Specification Details: **Date: 9/26/2023**

Specification: MIL-PRF-31032
Title: Printed Circuit Board/Printed Wiring Board
Federal Supply Class (FSC): 5998
Conventional: No
Specification contains quality assurance program: Yes
MIL-STD-790 Established Reliability & High Reliability: No
MIL-STD-690 Failure Rate Sampling Plans & Procedures: No
Weibull Graded: Yes
Specification contains space level reliability requirements: No
Specification allows test optimization: Yes

Contact Information:

Office of Primary Involvement: Electronic Devices Branch, DLA Land and Maritime - VQE
Primary Qualifying Activity Contact: 614-692-9508, e-mail: vqe.kp@dla.mil

Notes:

If a manufacturer desires to have test data considered for qualification, it must be certified and meet all qualification test requirements of MIL-PRF-31032 and the applicable associated specification.

The listing of printed board manufacturing lines in the QML applies only to printed boards produced in the plant(s) specified herein. Therefore, only those printed boards that have been manufactured and tested on the certified/qualified lines listed herein can be supplied as QML printed boards.

The DLA Land and Maritime - VQE contacts for QML companies can be located in the file "31032 main points-of-contact" at website: http://www.dscc.dla.mil/offices/sourcing and qualification/offices.asp?section=VQE

QML is a definition of a manufacturer's verified capabilities. Manufacturers may use the add-on qualification process to qualify capabilities that are not currently listed on the QML. The user is encouraged to contact the manufacturer or Qualifying Activity to make arrangements for QML availability.

The following abbreviations are used in this listing:

Ag: Silver
Au: Gold
CAGE: Commercial and Government Entity (Code)
Cu: Copper
ENIG: Electroless Nickel Immersion Gold
HASL: Hot Air Solder Level
ImmAg: Immersion Silver
IR: Infrared
LPI: Liquid Photoimageable
MIX: Mix of SMT and THM
Ni: Nickel
OSP: Organic Surface Protection
Pb: Lead
Pd: Palladium
PTH: Plated Thru Hole
SMOBC: Solder Mask Over Bare Copper
SMT: Surface-Mount Technology
Sn: Tin
THM: Through-Hole Mounting

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0MNN9
Accurate Circuit Engineering 3019 S. Kilson Drive, Santa Ana, CA, 92707 USA	Same Address as Manufacturer	Phone: 714-546-2162 Fax: 714-546-8134 EMail: quality@ace-pcb.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-06-012150, VQE-07-012577, VQE-09-018384, VQE-10-020411, VQE-11-022279, VQE-13-026528, VQE-13-026662
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .22"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 11:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:

Accurate Engineering Inc..

8710 Telfair Ave, Sun Valley, CA, 91352 USA

CAGE Code: 1W538

Phone: 818-768-3919

Fax: 818-768-2771

EMail: harsh@accueng.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-20-035521)
Composition: H - Homogenous thermoplastic base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 16" x 21"
Max. Number of Layers: 20
Max. Board Thickness: .128"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-20-035521)
Composition: H - Homogenous thermoplastic base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 16" x 21"
Max. Number of Layers: 20
Max. Board Thickness: .128"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:

Accurate Engineering Inc..

8710 Telfair Ave, Sun Valley, CA, 91352 USA

CAGE Code: 1W538

Phone: 818-768-3919

Fax: 818-768-2771

EMail: harsh@accueng.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQ(VQE-23-037397)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 12" x 18"
Max. Number of Layers: 24
Max. Board Thickness: .18"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Permanganate Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 45032
Advanced Circuits Minnesota 886 Zachary Lane North, Maple Grove, MN, 55369-4524 US	Same Address as Manufacturer	Phone: 763-315-1719 Fax: 763-425-0999 EMail: MG_Quality@4pcb.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-10-019530, VQE-10-020323, VQE-12-024534
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 21" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .125"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8.88:1 Through-Hole
Min. Conductor Width/Space: .0032"/.0032"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Carbon-based, Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-10-019530, VQE-10-020323, VQE-12-024534
Composition: M - Mixed based material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .18"
Min. Hole Size: .021" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8.57:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Carbon-based
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg,
Additional Fab Capabilities: Blind Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ (VQE-20-034383), VQE-11-021326, VQE-12-024534
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 8
Max. Board Thickness: .07"
Min. Hole Size: .0138" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 5.1:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Carbon-based
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Additional Fab Capabilities: Foil Lamination

