



DEFENSE LOGISTICS AGENCY
 DEFENSE SUPPLY CENTER, COLUMBUS
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 COLUMBUS OH 43218-3990

IN REPLY
REFER TO

DSCC-VQE-10-020422 (Mr. Robert Puckett / 614-692-0625 / rp)

1 June 2010

SUBJECT: Acceptable Capability Verification Inspection, MIL-PRF-31032, CAGE Code 6T499

Mr. Mike Hill
 Colonial Circuits Inc.
 1026 Warrenton Road
 Fredericksburg, VA 22406-6200

Dear Mr. Hill:

Your Capability Verification Inspection report has been reviewed. The data successfully demonstrates your ability to manufacture printed wiring boards to your current qualifications capabilities. Therefore, Colonial Circuits Inc. is reissued under the current issue of the Department of Defense Performance Specification MIL-PRF-31032, Printed Circuit Board/Printed Wiring Board, and associated specification MIL-PRF-31032 /1, /2, /3, and /4 and your listing will be continued as indicated below on the Qualified Manufacturers List QML-31032.

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|---|---|---|---------------------------------|------------|-----------|----------------------|--------|-------------------|-----------------|--------------|-------|------------------|----|----------------------|--------|------------------------|--------|---------------|----------|---------------|--------------------------------------|------------------|----------------|----------------|--------------------------|---------------|------------------------------|----------------------|------------|---|
| MANUFACTURER NAME & ADDRESS Colonial Circuits Inc. 1026 Warrenton Road Fredericksburg, VA 22406-6200 | BASIC PLANT LOCATION SAME | CAGE CODE: 6T499 CONTACT: Mike Hill PHONE: (540) 753-5511 x.125 FAX: (540) 752-2109 EMAIL: quality@colonialcircuits.com | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capabilities By Technology / Printed Board Type | | QUALIFICATION LETTER | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p align="center">MIL-PRF-31032/1, /2</p> <table border="0"> <tr><td>Base Material</td><td>GF (Woven E-Glass, Epoxy resin)</td></tr> <tr><td>Panel Size</td><td>18" X 24"</td></tr> <tr><td>Max. Board Thickness</td><td>0.127"</td></tr> <tr><td>Max/Min Hole Size</td><td>0.228" / 0.015"</td></tr> <tr><td>Aspect Ratio</td><td>8.5:1</td></tr> <tr><td>Number of Layers</td><td>12</td></tr> <tr><td>Min. Conductor Width</td><td>0.008"</td></tr> <tr><td>Min. Conductor Spacing</td><td>0.005"</td></tr> <tr><td>Part Mounting</td><td>PTH, SMT</td></tr> <tr><td>Finish System</td><td>Tin/Lead Hot Air Solder Level (HASL)</td></tr> <tr><td>Hole Preparation</td><td>Plasma Desmear</td></tr> <tr><td>Copper Plating</td><td>Electrolytic Acid Copper</td></tr> <tr><td>Solder Resist</td><td>Liquid Photo Imageable (LPI)</td></tr> <tr><td>Controlled Impedance</td><td>55-Ω ± 10%</td></tr> </table> | | Base Material | GF (Woven E-Glass, Epoxy resin) | Panel Size | 18" X 24" | Max. Board Thickness | 0.127" | Max/Min Hole Size | 0.228" / 0.015" | Aspect Ratio | 8.5:1 | Number of Layers | 12 | Min. Conductor Width | 0.008" | Min. Conductor Spacing | 0.005" | Part Mounting | PTH, SMT | Finish System | Tin/Lead Hot Air Solder Level (HASL) | Hole Preparation | Plasma Desmear | Copper Plating | Electrolytic Acid Copper | Solder Resist | Liquid Photo Imageable (LPI) | Controlled Impedance | 55-Ω ± 10% | <p align="center">VQ-04-006002 VQ-06-010192</p> |
| Base Material | GF (Woven E-Glass, Epoxy resin) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Panel Size | 18" X 24" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Max. Board Thickness | 0.127" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Max/Min Hole Size | 0.228" / 0.015" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aspect Ratio | 8.5:1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of Layers | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Min. Conductor Width | 0.008" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Min. Conductor Spacing | 0.005" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Mounting | PTH, SMT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Finish System | Tin/Lead Hot Air Solder Level (HASL) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hole Preparation | Plasma Desmear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper Plating | Electrolytic Acid Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solder Resist | Liquid Photo Imageable (LPI) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Controlled Impedance | 55-Ω ± 10% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| MANUFACTURER NAME & ADDRESS Colonial Circuits Inc. 1026 Warrenton Road Fredericksburg, VA 22406-6200 | BASIC PLANT LOCATION SAME | CAGE CODE: 6T499 CONTACT: Mike Hill PHONE: (540) 753-5511 