Specification Details: **Date: 12/18/2014**

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: 614-692-0627, e-mail: vqe.ls@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:	
AC Universal Circuits LLC 8860 Zachary Lane North, Maple Grove, MN, 55369-4524 US	Same Address as Manufacturer	CAGE Code: 45032 Phone: 763-315-1702 Fax: 763-425-0999 EMail: sbialka@universalcircuits.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
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: .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
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
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
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: VQE-11-021326, VQE-12-024534
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: .062"
Min. Hole Size: .0138" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 4.5:1 Through-Hole
Min. Conductor Width/Space: .007"/.006"
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: Foil Lamination

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 US	Same Address as Manufacturer	Phone: 714-546-2162 Fax: 714-433-7418 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
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 20" x 26"
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
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:

Advanced Circuits - Tempe Division

229 S. Clark Drive, Tempe, AZ, 85281-3073 US

CAGE Code: 6RJS1

Phone: 480-966-5894

Fax: 480-966-5896

EMail: tempesales@4pcb.com

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
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"/.0047"
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
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: .8:1 Microvia, 12.5:1 Through-Hole
Min. Conductor Width/Space: .004"/.0047"
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: " Not Specified
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: Copper Core, Foil Lamination, 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: Copper Core, 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: 4AA34
American Standard Circuits	Same Address as Manufacturer	Phone: 603-639-5444
475 Industrial Drive, West Chicago, IL, 60185 US		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-08-015934, VQE-11-021830, VQE-11-023138, VQE-13-025323, VQE-13-025791, VQE-13-025834
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
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: 57034
Amphenol Printed Circuits	Same Address as Manufacturer	Phone: 603-879-3268
91 Northeastern Boulevard, Nashua, NH, 03062 US		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-97-000649
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 24" x 42"
Max. Number of Layers: 33
Max. Board Thickness: .25"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: .6:1 Microvia, 11:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Permanganate Etchback, 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 / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb
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-97-000649
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: .0158" 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, Pulse Plate
Hole Fill/Via Plug: 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
Additional Fab Capabilities: Foil Lamination, Press Fit Mounting
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
Composition: H - Homogenous thermoplastic base material printed boards, 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 24"
Max. Number of Layers: 12
Max. Board Thickness: .101"
Min. Hole Size: .033" Drilled Plated-Through Hole Before Plating
Aspect Ratio: .5:1 Microvia, 3:1 Through-Hole
Min. Conductor Width/Space: .004"/.003"
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, Silk Screen
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, 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 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-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-10-019533, VQE-12-023765
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: .031"
Min. Hole Size: .0145"
Aspect Ratio: .7:1 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
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 49"
Max. Number of Layers: 22
Max. Board Thickness: .14"
Min. Hole Size: .12" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7.75:1 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
Finish System: Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb
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: VQE 12 023734, VQE-03-4657, VQE-04-6280, VQE-14-027692
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: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL
Additional Fab Capabilities: Press Fit Mounting

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE 12 023734, VQE-03-4657, VQE-04-6280, VQE-13-026419
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame 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: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL

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-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-08-016602), VQE-14-028536
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 12" x 18"
Max. Number of Layers: 22
Max. Board Thickness: .125"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 12.5:1 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: 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-08-016602), VQE-14-028536
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 12" x 18"
Max. Number of Layers: 22
Max. Board Thickness: .125"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 12.5:1 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: 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-31032/3
Qualification Letters: VQ(VQE-07-014176)
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 12" x 18"
Max. Number of Layers: 2
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: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni/Au, HASL
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: VQ(VQE-08-016602), VQE-14-028536
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: 12.5:1 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: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, 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: 6T499
Colonial Circuits, Inc. 1026 Warrenton Road, Fredericksburg, VA, 22406-6200 US	Same Address as Manufacturer	Phone: 540-753-5511, x125 Fax: 540-752-2109 EMail: quality@colonialcircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: 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: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: HASL

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-04-6002
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: .127"
Min. Hole Size: .015"
Aspect Ratio: 8.5:1 Through-Hole
Min. Conductor Width/Space: .008"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: HASL