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 6RJS1
Advanced Circuits, Inc. (Chandler) 6615 W. Boreon St., Chandler, AZ, 85266 US	Same Address as Manufacturer	Phone: 480-966-5894 Fax: 480-966-5896 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-12-024291, VQE-12-024631, VQE-12-025042, VQE-13-025402, VQE-13-025881,
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .125"
Min. Hole Size: .004" Laser Ablated Plated Hole Size Before Plating, .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: .8:1 Microvia, 12.5:1 Through-Hole
Min. Conductor Width/Space: .004"/.0033"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Periodic Reverse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-12-024291, VQE-12-024631, VQE-12-025042, VQE-13-025402, VQE-13-025881, VQE-15-029681,
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .125"
Min. Hole Size: .004" Laser Ablated Plated Hole Size Before Plating, .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1.1:1 Microvia, 12.5:1 Through-Hole
Min. Conductor Width/Space: .004"/.0033"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Periodic Reverse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 38661
Airborn Flexible Circuits, Inc. 11 Dohme Avenue, Toronto, M4B 1Y7, Ontario Canada	Same Address as Manufacturer	Phone: 416-285-3825 Fax: 416-752-6719 EMail: pialisp@airbornflex.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-04-005354, VQE-08-015729
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 12" x 18"
Max. Number of Layers: 7
Max. Board Thickness: .035"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 3:1 Through-Hole
Min. Conductor Width/Space: .007"/.007"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Direct Metalization
Copper Plating: Direct Current Plate
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: HASL
Additional Fab Capabilities: Foil Lamination, Metal Core, Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-04-005354, VQE-08-015729
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 12" x 18"
Max. Number of Layers: 12
Max. Board Thickness: .094"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 12:1 Through-Hole
Min. Conductor Width/Space: .006"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Direct Metalization
Copper Plating: Direct Current Plate
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: HASL
Additional Fab Capabilities: Foil Lamination, Metal Core, Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 65114
All Flex Solutions, Inc. (Bloomington) 1200 West 96th Street, Bloomington, MN, 55431 USA	Same Address as Manufacturer	Phone: (507) 663-7162 Fax: EMail: tblakstad@allflexinc.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-23-038000
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .095"
Min. Hole Size: .0119" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Direct Metallization
Copper Plating: Pulse Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG
Flex Usage: Use A (Flex During Installation)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0ZGB2
All Flex Solutions, Inc. (Northfield) 1705 Cannon Lane, Northfield, MN, 55057-3605 USA	Same Address as Manufacturer	Phone: (800) 959-0865 Fax: (844) 274-3970 EMail: tkluver@allflexinc.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQ(VQE-19-033269), VQ(VQE-19-033661)
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 12" x 107", 18" x 24"
Max. Number of Layers: 6
Max. Board Thickness: .029"
Min. Hole Size: .0118" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 2:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear
Hole Wall Conductive Coating: Graphite-based
Copper Plating: Direct Current Plate
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, HASL
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQ(VQE-19-033269), VQ(VQE-19-033661)
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 12" x 54", 18" x 24"
Max. Number of Layers: 6
Max. Board Thickness: .029"
Min. Hole Size: .0118" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 2:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear
Hole Wall Conductive Coating: Graphite-based
Copper Plating: Direct Current Plate
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, HASL
Flex Usage: Use A (Flex During Installation)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 4AA34
AMERICAN STANDARD CIRCUITS, LLC 475 Industrial Drive, West Chicago, IL, 60185 US	Same Address as Manufacturer	Phone: 603-639-5444 Fax: 603-293-1240 EMail: sales@asc-i.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-17-031437
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 12" x 18"
Max. Number of Layers: 20
Max. Board Thickness: .095"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .0033"/.006"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg
Additional Fab Capabilities: Foil Lamination
Flex Usage: Use A (Flex During Installation)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-08-015934, VQE-11-021830, VQE-11-023138, VQE-13-025323, VQE-13-025791, VQE-13-025834
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .09" (for /1, Type 3 - Multilayer), .125" (for /2, Type /2 - Double-sided only)
Min. Hole Size: .009" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg
Additional Fab Capabilities: Blind Vias, Foil Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-022358, VQE-11-023138
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .125"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 5:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 4AA34
AMERICAN STANDARD CIRCUITS, LLC 475 Industrial Drive, West Chicago, IL, 60185 US	Same Address as Manufacturer	Phone: 603-639-5444 Fax: 603-293-1240 EMail: sales@asc-i.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-16-029852
Composition: M - Mixed based material printed boards, S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 18" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .095"
Min. Hole Size: .017" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:		
AMITRON, INC. 2001 Landmeier Road, Elk Grove Village, IL, 60007 USA		CAGE Code: 1LHP6 Phone: 2242658761 Fax: EMail: csavaliya@amitroncorp.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-19-033935
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .08"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8:1
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Graphite-based
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable, Silk Screen
Finish System: ENIG, HASL
Additional Fab Capabilities: Blind Vias, Foil Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 57034
AMPHENOL PRINTED CIRCUITS, INC. 91 Northeastern Boulevard, Nashua, NH, 03062 US	Same Address as Manufacturer	Phone: 603-879-3268 Fax: 603-879-2818 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE 10-020582, VQE-06-010054, VQE-09-017008, VQE-12-023765, VQE-15-029690, VQE-17-031637, VQE-20-035416, VQE-97-000649
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 24" x 36"
Max. Number of Layers: 33
Max. Board Thickness: .25"
Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 11:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Foil Lamination, Press Fit Mounting, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE 10-020582, VQE-06-010054, VQE-09-017008, VQE-12-023765, VQE-15-029626, VQE-17-031637, VQE-20-035416, VQE-97-000649
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 30" x 36"
Max. Number of Layers: 28
Max. Board Thickness: .18"
Min. Hole Size: .006" Laser Ablated Plated Hole Size Before Plating, .0118" Drilled Plated-Through Hole Before Plating
Aspect Ratio: .8:1 Microvia, 11:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Foil Lamination, Press Fit Mounting, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 57034
AMPHENOL PRINTED CIRCUITS, INC. 91 Northeastern Boulevard, Nashua, NH, 03062 US	Same Address as Manufacturer	Phone: 603-879-3268 Fax: 603-879-2818 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE 10-020582, VQE-06-010054, VQE-09-017008, VQE-12-023765, VQE-15-029690, VQE-19-033889, VQE-20-035416
Composition: M - Mixed based material printed boards, S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 24" x 31"
Max. Number of Layers: 12
Max. Board Thickness: .101"
Min. Hole Size: .04" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 2.6:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Foil Lamination, Press Fit Mounting, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-10-019533, VQE-12-023765, VQE-15-029690
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 24" x 36"
Max. Number of Layers: 4 (types 1, 2, and 3 only)
Max. Board Thickness: .035"
Min. Hole Size: .0145"
Aspect Ratio: 1.75:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Palladium-based
Copper Plating: Direct Current Plate, Pulse Plate
Finish System: HASL, Hot Oil Reflow of Plated Sn/Pb
Flex Usage: Use A (Flex During Installation)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-10-019533, VQE-12-023765, VQE-15-029690, VQE-20-035416
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 24" x 36"
Max. Number of Layers: 22
Max. Board Thickness: .14"
Min. Hole Size: .0197" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper, Palladium-based
Copper Plating: Direct Current Plate, Pulse Plate
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Foil Lamination, Press Fit Mounting, Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 65337
Calumet Electronics Corp. 25830 Depot Street, Calumet, MI, 49913-1985 US	Same Address as Manufacturer	Phone: 906-337-1305 Fax: 906-337-5359 EMail: quality@calumetelectronics.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-19-033358), VQE 12 023734, VQE-03-4657, VQE-04-6280, VQE-14-027692, VQE-17-030995, VQE-18-032747, VQE-18-033030
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 21" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .125"
Min. Hole Size: .016" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Carbon-based, Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, ImmAg
Additional Fab Capabilities: Blind Vias, Foil Lamination, Press Fit Mounting, Sequential Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-19-033358), VQE 12 023734, VQE-03-4657, VQE-04-6280, VQE-13-026419, VQE-17-030995, VQE-18-032747
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 21" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .125"
Min. Hole Size: .0079" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, ImmAg
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: L4387
Circuit-Tech, Inc.	Same Address as Manufacturer	Phone: 905-474-9227
399 Denison Street, Markham, ON, L3R 1B7 Canada		Fax: 416 497-4953
		EMail: sales@circuittech.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-19-033355
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .125"
Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 12:1 Through-Hole
Min. Conductor Width/Space: .0035"/.0035"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 4MEG7
Cirexx International, Inc.	Same Address as Manufacturer	Phone: 408-988-3980
791 Nuttman Street, Santa Clara, CA, 95054 US		Fax: 408-988-4534
		EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-08-016602, VQE-14-028536, VQE-18-032748, VQE-19-034045
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 22
Max. Board Thickness: .185"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14.2:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-08-016602, VQE-14-028536, VQE-18-032748, VQE-19-034045
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 22
Max. Board Thickness: .185"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14.2:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-07-014176, VQE-15-029356, VQE-19-033333, VQE-19-034045
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 12" x 18"
Max. Number of Layers: 5
Max. Board Thickness: .056"
Min. Hole Size: .016" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 3.5:1 Through-Hole
Min. Conductor Width/Space: .0058"/.01"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg, Ni/Pd/Au
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 4MEG7
Cirexx International, Inc. 791 Nuttman Street, Santa Clara, CA, 95054 US	Same Address as Manufacturer	Phone: 408-988-3980 Fax: 408-988-4534 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-08-016602, VQE-14-028536, VQE-19-033333, VQE-19-034045
Composition: M - Mixed based material printed boards, S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .125"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8.3:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg, Ni/Pd/Au
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 8K616
Cirtech, Inc. 250 E. Emerson Ave., Orange, CA, 92865-3303	Same Address as Manufacturer	Phone: 714-921-0860 Fax: EMail: dennis.wojtkiewicz@apctinc.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE 19 033331)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 16
Max. Board Thickness: .125"
Min. Hole Size: .016"
Aspect Ratio: 8:1 Through-Hole
Min. Conductor Width/Space: .008"/.006"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: HASL, Hot Oil Reflow of Plated Sn/Pb

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQ (VQE-19-033575)
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 24"
Max. Number of Layers: 12
Max. Board Thickness: .08"
Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8.5:1 Through-Hole
Min. Conductor Width/Space: .005"/.006"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb
Flex Usage: Use A (Flex During Installation)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ (VQE-19-033573), VQ (VQE-19-034352)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .1"
Min. Hole Size: .011" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:1 Through-Hole
Min. Conductor Width/Space: .006"/.006"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Foil Lamination

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 30598
Compunetics Inc.	Same Address as Manufacturer	Phone: 412-858-1272
700 Seco Rd, Monroeville, PA, 15146 US		Fax:
		EMail: sales@compunetics.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-13-026082), VQ(VQE-15-029422)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 32
Max. Board Thickness: .26"
Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10.8:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Periodic Reverse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, ImmAg
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-15-029722
Composition: M - Mixed based material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .177"
Min. Hole Size: .017" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10.4:1 Through-Hole
Min. Conductor Width/Space: .0047"/.006"
Hole Preparation: Plasma Desmear
Copper Plating: Periodic Reverse Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, ImmAg
Additional Fab Capabilities: Blind Vias, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQ (VQE-17-031349)
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 24" x 18"
Max. Number of Layers: 4
Max. Board Thickness: .024"
Min. Hole Size: .018" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1.3 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Periodic Reverse Plate
Finish System: HASL
Flex Usage: Use A (Flex During Installation)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:
Electro Plate Circuitry, Inc.
1430 Century Drive, Carrollton, TX, 75006 US

PLANT LOCATION:
Same Address as Manufacturer

CAGE Code: 79616
Phone: 972-466-0818
Fax: 972-466-9078
EMail: jim@eplate.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-06-010333), VQ(VQE-06-011433), VQ(VQE-10-020352)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 16", 18" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .12"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.3:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL
Additional Fab Capabilities: Foil Lamination, Sequential Lamination, ,
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-06-010333), VQ(VQE-06-011433), VQ(VQE-10-020352)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 16", 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .17"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.3:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 79616
Electro Plate Circuitry, Inc. 1430 Century Drive, Carrollton, TX, 75006 US	Same Address as Manufacturer	Phone: 972-466-0818 Fax: 972-466-9078 EMail: jim@eplate.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/5, MIL-PRF-31032/6

Qualification Letters: VQ(VQE-10-021161)

Rigid Base Material: GT: Woven E-Glass, PTFE Resin; GX: Glass Base, Woven, Polytetrafluoroethylene Resin, Flame Resistant; GY: Glass Base, Woven, Polytetrafluoroethylene Resin, Flame Resistant, for Microwave Application; With or without woven or non-woven E-glass, Polytetrafluoroethylene (PTFE) resin, ceramic filler

Max. Panel Size: 12" x 18", 18" x 12"

Max. Number of Layers: 6

Max. Board Thickness: .18"

Min. Hole Size: .039" Drilled Plated-Through Hole Before Plating

Aspect Ratio: 6:1 Through-Hole

Min. Conductor Width/Space: .004"/.004"

