped in a solder bath. The test shall be in accordance with MIL-STD-202, Method 208 C, and the following details shall apply:

- a. Flux: Alpha 100, GX-5 or GX-7
- b. Solder: 60/40 Tin-Lead
- c. Flux Immersion Time: 5 to 10 seconds
- d. Solder Temperature: $230 \pm 5^{\circ}$ C
- e. Dipping Time: 3 ± 0.5 seconds

4.0 QUALITY ASSURANCE PROVISIONS

4.1 Equipment Calibration

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with MIL-C-45662.

| | | | |
|--|--------------------------------------|---|--------------------|
| NUMBER BUS-12-075 | TYPE PRODUCT SPECIFICATION |  | |
| TITLE Friction Latch Header Connector | | PAGE 6 of 8 | REVISION E |
| | | AUTHORIZED BY J. ZHOU | DATE 01 July 15 |
| CLASSIFICATION UNRESTRICTED | | | |

4.2 Inspection Condition

Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:

- a. Temperature: 25°C ± 5°C
- b. Relative Humidity: 30 to 80%
- c. Barometric Pressure: Local ambient


4.3 Qualification Inspection

Qualification inspection shall be performed on sample units produced with equipment and procedures normally used in production.

- 4.3.1 Sample. The qualification sample shall consist of two of the largest size connectors of the particular design, configuration, and type that are the subject of the test.
- 4.3.2 Test Sequence. The sample connectors shall be subjected to the inspections specified in Table II in the order shown.

TABLE II - CONNECTOR QUALIFICATION INSPECTION

| <u>Examination or Test</u> | <u>Paragraph</u> | <u>Test Sample</u> | |
|---------------------------------|------------------|--------------------|----------|
| | | <u>1</u> | <u>2</u> |
| Contact Retention | 3.6.1 | x | - |
| Insulation Resistance | 3.5.1 | x | - |
| Thermal Shock | 3.7.1 | x | - |
| Insulation Resistance | 3.5.1 | x | - |
| Dielectric Withstanding Voltage | 3.5.2 | x | - |
| High Temperature Life | 3.7.2 | x | - |
| Insulation Resistance | 3.5.1 | x | - |
| Capacitance | 3.5.3 | x | - |
| Contact Retention | 3.6.1 | x | - |
| Solderability | 3.8 | - | x |

| | | | |
|--|--------------------------------------|---|--------------------|
| NUMBER BUS-12-075 | TYPE PRODUCT SPECIFICATION |  | |
| TITLE Friction Latch Header Connector | | PAGE 7 of 8 | REVISION E |
| | | AUTHORIZED BY J. ZHOU | DATE 01 July 15 |
| CLASSIFICATION UNRESTRICTED | | | |

4.4 Acceptance

4.4.1 Acceptance Inspection. Acceptance inspection shall be consistent with 4.4.3 below.

4.4.2 Inspection Lot. An inspection lot shall consist of all connectors produced under essentially the same conditions and offered for inspection at one time.


4.4.3 Sampling Plan

4.4.3.1 Statistical sampling and inspection shall be performed for General Inspection

4.4.3.2 FCI is committed to a Zero Defect Philosophy utilizing Statistical Process Control. Our commitment to Zero Defects is a continuous improvement in process and product quality.

4.4.4 Rejected Lots. Rejected lots shall be reworked to correct the defects or screened to remove defective units and re-submitted for inspection.

4.4.5 Disposition of Sample Units. Sample units that have been subjected to the acceptance inspection shall be considered deliverable on the contract or purchase order.

| | | | |
|--|--------------------------------------|---|--------------------|
| NUMBER BUS-12-075 | TYPE PRODUCT SPECIFICATION |  | |
| TITLE Friction Latch Header Connector | | PAGE 8 of 8 | REVISION E |
| | | AUTHORIZED BY J. ZHOU | DATE 01 July 15 |
| CLASSIFICATION UNRESTRICTED | | | |

REVISION RECORD

| <u>REV</u> | <u>PAGE</u> | <u>DESCRIPTION</u> | <u>EC #</u> | <u>DATE</u> |
|------------|-------------|--|--------------|-------------|
| A | All | Change from preliminary to released | J10001 | 03/01/91 |
| B | All | Revised format to be consistent with GS-01-001, and change BERG, Dupont, etc. references to FCI. | V01904 | 08/01/00 |
| C | 1to 3 | Add lead free information | M06-0226 | 06/12/06 |
| D | 1 | Change 1.2 plating description | ELX-N-011931 | 05/31/12 |
| E | 5 | Change temperature of thermal shock and high temperature life | ELX-N-21279 | 07/02/15 |