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/5, MIL-PRF-31032/6
Qualification Letters: VQE-04-6002, VQE-06-010192
Rigid Base Material: Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 12" x 18"
Max. Number of Layers: 8
Max. Board Thickness: .09"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6.2:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
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:	PLANT LOCATION:	CAGE Code: 6T499
Colonial Circuits, Inc.	Same Address as Manufacturer	Phone: 540-753-5511, x125
1026 Warrenton Road, Fredericksburg, VA, 22406-6200 US		Fax: 540-752-2109
		EMail: quality@colonialcircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQ (VQE-10-019425
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: 10
Max. Board Thickness: .093"
Min. Hole Size: .01"
Aspect Ratio: 8.6:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: HASL
Flex Usage: Use A (Flex During Installation),

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: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: HASL
Flex Usage: Use A (Flex During Installation),

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/6
Qualification Letters: VQE-04-6002
Rigid Base Material: GT: Woven E-Glass, PTFE Resin; GT: Woven E-Glass, PTFE Resin; GX: Glass Base, Woven, Polytetrafluoroethylene Resin, Flame Resistant; With or without woven or non-woven E-glass, Polytetrafluoroethylene (PTFE) resin, ceramic filler
Max. Panel Size: 12" x 18"
Max. Number of Layers: 2
Max. Board Thickness: .031"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1.55:1 Through-Hole
Min. Conductor Width/Space: .025"/.01"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: HASL

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

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, OH, 15146 US		Fax:
		EMail: lhart@compunetics.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-13-026082)
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: .099"
Min. Hole Size: .0098" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.18:1 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
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 63695
Cosmotronic, Inc. 16721 Noyes Avenue, Irvine, CA, 92606-5176 US	Same Address as Manufacturer	Phone: 949-660-0740 Fax: 949-553-8371 EMail: Patricia_Alcantar@cosmotronic.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-04-006966, VQE-05-009107, VQE-06-010085, VQE-06-011248
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Board Thickness: .335"
Min. Hole Size: .014" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 15:1 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
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Sequential Lamination
Controlled Impedance: Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-04-006966, VQE-05-009107, VQE-06-010085, VQE-06-011248
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Board Thickness: .335"
Min. Hole Size: .014" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 15:1 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
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Sequential Lamination
Controlled Impedance: Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-04-006966, VQE-05-009107, VQE-06-010085
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant; GM: Glass Base, Woven, Triazine and/or Bismaleimide Modified Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Adhesiveless Polyimide
Max. Panel Size: 18" x 24"
Max. Number of Layers: 22
Max. Board Thickness: .165"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8:1 Through-Hole
Min. Conductor Width/Space: .006"/.008"
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), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 63695
Cosmotronic, Inc.	Same Address as Manufacturer	Phone: 949-660-0740
16721 Noyes Avenue, Irvine, CA, 92606-5176 US		Fax: 949-553-8371
		EMail: Patricia_Alcantar@cosmotronic.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-04-006966, VQE-05-009107, VQE-06-010085
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; GI: Glass Base, Woven, Polyimide Resin, Heat Resistant; GM: Glass Base, Woven, Triazine and/or Bismaleimide Modified Epoxy Resin, Flame Resistant
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 18" x 24"
Max. Number of Layers: 22
Max. Board Thickness: .165"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8:1 Through-Hole
Min. Conductor Width/Space: .006"/.008"
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), Use B (Dynamic Flex)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/5, MIL-PRF-31032/6
Qualification Letters: VQE-04-006966, VQE-05-009107, VQE-06-010085
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 12" x 18"
Max. Number of Layers: 16
Max. Board Thickness: .225"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .011"/.007"
Hole Preparation: 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, Sequential Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/5, MIL-PRF-31032/6
Qualification Letters: VQE-04-006966, VQE-05-009107, VQE-06-010085
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant; Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 12" x 18"
Max. Number of Layers: 16
Max. Board Thickness: .225"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .011"/.007"
Hole Preparation: 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, Sequential Lamination