Hole Preparation: Plasma Desmear

Hole Wall Conductive Coating: Electroless Copper

Copper Plating: Direct Current Plate

Hole Fill/Via Plug: Conductive, Non-Conductive

Solder Resist: Dry Film, Liquid Photoimageable

Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb

Additional Fab Capabilities: Blind Vias, Foil Lamination, Sequential Lamination

Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: L2665
Firan Technology Group 250 Finchdene Square, Scarborough, M1X 1A5, Ontario, Canada	Same Address as Manufacturer	Phone: 416-299-4000 Fax: 416-292-4308 EMail: info@ftgcorp.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-05-009339, VQE-06-010764, VQE-06-010889, VQE-15-028987, VQE-16-030295, VQE-17-031083, VQE-17-031084
Rigid Base Material: BI: Aramid Fabric, Nonwoven, Polyimide Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .106"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 5.1:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-05-009339, VQE-06-010764, VQE-06-010889, VQE-15-028987, VQE-16-030295, VQE-17-031083
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 30
Max. Board Thickness: .245"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1.01:1 Microvia, 15.9:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-05-009339, VQE-06-010764, VQE-06-010889, VQE-15-028987, VQE-16-030295, VQE-17-031083
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 21" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .17"
Min. Hole Size: .0059" Laser Ablated Plated Hole Size Before Plating, .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.6:1 Microvia, 9.6:1 Through-Hole
Min. Conductor Width/Space: .0035"/.003"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Additional Fab Capabilities: Blind Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: L2665
Firan Technology Group 250 Finchdene Square, Scarborough, M1X 1A5, Ontario, Canada	Same Address as Manufacturer	Phone: 416-299-4000 Fax: 416-292-4308 EMail: info@ftgcorp.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-05-009339, VQE-06-010764, VQE-06-010889, VQE-15-028987, VQE-16-030295, VQE-17-031083
Rigid Base Material: GM: Glass Base, Woven, Triazine and/or Bismaleimide Modified Epoxy Resin, Flame Resistant
Max. Panel Size: 21" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .137"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.3:1 Through-Hole
Min. Conductor Width/Space: .004"/.0037"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Additional Fab Capabilities: Blind Vias, Foil Lamination, Sequential Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-15-029018, VQE-16-030295, VQE-21-036160
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 12" x 18"
Max. Number of Layers: 12
Max. Board Thickness: .073"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:1
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Flex Usage: Use A (Flex During Installation)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:		CAGE Code: 22928
Flexible Circuits Inc.		Phone: 215-343-2300
222 Valley Rd, Warrington, PA, 18976 US		Fax:
		EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQ(VQE-21-035706)
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 24"
Max. Number of Layers: 8
Max. Board Thickness: .07"
Min. Hole Size: .031" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 3:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Periodic Reverse Plate
Finish System: HASL
Flex Usage: Use A (Flex During Installation)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 6T499
FTG Circuits Fredericksburg Inc.	Same Address as Manufacturer	Phone: 540-753-5511, x177
1026 Warrenton Road, Fredericksburg, VA, 22406-6200 US		Fax: 540-752-2109
		EMail: quality@colonialcircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-21-035719), VQE-04-6002
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .088"
Min. Hole Size: .021" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 4.2:1 Through-Hole
Min. Conductor Width/Space: .006"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Carbon-based
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Foil Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-21-035719), VQE-04-6002, VQE-20-034719
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 16
Max. Board Thickness: .127"
Min. Hole Size: .015"
Aspect Ratio: 8.5:1 Through-Hole
Min. Conductor Width/Space: .005"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Carbon-based
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Foil Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-04-6002
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 12" x 18"
Max. Number of Layers: 10
Max. Board Thickness: .093"
Min. Hole Size: .025" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 3.7:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Carbon-based
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Flex Usage: Use A (Flex During Installation),

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:

FTG Circuits, Inc. - Chatsworth

20750 Marilla Street, Chatsworth,, CA, 91311 US

CAGE Code: 30803

Phone: 818-407-4024

Fax: 818-407-4034

EMail: info@ftgcorp.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-19-033705
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .165"
Min. Hole Size: .016" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8.9:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Foil Lamination, Metal Core, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-19-033708
Composition: M - Mixed based material printed boards, S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .18"
Min. Hole Size: .0197" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .0035"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-19-033709
Composition: M - Mixed based material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .165"
Min. Hole Size: .0256" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6.5:1 Through-Hole
Min. Conductor Width/Space: .007"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Finish System: ENIG, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Flex Usage: Use A (Flex During Installation)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:		CAGE Code: 30803
FTG Circuits, Inc. - Chatsworth		Phone: 818-407-4024
20750 Marilla Street, Chatsworth,, CA, 91311 US		Fax: 818-407-4034
		EMail: info@ftgcorp.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-19-033706
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 32
Max. Board Thickness: .201"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 11.3:1 Through-Hole, 1:1 Microvia
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Metal Core, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-19-033707
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: BI: Aramid Fabric, Nonwoven, Polyimide Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 16
Max. Board Thickness: .095"
Min. Hole Size: .0079" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 12:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 3C7D2
Gorilla Circuits 1445 Old Oakland Rd, San Jose, CA, 95112 US	Same Address as Manufacturer	Phone: 408-294-9897 Fax: 408-297-1540 EMail: info@gorillacircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: 11-022314, 14-028138, 17-031452, 17-031462, 18-032591
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .18"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: 11-022314, 14-028138, 17-031452, 17-031462
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .093"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.3:1 Through-Hole
Min. Conductor Width/Space: .004"/.005"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	
Holaday Circuits, Inc. 11126 Bren Road West, Minnetonka, MN, 55343 US	Same Address as Manufacturer	CAGE Code: 59554 Phone: 952-988-8059 Fax: EMail: MarwanR@Holaday.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-15-028707), VQ(VQE-18-032982), VQ(VQE-19-033858)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .136"
Min. Hole Size: .007" Laser Ablated Plated Hole Size Before Plating, .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.56:1 Microvia, 6.75:1 Through-Hole
Min. Conductor Width/Space: .0035"/.0045"
Hole Preparation: Permanganate Desmear, Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-15-028707), VQ(VQE-18-032982), VQ(VQE-19-033858)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant;
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .122"
Min. Hole Size: .014" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6.66:1 Through-Hole
Min. Conductor Width/Space: .004"/.0037"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 1KXU6
Hughes Circuits, Inc. 540 S. Pacific Street, San Marcos, CA, 92078-4056 US	Same Address as Manufacturer	Phone: 760-744-0300 Fax: 760-744-6388 EMail: Trevor@hughescircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-07-014018), VQ(VQE-14-028093), VQE-12-24783
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .08"
Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8.2:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Graphite-based
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Blind Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-08-015865), VQ(VQE-14-028093), VQE-12-24783
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 32
Max. Board Thickness: .248"
Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating, .011" Laser Ablated Plated Hole Size Before Plating
Aspect Ratio: 0.5:1 Microvia, 9.7:1 Through-Hole
Min. Conductor Width/Space: .0045"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Graphite-based
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:

IMI, Inc.

140 Hilldale Avenue, Haverhill, MA, 01832

CAGE Code: 78259

Phone: 978-373-9190

Fax: 978-521-1846

EMail: sales@imipcb.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2

Qualification Letters: VQ(VQE-17-031308)

Composition: S - Homogenous thermosetting base material printed boards

Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant

Max. Panel Size: 16" x 18"

Max. Number of Layers: 10

Max. Board Thickness: .11"

Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating

Aspect Ratio: 12.5:1 Through-Hole

Min. Conductor Width/Space: .005"/.005"

Hole Preparation: Permanganate Desmear

Hole Wall Conductive Coating: Electroless Copper

Copper Plating: Direct Current Plate

Solder Resist: Liquid Photoimageable

Finish System: HASL

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:

ISU Petasys

12930 Bradley St, Sylmar, CA, 91342 US

CAGE Code: 1WFH9

Phone: 818-833-5800

Fax:

EMail: andrewy@isupetasys.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-15-028813), VQ(VQE-23-037565)
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 24" x 30"
Max. Number of Layers: 18
Max. Board Thickness: .15"
Min. Hole Size: .0098"
Aspect Ratio: 12.5:1 Through-Hole
Min. Conductor Width/Space: .003"/.004"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Periodic Reverse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, ImmAg, OSP,
Additional Fab Capabilities: Buried Vias, Foil Lamination,
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 1VUH8
KCA Electronics, Inc. 223 N. Crescent Way, Anaheim, CA, 92801 US	Same Address as Manufacturer	Phone: 714-239-2433 Fax: 714-239-2455 EMail: info@summitinterconnect.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-19-033897)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: AF: Aramid Fabric, Woven, Majority Polyfunctional Epoxy Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .076"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 3.8:1 Through-Hole
Min. Conductor Width/Space: .008"/.007"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-11-021796, VQE-14-027414, VQE-16-030557, VQE-16-030789
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 24"
Max. Number of Layers: 16
Max. Board Thickness: .133"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7:1 Through-Hole
Min. Conductor Width/Space: .005"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-022398, VQE-14-027414, VQE-17-031406
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 22
Max. Board Thickness: .132"
Min. Hole Size: .008" Laser Ablated Plated Hole Size Before Plating, .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.75:1 Microvia, 7:1 Through-Hole
Min. Conductor Width/Space: .0048"/.004"
Hole Preparation: Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: HASL
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 1VUH8
KCA Electronics, Inc. 223 N. Crescent Way, Anaheim, CA, 92801 US	Same Address as Manufacturer	Phone: 714-239-2433 Fax: 714-239-2455 EMail: info@summitinterconnect.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-022964, VQE-14-027414, VQE-16-030045
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 16
Max. Board Thickness: .117"
Min. Hole Size: .0135" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8.67:1 Through-Hole
Min. Conductor Width/Space: .0098"/.0044"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: HASL