x.125 FAX: (540) 752-2109 EMAIL: quality@colonialcircuits.com | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capabilities By Technology / Printed Board Type | | QUALIFICATION LETTER | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">MIL-PRF-31032/1, /2</p> <table border="0"> <tr><td>Base Material</td><td>GI (Woven E-Glass, Polyimide resin)</td></tr> <tr><td>Panel Size</td><td>18" X 24"</td></tr> <tr><td>Max. Board Thickness</td><td>0.088"</td></tr> <tr><td>Max/Min Hole Size</td><td>0.052" / 0.021"</td></tr> <tr><td>Aspect Ratio</td><td>4.2:1</td></tr> <tr><td>Number of Layers</td><td>14</td></tr> <tr><td>Min. Conductor Width</td><td>0.006"</td></tr> <tr><td>Min. Conductor Spacing</td><td>0.005"</td></tr> <tr><td>Part Mounting</td><td>PTH, SMT</td></tr> <tr><td>Finish System</td><td>Tin/Lead Hot Air Solder Level (HASL)</td></tr> <tr><td>Hole Preparation</td><td>Plasma Desmear and Etchback</td></tr> <tr><td>Copper Plating</td><td>Electrolytic Acid Copper</td></tr> <tr><td>Solder Resist</td><td>Liquid Photo Imageable (LPI)</td></tr> </table> | | Base Material | GI (Woven E-Glass, Polyimide resin) | Panel Size | 18" X 24" | Max. Board Thickness | 0.088" | Max/Min Hole Size | 0.052" / 0.021" | Aspect Ratio | 4.2:1 | Number of Layers | 14 | Min. Conductor Width | 0.006" | Min. Conductor Spacing | 0.005" | Part Mounting | PTH, SMT | Finish System | Tin/Lead Hot Air Solder Level (HASL) | Hole Preparation | Plasma Desmear and Etchback | Copper Plating | Electrolytic Acid Copper | Solder Resist | Liquid Photo Imageable (LPI) | <p style="text-align: center;">VQ-04-006002 VQ-06-010192</p> |
| Base Material | GI (Woven E-Glass, Polyimide resin) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Panel Size | 18" X 24" | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Max. Board Thickness | 0.088" | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Max/Min Hole Size | 0.052" / 0.021" | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aspect Ratio | 4.2:1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of Layers | 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Min. Conductor Width | 0.006" | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Min. Conductor Spacing | 0.005" | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Mounting | PTH, SMT | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Finish System | Tin/Lead Hot Air Solder Level (HASL) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hole Preparation | Plasma Desmear and Etchback | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper Plating | Electrolytic Acid Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solder Resist | Liquid Photo Imageable (LPI) | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| MANUFACTURER NAME & ADDRESS Colonial Circuits Inc. 1026 Warrenton Road Fredericksburg, VA 22406-6200 | BASIC PLANT LOCATION SAME | CAGE CODE: 6T499 CONTACT: Mike Hill PHONE: (540) 753-5511 x.125 FAX: (540) 752-2109 EMAIL: quality@colonialcircuits.com | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capabilities By Technology / Printed Board Type | | QUALIFICATION LETTER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">MIL-PRF-31032 /3, /4</p> <table border="0"> <tr><td>Panel Size</td><td>18" X 24"</td></tr> <tr><td>Max. Board Thickness</td><td>0.093"</td></tr> <tr><td>Max/Min Hole Size</td><td>0.150" / 0.010"</td></tr> <tr><td>Aspect Ratio</td><td>8.6:1</td></tr> <tr><td>Number of Layers</td><td>10</td></tr> <tr><td>Min. Conductor Width</td><td>0.005"</td></tr> <tr><td>Min. Conductor Spacing</td><td>0.005"</td></tr> <tr><td>Part Mounting</td><td>PTH, SMT</td></tr> <tr><td>Base Material</td><td>Rigid Flex/Kapton Adhesive</td></tr> <tr><td>Flex Base Material</td><td>IPC-FC-241/11 (Adhesiveless)</td></tr> <tr><td>Finish System</td><td>Tin/Lead Reflow, Immersion Tin</td></tr> <tr><td>Hole Preparation</td><td>Plasma Desmear and Etchback</td></tr> <tr><td>Copper Plating</td><td>Electrolytic Acid Copper</td></tr> <tr><td>Solder Resist</td><td>Liquid Photo Imageable (LPI)</td></tr> <tr><td>Vias</td><td>.010</td></tr> </table> | | Panel Size | 18" X 24" | Max. Board Thickness | 0.093" | Max/Min Hole Size | 0.150" / 0.010" | Aspect Ratio | 8.6:1 | Number of Layers | 10 | Min. Conductor Width | 0.005" | Min. Conductor Spacing | 0.005" | Part Mounting | PTH, SMT | Base Material | Rigid Flex/Kapton Adhesive | Flex Base Material | IPC-FC-241/11 (Adhesiveless) | Finish System | Tin/Lead Reflow, Immersion Tin | Hole Preparation | Plasma Desmear and Etchback | Copper Plating | Electrolytic Acid Copper | Solder Resist | Liquid Photo Imageable (LPI) | Vias | .010 | <p style="text-align: center;">VQ-10-019425</p> |