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 38898
Dynamic & Proto Circuits, Inc. 869 Barton Street, Stoney Creek, L8E 5G6, Ontario Canada	Same Address as Manufacturer	Phone: 905-643-9900 Fax: 905-643-9911 EMail: dynamicinfo@dapc.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-00-0007, VQE-01-0311, VQE-03-0818, VQE-98-1143
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 16" x 18"
Max. Number of Layers: 16
Max. Board Thickness: .125"
Min. Hole Size: .0135" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.3:1 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
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: HASL

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-12-024252
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 16" x 18"
Max. Number of Layers: 16
Max. Board Thickness: .125"
Min. Hole Size: .0135" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.3:1 Through-Hole
Min. Conductor Width/Space: .025"/.025"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: HASL

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 79616
Electro Plate Circuitry, Inc.	Same Address as Manufacturer	Phone: 972-466-0818
1430 Century Drive, Carrollton, TX, 75006 US		Fax: 972-466-9078
		EMail: jimm@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)
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 16", 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .12"
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

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)
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

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 24"
Max. Number of Layers: 6
Max. Board Thickness: .18"
Min. Hole Size: .008" 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: 66030
Electrotek Corp. 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)
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: .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

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)
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:

Firan Technology Group

250 Finchdene Square, Scarborough, M1X 1A5,
Ontario Canada

PLANT LOCATION:
Same Address as Manufacturer

CAGE Code: L2665

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
Rigid Base Material: BI: Aramid Fabric, Nonwoven, Polyimide Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .101"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 12.65:1 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: 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-05-009339, VQE-06-010764, VQE-06-010889
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: .22"
Min. Hole Size: .0059" Laser Ablated Plated Hole Size Before Plating, .0096" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1.01:1 Microvia, 22.45:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, 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-05-009339, VQE-06-010764, VQE-06-010889
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: .13"
Min. Hole Size: .0059" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.95:1 Microvia, 16.25:1 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: Liquid Photoimageable
Finish System: ENIG, 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:	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
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: 14
Max. Board Thickness: .097"
Min. Hole Size: .0138" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7.03:1 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: 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:
Gorilla Circuits
1445 Old Oakland Rd, San Jose, CA, 95112 US

CAGE Code: 3C7D2
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
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: 18:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Permanganate Desmear, Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL
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: 11-022314, 14-028138
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, .01" Laser Ablated Plated Hole Size Before Plating
Aspect Ratio: 1:1 Microvia, 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: Blind Vias
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: U4538
Graphic Plc Lords Meadow Industrial Estate, Crediton, Devon, EX17 IHN UK	Same Address as Manufacturer	Phone: 44-1363-774874 Fax: 44-1363-772265 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-023205, VQE-12-025118
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: .11" (2.79mm)
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8.4:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: Plasma Desmear
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-12-025119
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 12" x 18"
Max. Number of Layers: 10
Max. Board Thickness: .11" (2.79mm)
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8.4:1 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
Additional Fab Capabilities: Foil Lamination

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 07284
Hamby Corporation 27704 Avenue Scott, Valencia, CA, 91355-1218 US	Same Address as Manufacturer	Phone: 661-257-1924 Fax: 661-257-1213 EMail: suesharp@hambycorp.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-09-017349
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 12" x 18"
Max. Number of Layers: 6
Max. Board Thickness: .035"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 2:1 Through-Hole
Min. Conductor Width/Space: .009"/.009"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Finish System: Electrolytic Ni / Hard Au, HASL

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-08-14596
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: 11
Max. Board Thickness: .085"
Min. Hole Size: .018" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 5:1 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: Electrolytic Ni / Hard Au, HASL
Controlled Impedance: Differential, Single-Ended
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-09-017349
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 12" x 18"
Max. Number of Layers: 6
Max. Board Thickness: .035"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 2:1 Through-Hole
Min. Conductor Width/Space: .009"/.009"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Finish System: Electrolytic Ni / Hard Au, HASL