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 03640
LOCKHEED MARTIN CORPORATION ROTARY AND MISSION SYSTEMS 1801 State Route 17C, Owego, NY, 13827 US	Same Address as Manufacturer	Phone: 607-751-5395 Fax: 607-751-7714 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-00-000961, VQE-07-013268, VQE-07-013459, VQE-11-022596, VQE-15-029009, VQE-15-029561, VQE-16-030240, VQE-16-030354, VQE-18-032427, VQE-99-000130
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 9
Max. Board Thickness: .104"
Min. Hole Size: .018" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 4:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-00-000961, VQE-07-013459, VQE-15-029009, VQE-15-029561, VQE-16-030240, VQE-18-032427, VQE-99-000130
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 12
Max. Board Thickness: .082"
Min. Hole Size: .0256" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 4:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-00-000684, VQE-07-013459, VQE-15-029009, VQE-18-032427
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant;
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 12" x 18"
Max. Number of Layers: 18
Max. Board Thickness: .11"
Min. Hole Size: .016" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Solder Resist: Liquid Photoimageable
Finish System: HASL, Hot Oil Reflow of Plated Sn/Pb
Flex Usage: Use A (Flex During Installation)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 03640
LOCKHEED MARTIN CORPORATION ROTARY AND MISSION SYSTEMS	Same Address as Manufacturer	Phone: 607-751-5395
1801 State Route 17C, Owego, NY, 13827 US		Fax: 607-751-7714
		EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-00-000684, VQE-07-013459, VQE-15-029009, VQE-15-029562, VQE-18-032427
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 12" x 18"
Max. Number of Layers: 4
Max. Board Thickness: .022"
Min. Hole Size: .0413"
Aspect Ratio: .5:1 Through-Hole
Min. Conductor Width/Space: .009"/.01"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Finish System: HASL, Hot Oil Reflow of Plated Sn/Pb
Flex Usage: Use A (Flex During Installation)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 12" x 18"
Max. Number of Layers: 18
Max. Board Thickness: .11"
Min. Hole Size: .016" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6:1
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Etchback, Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Solder Resist: Liquid Photoimageable
Finish System: HASL, Hot Oil Reflow of Plated Sn/Pb
Flex Usage: Use A (Flex During Installation)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 04RV5
Lone Star Circuits 901 Hensley Drive, Wylie, TX, 75098-4909 US	Same Address as Manufacturer	Phone: 214-291-1427 Fax: EMail: sdiacont@lscpwb.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/6
Qualification Letters: VQ(VQE-15-029714), VQE-11-021947
Rigid Base Material: GR: Glass Base, Nonwoven, Polytetrafluoroethylene Resin, Flame Resistant; GY: Glass Base, Woven, Polytetrafluoroethylene Resin, Flame Resistant, for Microwave Application
Max. Panel Size: 9" x 16", 18" x 24"
Max. Number of Layers: 2 , 2
Max. Board Thickness: .031" , .098"
Min. Hole Size: .031" , .039" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Through-Hole, 3.2:1
Min. Conductor Width/Space: .013"/.005", .19"/.005"
Hole Preparation: Sodium Treatment, Sodium Treatment
Hole Wall Conductive Coating: Electroless Copper, Electroless Copper
Copper Plating: Direct Current Plate, Direct Current Plate
Solder Resist: Liquid Photoimageable, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, Fused Tin Lead, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-4341, VQE-04-5599, VQE-04-5891, VQE-05-7288
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .119"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7.5:1 Through-Hole
Min. Conductor Width/Space: .004"/.005"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, Fused Tin Lead, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-04-4957, VQE-05-7288
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 6
Max. Board Thickness: .074"
Min. Hole Size: .031" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 2:1 Through-Hole
Min. Conductor Width/Space: .01"/.014"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, Fused Tin Lead, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:		CAGE Code: 3AD63
Metaplast Circuits Ltd.		Phone: 416-285-5000
180 Hymus Road, Scarborough, M1L 2E1, Ontario, Canada		Fax:
		EMail: sales@metaplast.ca

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-18-032032
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .113"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Periodic Reverse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0436Y
Micropack Limited , Plot No. 16, Jigani Industrial Area, Anekal Taluk, Bangalore District 560105 India	Same Address as Manufacturer	Phone: 91-80-27825223 Fax: 91-80-27825225 EMail: process@micropack.in

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-17-031413
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 21" x 24"
Max. Number of Layers: 26
Max. Board Thickness: .12"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 11.92:1 Through-Hole
Min. Conductor Width/Space: .0035"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-17-031258
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .1"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole,
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination, Metal Core
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0436Y
Micropack Limited , Plot No. 16, Jigani Industrial Area, Anekal Taluk, Bangalore District 560105 India	Same Address as Manufacturer	Phone: 91-80-27825223 Fax: 91-80-27825225 EMail: process@micropack.in

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-17-031258
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .1"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole,
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination, Metal Core
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/5, MIL-PRF-31032/6
Qualification Letters: VQ (VQE-20-035093)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .1366"
Min. Hole Size: .00984" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 13.9:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:		CAGE Code: 0YYS4
Midwest Printed Circuit Services		Phone: 847-740-4120
1741 Circuit Drive, Round Lake Beach, IL, 60073 US		Fax: 847-740-4187
		EMail: mpcs@midwestpcb.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-12-024841, VQE-12-025070, VQE-13-025727, VQE-14-028088, VQE-16-030296
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 12
Max. Board Thickness: .1"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7.92:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Controlled Depth Mechanically Drilled Low Aspect Ratio Blind Vias, Foil Lamination
Controlled Impedance: Differential

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-13-025705, VQE-14-028088
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .1"
Min. Hole Size: .038" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 2.5:1 Through-Hole
Min. Conductor Width/Space: .01"/.01"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:
Multicircuits Inc.
2301 Universal St, Oshkosh, WI, 54904

CAGE Code: 1BQS8
Phone: 920-385-7537
Fax:
EMail: twalker@multicircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-19-033227)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 21" x 24"
Max. Number of Layers: 16
Max. Board Thickness: .127"
Min. Hole Size: .0079" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:1 Through-Hole
Min. Conductor Width/Space: .0035"/.003"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-19-033870)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 16
Max. Board Thickness: .093"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:3:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:

Multilayer Technology

3835 West Conflans Road, Irving, TX, 75061

CAGE Code: 0JKV9

Phone: 972-790-0062

Fax:

EMail: rick@multilayer.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE(VQ-20-034746)
Composition: H - Homogenous thermoplastic base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 16
Max. Board Thickness: .102"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 11.625:1 Through-Hole, 1:1 Microvia
Min. Conductor Width/Space: .00325"/.0049"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0EJD7
Murrietta Circuits, Inc. 5000 E. Landon Drive, Anaheim, CA, 92807 US	Same Address as Manufacturer	Phone: 714-970-2430 Fax: 714-970-2406 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-20-034846
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .103"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.4:1 Through-Hole
Min. Conductor Width/Space: .0045"/.0045"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-15-029521, VQE-18-032565,
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .11"
Min. Hole Size: .011" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Ni/Pd/Au
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:

Pioneer Circuits, Inc.

3000 S. Shannon Street, Santa Ana, CA, 92704-6321
US

CAGE Code: 65723

Phone: 714-641-3132

Fax: 714-641-3120

EMail: Quality@pioneercircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-09-017323, VQE-09-017656
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 22
Max. Board Thickness: .177"
Min. Hole Size: .0135" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 11:1 Through-Hole
Min. Conductor Width/Space: .0035"/.0035"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Periodic Reverse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni/Au, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Buried Vias, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-09-017323, VQE-09-017656
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .275"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 11:1 Through-Hole
Min. Conductor Width/Space: .0035"/.0035"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Periodic Reverse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni/Au, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Buried Vias, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:

Pioneer Circuits, Inc.