| Panel Size | 18" X 24" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Max. Board Thickness | 0.093" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Max/Min Hole Size | 0.150" / 0.010" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aspect Ratio | 8.6:1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of Layers | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Min. Conductor Width | 0.005" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Min. Conductor Spacing | 0.005" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Mounting | PTH, SMT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Base Material | Rigid Flex/Kapton Adhesive | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Flex Base Material | IPC-FC-241/11 (Adhesiveless) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Finish System | Tin/Lead Reflow, Immersion Tin | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hole Preparation | Plasma Desmear and Etchback | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper Plating | Electrolytic Acid Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solder Resist | Liquid Photo Imageable (LPI) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vias | .010 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| Capabilities By Technology / Printed Board Type | | QUALIFICATION LETTER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">MIL-PRF-31032/1, /2</p> <table> <tr><td>Panel Size</td><td>12" X 18"</td></tr> <tr><td>Max. Board Thickness</td><td>0.090"</td></tr> <tr><td>Max/Min Hole Size</td><td>0.139"/0.021"</td></tr> <tr><td>Aspect Ratio</td><td>4.29:1</td></tr> <tr><td>Number of Layers</td><td>8</td></tr> <tr><td>Min. Conductor Width</td><td>0.005</td></tr> <tr><td>Min. Conductor Spacing</td><td>0.005</td></tr> <tr><td>Part Mounting</td><td>PTH, SMT</td></tr> <tr><td>Base Material</td><td>Woven E-glass, hydrocarbon resin with ceramic filler</td></tr> <tr><td>Finish System</td><td>Tin/Lead Hot Air Solder Level (HASL) Tin/Lead Reflow</td></tr> <tr><td>Hole Preparation</td><td>Plasma Desmear, Plasma Etchback</td></tr> <tr><td>Copper Plating</td><td>Electrolytic Acid Copper</td></tr> <tr><td>Solder Resist</td><td>Liquid Photo Imageable (LPI)</td></tr> <tr><td>Impedance</td><td>55-Ω ± 10%</td></tr> <tr><td>Vias</td><td>Buried Vias</td></tr> </table> | | Panel Size | 12" X 18" | Max. Board Thickness | 0.090" | Max/Min Hole Size | 0.139"/0.021" | Aspect Ratio | 4.29:1 | Number of Layers | 8 | Min. Conductor Width | 0.005 | Min. Conductor Spacing | 0.005 | Part Mounting | PTH, SMT | Base Material | Woven E-glass, hydrocarbon resin with ceramic filler | Finish System | Tin/Lead Hot Air Solder Level (HASL) Tin/Lead Reflow | Hole Preparation | Plasma Desmear, Plasma Etchback | Copper Plating | Electrolytic Acid Copper | Solder Resist | Liquid Photo Imageable (LPI) | Impedance | 55-Ω ± 10% | Vias | Buried Vias | <p style="text-align: center;">VQ-04-006002 VQ-06-010192</p> |
| Panel Size | 12" X 18" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Max. Board Thickness | 0.090" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Max/Min Hole Size | 0.139"/0.021" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Aspect Ratio | 4.29:1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of Layers | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Min. Conductor Width | 0.005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Min. Conductor Spacing | 0.005 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Part Mounting | PTH, SMT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Base Material | Woven E-glass, hydrocarbon resin with ceramic filler | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Finish System | Tin/Lead Hot Air Solder Level (HASL) Tin/Lead Reflow | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hole Preparation | Plasma Desmear, Plasma Etchback | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Copper Plating | Electrolytic Acid Copper | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solder Resist | Liquid Photo Imageable (LPI) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Impedance | 55-Ω ± 10% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vias | Buried Vias | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| Capabilities By Technology / Printed Board Type | | QUALIFICATION LETTER |
| MIL-PRF-31032/4 Panel Size 12" X 18" Max. Board Thickness 0.093" Max/Min Hole Size 0.045" / 0.025" Aspect Ratio 3.7:1 Number of Layers 10 Min. Conductor Width 0.005" Min. Conductor Spacing 0.005" Part Mounting PTH, SMT Base Material GI (Woven E-Glass, Polyimide resin) Flex Base Material IPC-FC-241/1 (Adhesive) Finish System Tin/Lead Reflow Hole Preparation Plasma Desmear and Etchback Copper Plating Electrolytic Acid Copper Solder Resist Liquid Photo Imageable (LPI) | | VQ-04-006002 VQ-06-010192 |