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 07284
Hamby Corporation 27704 Avenue Scott, Valencia, CA, 91355-1218 US	Same Address as Manufacturer	Phone: 661-257-1924 Fax: 661-257-1213 EMail: suesharp@hambycorp.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-08-14596
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: 11
Max. Board Thickness: .095"
Min. Hole Size: .018" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 5:1 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: Electrolytic Ni / Hard Au, 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: C4831
Hans Brockstedt GmbH Clara-Immerwahr-Strabe 7, 24145 Kiel Germany	Same Address as Manufacturer	Phone: 0049-431-71966-0, -30 Fax: 0049-431-71966-29 EMail: klammer@brockstedt.de

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-2619, VQE-05-7480
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 9" x 13", 13" x 20", 15" x 21", 18" x 24"
Max. Number of Layers: 12
Max. Board Thickness: .2"
Min. Hole Size: .004" Laser Ablated Plated Hole Size Before Plating, .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Microvia, 7:1 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
Solder Resist: 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

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-03-2619, VQE-05-7480,
Composition: 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: 9" x 13", 13" x 20"
Max. Number of Layers: 12
Max. Board Thickness: .2"
Min. Hole Size: .004" Laser Ablated Plated Hole Size Before Plating, .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Microvia, 7:1 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
Solder Resist: 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
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3
Qualification Letters: VQE-03-2619, VQE-05-7480, VQE-13-25594
Composition: S - Homogenous thermosetting base material printed boards
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 9" x 13", 13" x 20"
Max. Number of Layers: 2
Max. Board Thickness: .01"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Through-Hole
Min. Conductor Width/Space: .004"/.004"
Hole Preparation: 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, Hot Oil Reflow of Plated Sn/Pb
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: C4831
Hans Brockstedt GmbH Clara-Immerwahr-Strabe 7, 24145 Kiel Germany	Same Address as Manufacturer	Phone: 0049-431-71966-0, -30 Fax: 0049-431-71966-29 EMail: klammer@brockstedt.de

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-2619, VQE-05-7480
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 9" x 13", 13" x 20", 15" x 21", 18" x 24"
Max. Number of Layers: 12
Max. Board Thickness: .2"
Min. Hole Size: .004" Laser Ablated Plated Hole Size Before Plating, .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Microvia, 7:1 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
Solder Resist: 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

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 59554
Holaday Circuits, Inc. 11126 Bren Road West, Minnetonka, MN, 55343 US	Same Address as Manufacturer	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)
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: .11"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7.8:1 Through-Hole
Min. Conductor Width/Space: .003"/.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: Liquid Photoimageable
Finish System: ENIG, HASL, ImmAg, 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: 1KXU6
Hughes Circuits, Inc.	Same Address as Manufacturer	Phone: 760-744-0300
540 S. Pacific Street, San Marcos, CA, 92078-4056 US		Fax: 760-744-6388
		EMail: joe@hughescircuits.com

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
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: .08"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7:1 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
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-07-014018), VQ(VQE-14-028093), VQE-12-24783
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: .08"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7:1 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
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:		
ISU Petasys		CAGE Code: 1WFH9
12930 Bradley St., Sylmar, CA, 91342 US		Phone: 818-833-4832
		Fax:
		EMail: SimeonR@isupetasys.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-15-028813)
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: .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
Solder Resist: Liquid Photoimageable
Finish System: ImmAg
Additional Fab Capabilities: Buried Vias, Foil Lamination, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:
KCA Electronics, Inc.
223 N. Crescent Way, Anaheim, CA, 92801 US

CAGE Code: 1VUH8
Phone: 714-239-2433
Fax: 714-239-2455
EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-022964, VQE-14-027414
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: .0548"
Min. Hole Size: .04" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1.37:1 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
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: HASL

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-11-021796, VQE-14-027414
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: 16
Max. Board Thickness: .074"
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: HASL
Additional Fab Capabilities: Blind Vias, Sequential Lamination
Controlled Impedance: Differential
Flex Usage: Use A (Flex During Installation)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3
Qualification Letters: VQE-11-021796
Flex Base Material: Copper Clad Polyimide with Acrylic Adhesive
Max. Panel Size: 12" x 18"
Max. Number of Layers: 1
Max. Board Thickness: .008"
Min. Conductor Width/Space: .004"/.006"
Finish System: HASL
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: 1VUH8
KCA Electronics, Inc.		Phone: 714-239-2433
223 N. Crescent Way, Anaheim, CA, 92801 US		Fax: 714-239-2455
		EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-022398, VQE-14-027414
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: .092"
Min. Hole Size: .004" Laser Ablated Plated Hole Size Before Plating, .0079" 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: 04RV5
Loan 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-31032/1, 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: HASL
Additional Fab Capabilities: Foil Lamination