3000 S. Shannon Street, Santa Ana, CA, 92704-6321
US

CAGE Code: 65723

Phone: 714-641-3132

Fax: 714-641-3120

EMail: Quality@pioneercircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-09-017323, VQE-09-017656, VQE-10-029651
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 26"
Max. Number of Layers: 22
Max. Board Thickness: .231"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8.5:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Periodic Reverse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni/Au, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Buried Vias, Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-09-017323, VQE-09-017656
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 18" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .1"
Min. Hole Size: .016" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6:1 Through-Hole
Min. Conductor Width/Space: .0035"/.0035"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Periodic Reverse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni/Au, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Book Binder, Buried Vias, Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:		CAGE Code: 65723
Pioneer Circuits, Inc.		Phone: 714-641-3132
3000 S. Shannon Street, Santa Ana, CA, 92704-6321 US		Fax: 714-641-3120
		EMail: Quality@pioneercircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-09-017323, VQE-09-017656
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 24" x 36"
Max. Number of Layers: 26
Max. Board Thickness: .185"
Min. Hole Size: .013" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 11:1 Through-Hole
Min. Conductor Width/Space: .0035"/.0035"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Periodic Reverse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni/Au, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Book Binder, Buried Vias, Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:		CAGE Code: 3CP65
PRO-TECH INTERCONNECT SOLUTIONS, LLC		Phone: 952-442-2189
4300 Peavey Road, Chaska, MN, 55318 US		Fax: 952-442-2472
		EMail: stum@protechmn.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-021704, VQE-19-033101
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 12" x 24"
Max. Number of Layers: 16 ,
Max. Board Thickness: .1"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .0079" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1.8:1 Microvia, 12:1 Through-Hole
Min. Conductor Width/Space: .005"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Carbon-based
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-021704, VQE-16-030058, VQE-19-033101
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .1"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .0059" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 15:1 Through-Hole, 1:1 Microvia
Min. Conductor Width/Space: .003"/.002"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Carbon-based
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL, ImmAg, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:		CAGE Code: 66108
Prototron Circuits, Inc.		Phone: 520-745-8515
3760 East 43rd Place, Tucson, AZ, 58713 US		Fax: 520-747-8334
		EMail: Info@Prototron.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-17-030991
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 12
Max. Board Thickness: .112"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:

Sanmina (Costa Mesa)

2945 Airway Avenue, Costa Mesa, CA, 92626 US

CAGE Code: 3BKL5

Phone: 714-371-2800

Fax: 714-371-2833

EMail: terry.lichte@sanmina.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-19-033984)
Rigid Base Material: Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 18" x 24"
Max. Number of Layers: 6
Max. Board Thickness: .12"
Min. Hole Size: .0159"
Aspect Ratio: 7.59
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Permanganate Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive
Solder Resist: Liquid Photoimageable
Finish System: ImmAu

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-12-024031
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 12" x 18"
Max. Number of Layers: 8
Max. Board Thickness: .063"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .013" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Microvia, 5:1 Through-Hole
Min. Conductor Width/Space: .008"/.008"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination, Press Fit Mounting, Sequential Lamination, ,
Controlled Impedance: Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-19-033984), VQE-12-24471
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant;
Max. Panel Size: 12" x 18"
Max. Number of Layers: 18 ,
Max. Board Thickness: .093"
Min. Hole Size: .013" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7 : 1 Through-Hole,
Min. Conductor Width/Space: .008"/.008"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive,
Solder Resist: Liquid Photoimageable
Finish System: ENIG
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 3DR67
Sanmina-SCI (San Jose) 2050 Bering Drive, San Jose, CA, 95131 US	Same Address as Manufacturer	Phone: 408-964-6515 Fax: 408-964-6453 EMail: darrell.myers@sanmina-sci.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-18-031913), VQ(VQE-19-033467)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 21" x 27"
Max. Number of Layers: 20
Max. Board Thickness: .221"
Min. Hole Size: .0157" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14.1:1 Through-Hole
Min. Conductor Width/Space: .00735"/.004"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, IR Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-06-11137, VQE-10-19381, VQE-11-22038
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 21" x 27"
Max. Number of Layers: 8
Max. Board Thickness: .062"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6.32:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-06-11137
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 21" x 27"
Max. Number of Layers: 30
Max. Board Thickness: .25"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 15:1 Through-Hole, 1:2 Microvia
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 3DR67
Sanmina-SCI (San Jose) 2050 Bering Drive, San Jose, CA, 95131 US	Same Address as Manufacturer	Phone: 408-964-6515 Fax: 408-964-6453 EMail: darrell.myers@sanmina-sci.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-18-031913)
Composition: M - Mixed based material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 21" x 27"
Max. Number of Layers: 24
Max. Board Thickness: .111"
Min. Hole Size: .0079" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14.1:1 Through-Hole
Min. Conductor Width/Space: .003"/.0025"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Carbon-based
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-18-031913)
Composition: M - Mixed based material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 21" x 27"
Max. Number of Layers: 28
Max. Board Thickness: .227"
Min. Hole Size: .0157" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14.5:1 Through-Hole
Min. Conductor Width/Space: .0046"/.0035"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias
Controlled Impedance: Differential, Single-Ended

MANUFACTURER INFORMATION:
Sierra Circuits Inc.
1108 West Evelyn Ave, Sunnyvale, CA, 94086 USA

CAGE Code: 0ZHS4
Phone: 800-763-7503
Fax: 408-735-0175
EMail: estrelitam@protoexpress.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-18-032408)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .1"
Min. Hole Size: .007" Laser Ablated Plated Hole Size Before Plating, .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.6:1 Microvia, 10:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Periodic Reverse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Blind Vias, Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-18-032408)
Composition: H - Homogenous thermoplastic base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .1"
Min. Hole Size: .007" Laser Ablated Plated Hole Size Before Plating, .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.6:1 Microvia, 10:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Periodic Reverse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Blind Vias, Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-22-037319
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 18" x 24"
Max. Number of Layers: 2
Max. Board Thickness: .12"
Min. Hole Size: .0079"
Aspect Ratio: 12:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Solder Resist: Dry Film
Finish System: ENIG, HASL
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:
Sierra Circuits Inc.
1108 West Evelyn Ave, Sunnyvale, CA, 94086 USA

CAGE Code: 0ZHS4
Phone: 800-763-7503
Fax: 408-735-0175
EMail: estrelitam@protoexpress.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-22-037319
Composition: H - Homogenous thermoplastic base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 24"
Max. Number of Layers: 2
Max. Board Thickness: .12"
Min. Hole Size: .0079"
Aspect Ratio: 12:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Solder Resist: Dry Film
Finish System: ENIG, HASL
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 66030
Sierra Electrotek LLC 7745 S. 10th Street, Oak Creek, WI, 53154 US	Same Address as Manufacturer	Phone: 414-762-1390 Fax: 414-762-1510 EMail: sales@boards4u.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-06-011451), VQ(VQE-08-014513), VQ(VQE-09-018692), VQ(VQE-12-024024), VQ(VQE-12-024411), VQ(VQE-17-031008, VQ(VQE-19-033298), VQ(VQE-19-033627)
Composition: M - Mixed based material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .115"
Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.7:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: Carbon Ink, ENIG, Electrolytic Ni/Au, HASL, ImmAg
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-06-011451), VQ(VQE-08-014513), VQ(VQE-09-018692), VQ(VQE-12-024024), VQ(VQE-12-024411), VQ(VQE-19-033298)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .115"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: Carbon Ink, ENIG, Electrolytic Ni/Au, HASL, ImmAg
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:		CAGE Code: 3WUY3
Streamline Circuits		Phone: 408-727-1418
1410 Martin Ave., Santa Clara, CA, 95050		Fax: 408-727-8971
		EMail: trb@streamlinecircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-17-031750
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 6
Max. Board Thickness: .093"
Min. Hole Size: .024" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 3.6:1 Through-Hole
Min. Conductor Width/Space: .013"/.01"
Hole Preparation: Permanganate Desmear, Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-18-031945
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 6
Max. Board Thickness: .062"
Min. Hole Size: .0079" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7.2:1 Through-Hole
Min. Conductor Width/Space: .004"/.00475"
Hole Preparation: Permanganate Desmear, Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 38747
Summit Interconnect Toronto 90 Don Park Road, Markham, L3R 1C4, Ontario, Canada	Same Address as Manufacturer	Phone: 905-475-6658 Fax: 905-475-5097 EMail: sales@itlcircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-17-031450
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .08"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 5.7:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-18-032695
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .08"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6.7:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Foil Lamination

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: H0203
Thales Nederland B.V. Haaksbergerstraat 49, 7554PA Hengelo The Netherlands	Same Address as Manufacturer	Phone: 31 0 742482880 Fax: 31 0 742484124 EMail: jan.bokhove@nl.thalesgroup.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-14-028079, VQE-19-034061
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 12
Max. Board Thickness: .1"
Min. Hole Size: .014" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 5.7:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Dry Film
Finish System: HASL
Additional Fab Capabilities: Blind Vias, Foil Lamination, Sequential Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-14-028079, VQE-19-034062
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 12
Max. Board Thickness: .1"
Min. Hole Size: .014" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 5.7:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Dry Film
Finish System: HASL
Additional Fab Capabilities: Blind Vias, Foil Lamination, Sequential Lamination

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 65916
TTM PRINTED CIRCUIT GROUP, INC. 407 Mathew Street, Santa Clara, CA, 95050 US	Same Address as Manufacturer	Phone: 408-486-3184 Fax: 408-727-1003 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-17-030872, VQE-18-032677,
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GM: Glass Base, Woven, Triazine and/or Bismaleimide Modified Epoxy Resin, Flame Resistant
Max. Panel Size: 18.5" x 24.5"
Max. Number of Layers: 10
Max. Board Thickness: .079"
Min. Hole Size: .023" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 2:1 Through-Hole
Min. Conductor Width/Space: .02"/.007"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Foil Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003888, VQE-10-020500, VQE-10-020581, VQE-11-022973, VQE-14-028240, VQE-14-028262, VQE-15-029137, VQE-15-029683, VQE-16-030610, VQE-18-032677
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 21.5" x 24.5"
Max. Number of Layers: 28
Max. Board Thickness: .19"
Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 11:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Foil Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 65916
TTM PRINTED CIRCUIT GROUP, INC. 407 Mathew Street, Santa Clara, CA, 95050 US	Same Address as Manufacturer	Phone: 408-486-3184 Fax: 408-727-1003 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003888, VQE-10-020500, VQE-10-020581, VQE-11-022973, VQE-14-028240, VQE-14-028262, VQE-16-030610, VQE-18-032677
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 33
Max. Board Thickness: .19"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-03-003895, VQE-10-020500, VQE-10-020581, VQE-11-022973, VQE-14-028240, VQE-14-028262, VQE-16-030610, VQE-18-032677, VQE-18-032893
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18.5" x 24.5"
Max. Number of Layers: 20
Max. Board Thickness: .17"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:
TTM PRINTED CIRCUIT GROUP, INC.
407 Mathew Street, Santa Clara, CA, 95050 US