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| Capabilities By Technology / Printed Board Type | | QUALIFICATION LETTER |
| MIL-PRF-31032/CUSTOM Panel Size 12" X 18" Max. Board Thickness 0.031" Max/Min Hole Size 0.117" / 0.020" Aspect Ratio 1.55:1 Number of Layers 2 Min. Conductor Width 0.025" Min. Conductor Spacing 0.010" Part Mounting SMT Base Material With or without woven E-glass, PTFE resin with Ceramic filler Finish System Tin/Lead Hot Air Solder Level (HASL) Hole Preparation Plasma Desmear Copper Plating Electrolytic Acid Copper Solder Resist Liquid Photo Imageable (LPI) | | VQ-04-006002 VQ-06-010192 |

This qualification is based on your MIL-PRF-31032 certification and is subject to the conditions stated below:

1. A listing on the Qualified Manufacturers List (QML) does not guarantee acceptance of the product(s) in any future purchase.
2. QML listing does not constitute a waiver of any requirements of the specification or of the provisions of any contract.
3. Advertising of qualification information is permitted. Permission to use such information for advertising or publicity purposes is granted provided that such publicity or advertising does not state or imply that the product(s) is the only product of that type qualified or that the Department of Defense in any way recommends or endorses the manufacturer's product.
4. The listing applies only to products produced in the plant(s) specified in this letter and applies to future amendments or revisions of the specification, unless otherwise notified.
5. The listing applies only to materials and manufacturing construction techniques identical to or covered by that (those) qualified. The qualifying activity must be advised in advance of any change to the materials and manufacturing construction techniques. Failure to notify the qualifying activity of any change to the materials and manufacturing construction techniques is cause for removal from the QML.

Manufacturers are required to inform this office immediately if a failure occurs during Periodic Conformance Inspection (PCI) or Capability Verification Inspection (CVI) testing, if production of this qualification is discontinued, or prior to issuance of a GIDEP Alert and/or Problem Advisory on their QML products.

Because we are held responsible for the accuracy and currency of this QML, please let us know if your company discontinues production utilizing these materials or processes. If you have any questions, please contact Mr. Robert Puckett, (614) 692-0625.

Sincerely,



RAYMOND L. KOLONCHUK
Chief
Electronic Devices Branch