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: 12
Max. Board Thickness: .074"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6.2:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: HASL
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/6
Qualification Letters: VQE-07-013270, VQE-09-017797, VQE-10-020600
Rigid Base Material: GR: Glass Base, Nonwoven, Polytetrafluoroethylene Resin, Flame Resistant
Max. Panel Size: 9" x 16"
Max. Number of Layers: 2
Max. Board Thickness: .098"
Min. Hole Size: .031" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 3.2:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Sodium Treatment
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: Electrolytic Ni / Hard Au, HASL

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 04RV5
Loan 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: VQE-11-021947
Rigid Base Material: GY: Glass Base, Woven, Polytetrafluoroethylene Resin, Flame Resistant, for Microwave Application
Max. Panel Size: 12" x 17"
Max. Number of Layers: 2
Max. Board Thickness: .031"
Min. Hole Size: .039" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Sodium Treatment
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Finish System: Hot Oil Reflow of Plated Sn/Pb

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 03640
Lockheed Martin Mission Systems & Training	Same Address as Manufacturer	Phone: 607-751-5395
1801 State Route 17C, Owego, NY, 13827 US		Fax: 607-751-7714
		EMail: renee.akers@lmco.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-00-000961, VQE-99-000130
Rigid Base Material: AF: Aramid Fabric, Woven, Majority Polyfunctional Epoxy Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 16
Max. Board Thickness: .2"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8:1 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: Liquid Photoimageable
Finish System: Electrolytic Ni / Hard Au, HASL, Hot Oil Reflow of Plated Sn/Pb

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-01-0539
Rigid Base Material: BI: Aramid Fabric, Nonwoven, Polyimide Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .095"
Min. Hole Size: .014" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6.8:1 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: Electrolytic Ni / Hard Au, HASL, Hot Oil Reflow of Plated Sn/Pb

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-99-000130
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 24" x 30"
Max. Number of Layers: 24
Max. Board Thickness: .2"
Min. Hole Size: .018" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8:1 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: Electrolytic Ni / Hard Au, HASL, Hot Oil Reflow of Plated Sn/Pb

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 03640
Lockheed Martin Mission Systems & Training	Same Address as Manufacturer	Phone: 607-751-5395
1801 State Route 17C, Owego, NY, 13827 US		Fax: 607-751-7714
		EMail: renee.akers@lmco.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-00-000961, VQE-07-013459, VQE-99-000130
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 24" x 30"
Max. Number of Layers: 16
Max. Board Thickness: .2"
Min. Hole Size: .018" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 8:1 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: Liquid Photoimageable
Finish System: Electrolytic Ni / Hard Au, 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
Composition: 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: 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: .003"/.004"
Hole Preparation: Permanganate Desmear, Plasma Etchback
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
Flex Usage: Use A (Flex During Installation)

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-00-000684, VQE-07-013459
Composition: 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 Polyimide with Acrylic Adhesive
Max. Panel Size: 18" x 24"
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: .003"/.004"
Hole Preparation: Permanganate Desmear, Plasma Etchback
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
Flex Usage: Use A (Flex During Installation)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 34076
Micom Corp. 475 Old Highway 8 NW, New Brighton, MN, 55112 US	Same Address as Manufacturer	Phone: 651-604-2625 Fax: 651-636-1352 EMail: kmoe@micomcircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-02-002780, VQE-03-002980, VQE-12-023661
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 28
Max. Board Thickness: .239"
Min. Hole Size: .007" 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, 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, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Blind Vias, Buried Vias, Embedded Resistors, 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-02-002780, VQE-03-002980, VQE-12-023661
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18" x 24"
Max. Number of Layers: 28
Max. Board Thickness: .239"
Min. Hole Size: .007" 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, 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, 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:
Midwest Printed Circuit Services
1741 Circuit Drive, Round Lake Beach, IL, 60073 US