PLANT LOCATION:
Same Address as Manufacturer

CAGE Code: 65916
Phone: 408-486-3184
Fax: 408-727-1003
EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-03-003895, VQE-10-020500, VQE-10-020581, VQE-11-022973, VQE-14-028240, VQE-16-030610, VQE-18-032677
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 18" x 24"
Max. Number of Layers: 6
Max. Board Thickness: .043"
Min. Hole Size: .0118" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-07-013211, VQE-11-022973, VQE-14-028240, VQE-14-028262, VQE-16-030611, VQE-17-030871, VQE-18-032677
Composition: M - Mixed based material printed boards, S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 18" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .109"
Min. Hole Size: .0118" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Etchback, Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003888, VQE-10-020500, VQE-10-020581, VQE-11-022973, VQE-14-028240, VQE-14-028262, VQE-16-030610, VQE-18-032677
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: BI: Aramid Fabric, Nonwoven, Polyimide Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .182"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6.45:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 65916
TTM PRINTED CIRCUIT GROUP, INC. 407 Mathew Street, Santa Clara, CA, 95050 US	Same Address as Manufacturer	Phone: 408-486-3184 Fax: 408-727-1003 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-13-026953, VQE-14-028262, VQE-17-030872, VQE-18-032677
Rigid Base Material: BF: Aramid Fabric, Nonwoven, Epoxy Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .135"
Min. Hole Size: .0118" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7:1 Through-Hole
Min. Conductor Width/Space: .0088"/.008"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb
Controlled Impedance: Differential

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 3AF82
TTM Technologies Toronto, Inc. 8150 Sheppard Avenue East, Scarborough, M1B 5K2, Ontario Canada	Same Address as Manufacturer	Phone: 416-208-2100 Fax: 416-208-2196 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-04-006240, VQE-08-015407, VQE-09-018857, VQE-11-022676, VQE-12-023550
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .088"
Min. Hole Size: .0069" Laser Ablated Plated Hole Size Before Plating, .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Microvia, 8.4:1 Through-Hole
Min. Conductor Width/Space: .0037"/.0028"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper,
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, ImmAg, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-04-006240, VQE-08-015407, VQE-09-018857, VQE-11-022676, VQE-12-023550
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 20
Max. Board Thickness: .093"
Min. Hole Size: .0069" Laser Ablated Plated Hole Size Before Plating, .0091" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Microvia, 9.6:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, ImmAg, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0GN71
TTM Technologies, Inc.	Same Address as Manufacturer	Phone: 330-538-3900
12080 DeBartolo Drive, North Jackson, OH, 44451 US		Fax: 330-538-3820
		EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/2
Qualification Letters: VQE-18-032965
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 18" x 24"
Max. Number of Layers: 2
Max. Board Thickness: .117" (with Bonded Copper Backer)
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 4.1:1 Through-Hole
Min. Conductor Width/Space: .0152"/.009"
Hole Preparation: Permanganate Desmear, Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG
Additional Fab Capabilities: Metal Core

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-17-030811
Composition: H - Homogenous thermoplastic base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .25"
Min. Hole Size: .0075" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.53:1 Microvia, 15:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0GN71
TTM Technologies, Inc.	Same Address as Manufacturer	Phone: 330-538-3900
12080 DeBartolo Drive, North Jackson, OH, 44451 US		Fax: 330-538-3820
		EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003121, VQE-03-003214, VQE-07-012925, VQE-10-020405, VQE-19-033261
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .25"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 15:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni/Au, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg, Ni/Pd/Au, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Metal Core, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003121, VQE-03-003214, VQE-07-012925, VQE-10-020405, VQE-19-033261
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .25"
Min. Hole Size: .0075" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.53:1 Microvia, 15:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg, Ni/Pd/Au, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0GN71
TTM Technologies, Inc. 12080 DeBartolo Drive, North Jackson, OH, 44451 US	Same Address as Manufacturer	Phone: 330-538-3900 Fax: 330-538-3820 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-03-003121, VQE-03-003214, VQE-07-012925, VQE-10-020405, VQE-19-033261
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .25"
Min. Hole Size: .0075" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.53:1 Microvia, 15:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni/Au, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0GN71
TTM Technologies, Inc. 12080 DeBartolo Drive, North Jackson, OH, 44451 US	Same Address as Manufacturer	Phone: 330-538-3900 Fax: 330-538-3820 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/2
Qualification Letters: VQE-18-032965
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 18" x 24"
Max. Number of Layers: 2
Max. Board Thickness: .117" (with Bonded Copper Backer)
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 4.1:1 Through-Hole
Min. Conductor Width/Space: .0152"/.009"
Hole Preparation: Permanganate Desmear, Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG
Additional Fab Capabilities: Metal Core

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-17-030811
Composition: H - Homogenous thermoplastic base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .25"
Min. Hole Size: .0075" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.53:1 Microvia, 15:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0GN71
TTM Technologies, Inc. 12080 DeBartolo Drive, North Jackson, OH, 44451 US	Same Address as Manufacturer	Phone: 330-538-3900 Fax: 330-538-3820 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003121, VQE-03-003214, VQE-07-012925, VQE-10-020405, VQE-19-033261
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .25"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 15:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni/Au, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg, Ni/Pd/Au, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Metal Core, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003121, VQE-03-003214, VQE-07-012925, VQE-10-020405, VQE-19-033261
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .25"
Min. Hole Size: .0075" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.53:1 Microvia, 15:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg, Ni/Pd/Au, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0GN71
TTM Technologies, Inc.	Same Address as Manufacturer	Phone: 330-538-3900
12080 DeBartolo Drive, North Jackson, OH, 44451 US		Fax: 330-538-3820
		EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-03-003121, VQE-03-003214, VQE-07-012925, VQE-10-020405, VQE-19-033261
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .25"
Min. Hole Size: .0075" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.53:1 Microvia, 15:1 Through-Hole
Min. Conductor Width/Space: .003"/.003"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni/Au, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0BSG1
TTM Technologies, Inc. (Anaheim) 3140 East Coronado Street, Anaheim, CA, 92806 US	Same Address as Manufacturer	Phone: 714-688-7382 Fax: EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-09-018147), VQ(VQE-14-028542), VQE-14-028660, VQE-16-029908
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .1"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 5:1 Through-Hole
Min. Conductor Width/Space: .01"/.01"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: LDI, Liquid Photoimageable
Finish System: ENIG, HASL, Ni/Pd/Au
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-09-018147, VQE-17-031347, VQE-18-031989
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 22
Max. Board Thickness: .115"
Min. Hole Size: .007" Laser Ablated Plated Hole Size Before Plating, .009" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.6:1 Microvia, 10:1 Through-Hole
Min. Conductor Width/Space: .004"/.006"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: LDI, Liquid Photoimageable
Finish System: ENIG, HASL, Ni/Pd/Au
Additional Fab Capabilities: Buried Vias, Foil Lamination
Controlled Impedance: Differential, Single-Ended

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 01KV9
TTM Technologies, Inc. (Forest Grove) 1521 Poplar Lane, Forest Grove, OR, 97116-2033	Same Address as Manufacturer	Phone: (503) 992-4336 Fax: EMail: alan.preston@ttmtech.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE 19-033918), VQ(VQE-19-033180)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 21" x 24"
Max. Number of Layers: 31
Max. Board Thickness: .156"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.84:1 Microvia, 11.9:1 Through-Hole
Min. Conductor Width/Space: .0032"/.0025"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Dry Film, LDI, Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE 19-033919), VQ(VQE-19-033181)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 18
Max. Board Thickness: .099"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.84:1 Microvia, 8.4:1 Through-Hole
Min. Conductor Width/Space: .0032"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Dry Film, LDI, Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 01KV9
TTM Technologies, Inc. (Forest Grove) 1521 Poplar Lane, Forest Grove, OR, 97116-2033	Same Address as Manufacturer	Phone: (503) 992-4336 Fax: EMail: alan.preston@ttmtech.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQ(VQE20-034650)
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 24"
Max. Number of Layers: 16
Max. Board Thickness: .11"
Min. Hole Size: .0138" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8:1 Through-Hole
Min. Conductor Width/Space: .012"/.005"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Solder Resist: LDI
Finish System: ENIG
Additional Fab Capabilities: Sequential Lamination
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

MANUFACTURER INFORMATION:
TTM Technologies, Inc. (Stafford)
4 Old Monson Road, Stafford, CT, 06075 US

PLANT LOCATION:
Same Address as Manufacturer

CAGE Code: 5L706
Phone: 860-684-5881
Fax: 860-684-7425
EMail: seth.maitlen@ttmtech.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003348, VQE-09-018855, VQE-11-023287, VQE-12-023366, VQE-17-031350
Composition: M - Mixed based material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; Woven E-Glass, Epoxy Resin, Flame Resistant, with Inorganic Filler
Max. Panel Size: 30" x 54"
Max. Number of Layers: 50
Max. Board Thickness: .4"
Min. Hole Size: .0079" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Embedded Resistors, Foil Lamination, Metal Core, Press Fit Mounting, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003348, VQE-09-018855, VQE-11-023287, VQE-12-023366, VQE-16-030095, VQE-17-031350
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 24" x 36"
Max. Number of Layers: 33
Max. Board Thickness: .219"
Min. Hole Size: .0079" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Copper Invar Copper, Embedded Resistors, Foil Lamination, Metal Core, Press Fit Mounting, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:
TTM Technologies, Inc. (Stafford)
4 Old Monson Road, Stafford, CT, 06075 US

PLANT LOCATION:
Same Address as Manufacturer

CAGE Code: 5L706
Phone: 860-684-5881
Fax: 860-684-7425
EMail: seth.maitlen@ttmtech.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003348, VQE-09-018855, VQE-11-023287, VQE-16-030095, VQE-17-031350
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: AF: Aramid Fabric, Woven, Majority Polyfunctional Epoxy Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 12
Max. Board Thickness: .1"
Min. Hole Size: .0138" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 5:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Foil Lamination,
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003348, VQE-09-018855, VQE-11-023287, VQE-12-023366, VQE-16-030095, VQE-17-031350
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: BI: Aramid Fabric, Nonwoven, Polyimide Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 22
Max. Board Thickness: .129"
Min. Hole Size: .0118" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 11:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Embedded Resistors, Foil Lamination, Metal Core, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 5L706
TTM Technologies, Inc. (Stafford) 4 Old Monson Road, Stafford, CT, 06075 US	Same Address as Manufacturer	Phone: 860-684-5881 Fax: 860-684-7425 EMail: seth.maitlen@ttmtech.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003348, VQE-09-018855, VQE-11-023287
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GM: Glass Base, Woven, Triazine and/or Bismaleimide Modified Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .1"
Min. Hole Size: .032" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 3:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/5
Qualification Letters: VQE-03-003348, VQE-10-019855, VQE-11-023287, VQE-16-030095, VQE-17-031350
Rigid Base Material: With or without woven or non-woven E-glass, Polytetrafluoroethylene (PTFE) resin, ceramic filler
Max. Panel Size: 30" x 36"
Max. Number of Layers: 16
Max. Board Thickness: .16"
Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating, .012" Laser Ablated Plated Hole Size Before Plating
Aspect Ratio: .5:1 Microvia, 7.6:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Embedded Resistors, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003348, VQE-10-019855, VQE-11-023287, VQE-16-030095, VQE-17-031350
Composition: M - Mixed based material printed boards
Rigid Base Material: Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 30" x 36"
Max. Number of Layers: 30
Max. Board Thickness: .216"
Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Embedded Resistors, Foil Lamination, Metal Core, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 5L706
TTM Technologies, Inc. (Stafford)	Same Address as Manufacturer	Phone: 860-684-5881
4 Old Monson Road, Stafford, CT, 06075 US		Fax: 860-684-7425
		EMail: seth.maitlen@ttmtech.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-03-003349, VQE-09-018855, VQE-10-019456, VQE-11-023287, VQE-12-023366, VQE-16-030095, VQE-17-031350
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant; Woven E-Glass, Epoxy Resin, Flame Resistant, with Inorganic Filler
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 24" x 48"
Max. Number of Layers: 24
Max. Board Thickness: .275"
Min. Hole Size: .0079" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Embedded Resistors, Foil Lamination, Sequential Lamination
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-03-003349, VQE-10-019456, VQE-11-023287, VQE-17-031350, VQE-21-036251
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 24" x 36"
Max. Number of Layers: 4
Max. Board Thickness: .05"
Min. Hole Size: .035" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1.4:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable, Silk Screen
Finish System: ENIG, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0K703
TTM Technologies, Inc. (Sterling) 1200 Severn Way, Sterling, VA, 20166-8904 US	Same Address as Manufacturer	Phone: 703-652-2200 Fax: 703-652-2272 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-21-035999)
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: PPE/Woven Glass
Max. Panel Size: 18" x 24"
Max. Number of Layers: 12
Max. Board Thickness: .0619"
Min. Hole Size: .0079"
Aspect Ratio: 7.8:1 Through-Hole
Min. Conductor Width/Space: .004"/.0042"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Foil Lamination
Controlled Impedance: Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-03-003545), VQ(VQE-09-018207), VQ(VQE-14-028500), VQ(VQE-14-028501), VQ(VQE-17-031087), VQ(VQE-20-034480)
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 26
Max. Board Thickness: .192"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .009" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: LDI, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Resistors
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-03-003545), VQ(VQE-09-018207), VQ(VQE-14-028500), VQ(VQE-14-028501), VQ(VQE-17-031087)
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 26
Max. Board Thickness: .11"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .009" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: LDI, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Resistors
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0K703
TTM Technologies, Inc. (Sterling) 1200 Severn Way, Sterling, VA, 20166-8904 US	Same Address as Manufacturer	Phone: 703-652-2200 Fax: 703-652-2272 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-11-021244), VQ(VQE-14-028500), VQ(VQE-15-028809), VQ(VQE-20-034478), VQ(VQE-21-035999)
Composition: H - Homogenous thermoplastic base material printed boards, H - Homogenous thermoplastic base material printed boards
Rigid Base Material: Woven glass, reinforced, hydrocarbon resin, with ceramic fill
Max. Panel Size: 12" x 24", 18" x 24"
Max. Number of Layers: 12 , 12
Max. Board Thickness: .0169" , .0877"
Min. Hole Size: .0079" , .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7.8:1 Through-Hole, 8.2:1 Through-Hole
Min. Conductor Width/Space: .004"/.0042", .004"/.003"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper, Electroless Copper
Copper Plating: Direct Current Plate, Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable, Liquid Photoimageable
Finish System: ENIG, ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, HASL, Hot Oil Reflow of Plated Sn/Pb, Ni/Pd/Au
Additional Fab Capabilities: Blind Vias
Controlled Impedance: Differential, Single-Ended, Single-Ended

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 66311
Unicircuit, Inc. 8192 Southpark Lane, Littleton, CO, 80120 US	Same Address as Manufacturer	Phone: 303-730-0505, x110 Fax: EMail: blageman@unicircuit.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-07-13789, VQE-09-17422, VQE-11-23044, VQE-22-037175
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 12" x 18"
Max. Number of Layers: 16
Max. Board Thickness: .12"
Min. Hole Size: .006" Laser Ablated Plated Hole Size Before Plating, .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-09-17422, VQE-12-24296, VQE-20-034915
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 12" x 18"
Max. Number of Layers: 10
Max. Board Thickness: .063"
Min. Hole Size: .015" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 4:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: HASL, Hot Oil Reflow of Plated Sn/Pb
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:

US Circuit

2071 Wineridge Place, Escondido, CA, 92029

CAGE Code: 66483

Phone: 760-489-1413

Fax:

EMail: jmcintosh@uscircuit.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-19-033743), VQE-20-035360
Composition: H - Homogenous thermoplastic base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .11"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.1:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper, Graphite-based
Copper Plating: Periodic Reverse Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-19-033744), VQE-20-035305
Composition: H - Homogenous thermoplastic base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .11"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper, Graphite-based
Copper Plating: Periodic Reverse Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 65745
WESTAK OF OREGON, INC. 3941 24th Avenue, Forest Grove, OR, 97116 US	Same Address as Manufacturer	Phone: 503-359-3593 Fax: 503-357-5332 EMail: or-qa@westak.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-13-026434, VQE-14-027108, VQE-17-030915
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 21" x 24", " x "
Max. Number of Layers: 18
Max. Board Thickness: .18"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 15:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, HASL
Additional Fab Capabilities: Blind Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-13-026434, VQE-14-027109, VQE-17-030915
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 21" x 26"
Max. Number of Layers: 10
Max. Board Thickness: .11"
Min. Hole Size: .006" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 15:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni (no Au), Electrolytic Ni / Hard Au, HASL
Controlled Impedance: Differential, Single-Ended

SECTION II
LIST OF MANUFACTURERS AND ASSOCIATED SPECIFICATION

Accurate Circuit Engineering
3019 S. Kilson Drive, Santa Ana, CA, 92707 USA
CAGE Code: 0MNN9

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Accurate Engineering Inc..
8710 Telfair Ave, Sun Valley, CA, 91352 USA
CAGE Code: 1W538

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Advanced Circuits Minnesota
886 Zachary Lane North, Maple Grove, MN, 55369-4524 US
CAGE Code: 45032

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Advanced Circuits, Inc. (Chandler)
6615 W. Boreon St., Chandler, AZ, 85266 US
CAGE Code: 6RJS1

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Airborn Flexible Circuits, Inc.
11 Dohme Avenue, Toronto, M4B 1Y7, Ontario Canada
CAGE Code: 38661

☐ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☐ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

All Flex Solutions, Inc. (Bloomington)
1200 West 96th Street, Bloomington, MN, 55431 USA
CAGE Code: 65114

☐ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☐ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

All Flex Solutions, Inc. (Northfield)
1705 Cannon Lane, Northfield, MN, 55057-3605 USA
CAGE Code: 0ZGB2

☐ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☐ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

AMERICAN STANDARD CIRCUITS, LLC
475 Industrial Drive, West Chicago, IL, 60185 US
CAGE Code: 4AA34

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

AMITRON, INC.
2001 Landmeier Road, Elk Grove Village, IL, 60007 USA
CAGE Code: 1LHP6

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

AMPHENOL PRINTED CIRCUITS, INC.
91 Northeastern Boulevard, Nashua, NH, 03062 US
CAGE Code: 57034

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Calumet Electronics Corp.
25830 Depot Street, Calumet, MI, 49913-1985 US
CAGE Code: 65337

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Circuit-Tech, Inc.
399 Denison Street, Markham, ON, L3R 1B7 Canada
CAGE Code: L4387

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Cirexx International, Inc.
791 Nuttman Street, Santa Clara, CA, 95054 US
CAGE Code: 4MEG7

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

SECTION II
LIST OF MANUFACTURERS AND ASSOCIATED SPECIFICATION

Cirtech, Inc.
250 E. Emerson Ave., Orange, CA, 92865-3303
CAGE Code: 8K616

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [x] MIL-PRF-31032/3
- [x] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

Compunetics Inc.
700 Seco Rd, Monroeville, PA, 15146 US
CAGE Code: 30598

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [x] MIL-PRF-31032/3
- [x] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

Electro Plate Circuitry, Inc.
1430 Century Drive, Carrollton, TX, 75006 US
CAGE Code: 79616

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [ ] MIL-PRF-31032/3
- [ ] MIL-PRF-31032/4
- [x] MIL-PRF-31032/5
- [x] MIL-PRF-31032/6
- [ ] Custom

Firan Technology Group
250 Finchdene Square, Scarborough, M1X 1A5, Ontario, Canada
CAGE Code: L2665

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [x] MIL-PRF-31032/3
- [x] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

Flexible Circuits Inc.
222 Valley Rd, Warrington, PA, 18976 US
CAGE Code: 22928

- [ ] MIL-PRF-31032/1
- [ ] MIL-PRF-31032/2
- [x] MIL-PRF-31032/3
- [x] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

FTG Circuits Fredericksburg Inc.
1026 Warrenton Road, Fredericksburg, VA, 22406-6200 US
CAGE Code: 6T499

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [x] MIL-PRF-31032/3
- [x] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

FTG Circuits, Inc. - Chatsworth
20750 Marilla Street, Chatsworth,, CA, 91311 US
CAGE Code: 30803

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [x] MIL-PRF-31032/3
- [x] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

Gorilla Circuits
1445 Old Oakland Rd, San Jose, CA, 95112 US
CAGE Code: 3C7D2

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [ ] MIL-PRF-31032/3
- [ ] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

Holaday Circuits, Inc.
11126 Bren Road West, Minnetonka, MN, 55343 US
CAGE Code: 59554

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [ ] MIL-PRF-31032/3
- [ ] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

Hughes Circuits, Inc.
540 S. Pacific Street, San Marcos, CA, 92078-4056 US
CAGE Code: 1KXU6

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [ ] MIL-PRF-31032/3
- [ ] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

IMI, Inc.
140 Hilldale Avenue, Haverhill, MA, 01832
CAGE Code: 78259

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [ ] MIL-PRF-31032/3
- [ ] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

ISU Petasys
12930 Bradley St, Sylmar, CA, 91342 US
CAGE Code: 1WFH9

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [ ] MIL-PRF-31032/3
- [ ] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

KCA Electronics, Inc.
223 N. Crescent Way, Anaheim, CA, 92801 US
CAGE Code: 1VUH8

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [x] MIL-PRF-31032/3
- [x] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

SECTION II
LIST OF MANUFACTURERS AND ASSOCIATED SPECIFICATION

LOCKHEED MARTIN CORPORATION ROTARY AND MISSION SYSTEMS
1801 State Route 17C, Owego, NY, 13827 US
CAGE Code: 03640

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Lone Star Circuits
901 Hensley Drive, Wylie, TX, 75098-4909 US
CAGE Code: 04RV5

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☑ MIL-PRF-31032/6

Metaplast Circuits Ltd.
180 Hymus Road, Scarborough, M1L 2E1, Ontario, Canada
CAGE Code: 3AD63

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Micropack Limited
, Plot No. 16, Jigani Industrial Area, Anekal Taluk, Bangalore District 560105 India
CAGE Code: 0436Y

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☑ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☑ MIL-PRF-31032/6

Midwest Printed Circuit Services
1741 Circuit Drive, Round Lake Beach, IL, 60073 US
CAGE Code: 0YYS4

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Multicircuits Inc.
2301 Universal St, Oshkosh, WI, 54904
CAGE Code: 1BQS8

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Multilayer Technology
3835 West Conflans Road, Irving, TX, 75061
CAGE Code: 0JKV9

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Murrietta Circuits, Inc.
5000 E. Landon Drive, Anaheim, CA, 92807 US
CAGE Code: 0EJD7

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Pioneer Circuits, Inc.
3000 S. Shannon Street, Santa Ana, CA, 92704-6321 US
CAGE Code: 65723

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

PRO-TECH INTERCONNECT SOLUTIONS, LLC
4300 Peavey Road, Chaska, MN, 55318 US
CAGE Code: 3CP65

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Prototron Circuits, Inc.
3760 East 43rd Place, Tucson, AZ, 58713 US
CAGE Code: 66108

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Sanmina (Costa Mesa)
2945 Airway Avenue, Costa Mesa, CA, 92626 US
CAGE Code: 3BKL5

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Sanmina-SCI (San Jose)
2050 Bering Drive, San Jose, CA, 95131 US
CAGE Code: 3DR67

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

SECTION II
LIST OF MANUFACTURERS AND ASSOCIATED SPECIFICATION

Sierra Circuits Inc.
1108 West Evelyn Ave, Sunnyvale, CA, 94086 USA
CAGE Code: 0ZHS4

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Sierra Electrotek LLC
7745 S. 10th Street, Oak Creek, WI, 53154 US
CAGE Code: 66030

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Streamline Circuits
1410 Martin Ave., Santa Clara, CA, 95050
CAGE Code: 3WUY3

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Summit Interconnect Toronto
90 Don Park Road, Markham, L3R 1C4, Ontario, Canada
CAGE Code: 38747

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

Thales Nederland B.V.
Haaksbergerstraat 49, 7554PA Hengelo The Netherlands
CAGE Code: H0203

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

TTM PRINTED CIRCUIT GROUP, INC.
407 Mathew Street, Santa Clara, CA, 95050 US
CAGE Code: 65916

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

TTM Technologies Toronto, Inc.
8150 Sheppard Avenue East, Scarborough, M1B 5K2, Ontario Canada
CAGE Code: 3AF82

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

TTM Technologies, Inc.
12080 DeBartolo Drive, North Jackson, OH, 44451 US
CAGE Code: 0GN71

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

TTM Technologies, Inc.
2630 South Harbor Boulevard, Santa Ana, CA, 92704 US
CAGE Code: 1WQ42

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

TTM Technologies, Inc. (Anaheim)
3140 East Coronado Street, Anaheim, CA, 92806 US
CAGE Code: 0BSG1

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

TTM Technologies, Inc. (Forest Grove)
1521 Poplar Lane, Forest Grove, OR, 97116-2033
CAGE Code: 01KV9

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

TTM Technologies, Inc. (Stafford)
4 Old Monson Road, Stafford, CT, 06075 US
CAGE Code: 5L706

☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☑ MIL-PRF-31032/5
☑ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

TTM Technologies, Inc. (Sterling)
1200 Severn Way, Sterling, VA, 20166-8904 US
CAGE Code: 0K703

☑ MIL-PRF-31032/1 ☐ MIL-PRF-31032/4 ☐ Custom
☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/5
☐ MIL-PRF-31032/3 ☐ MIL-PRF-31032/6

SECTION II
LIST OF MANUFACTURERS AND ASSOCIATED SPECIFICATION

Unicircuit, Inc.
8192 Southpark Lane, Littleton, CO, 80120 US
CAGE Code: 66311

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [ ] MIL-PRF-31032/3
- [ ] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

US Circuit
2071 Wineridge Place, Escondido, CA, 92029
CAGE Code: 66483

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [ ] MIL-PRF-31032/3
- [ ] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom

WESTAK OF OREGON, INC.
3941 24th Avenue, Forest Grove, OR, 97116 US
CAGE Code: 65745

- [x] MIL-PRF-31032/1
- [x] MIL-PRF-31032/2
- [ ] MIL-PRF-31032/3
- [ ] MIL-PRF-31032/4
- [ ] MIL-PRF-31032/5
- [ ] MIL-PRF-31032/6
- [ ] Custom