CAGE Code: 0YYS4
Phone: 847-740-4120
Fax: 847-740-4187
EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-13-025705, VQE-14-028088
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

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
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, Permanganate 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: Controlled Depth Mechanically Drilled Low Aspect Ratio Blind Vias, Foil Lamination
Controlled Impedance: Differential

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
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
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

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)

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
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)

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:	PLANT LOCATION:	CAGE Code: 66766
PNC, Inc. 115 East Centre Street, Nutley, NJ, 07110 US	Same Address as Manufacturer	Phone: 973-284-1600 Fax: EMail: carmela@pnconline.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-10-19440
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18" x 22"
Max. Number of Layers: 10
Max. Board Thickness: .093"
Min. Hole Size: .014" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6.6:1 Through-Hole
Min. Conductor Width/Space: .008"/.008"
Hole Preparation: Permanganate Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: HASL
Additional Fab Capabilities: Foil Lamination

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 65114
Printed Circuits, Inc. 1200 West 96th Street, Bloomington, MN, 55431-2606 US	Same Address as Manufacturer	Phone: 612-888-7900 Fax: 612-888-2719 EMail: jsmith@printedcircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-01-000024
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: 12" x 18", 18" x 24"
Max. Number of Layers: 16
Max. Board Thickness: .12"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .004"/.005"
Hole Preparation: Plasma 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, Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: Sequential Lamination
Flex Usage: Use A (Flex During Installation), Use B (Dynamic Flex)

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:
Pro-Tech Interconnect Solutions LLC
4300 Peavey Road, Chaska, MN, 55318 US

CAGE Code: 3CP65
Phone: 952-442-2189
Fax: 952-442-2472
EMail: hkooda@protechmn.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-021704
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 12" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .1"
Min. Hole Size: .024" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 4:1 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: HASL

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-021704
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: .1"
Min. Hole Size: .024" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 4:1 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: HASL

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:
Sanmina-SCI (Costa Mesa)
2945 Airway Avenue, Costa Mesa, CA, 92626 US

CAGE Code: 3BKL5
Phone: 714-371-2800
Fax: 714-371-2833
EMail: joann.medina@sanmina-sci.com

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: .003"/.003"
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: Electrolytic Ni / Soft Au, HASL
Additional Fab Capabilities: Blind Vias, Buried Vias, 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: 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: .003"/.0035"
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: Electrolytic Ni / Soft Au, HASL
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:		CAGE Code: 4GZ84
Sanmina-SCI (Owego)		Phone: 607-689-5543
1200 Taylor Rd., Owego, NY, 13827 US		Fax:
		EMail: rick.sylvain@sanmina-sci.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-21597
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: .11"
Min. Hole Size: .012" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.3:1 Through-Hole
Min. Conductor Width/Space: .008"/.0045"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Solder Resist: Liquid Photoimageable
Finish System: HASL
Additional Fab Capabilities: Foil Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-11-22386
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: .095"
Min. Hole Size: .007" Laser Ablated Plated Hole Size Before Plating, .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: .59:1 Microvia, 9.7:1 Through-Hole
Min. Conductor Width/Space: .0035"/.0032"
Hole Preparation: Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: 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: 3DR67
Sanmina-SCI (San Jose)	Same Address as Manufacturer	Phone: 408-964-6515
2050 Bering Drive, San Jose, CA, 95131 US		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: 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: 30
Max. Board Thickness: .25"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14:1 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, ImmAg, OSP
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: 18" x 24"
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, 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-31032/2, MIL-PRF-31032/6
Qualification Letters: VQE-10-20921, VQE-10-21014
Rigid Base Material: Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 21" x 24"
Max. Number of Layers: 2
Max. Board Thickness: .062"
Min. Hole Size: .0197" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 3.1:1 Through-Hole
Min. Conductor Width/Space: .008"/.014"
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate, Pulse Plate
Hole Fill/Via Plug: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG

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-31032/5
Qualification Letters: VQE-11-021514
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 21" x 24"
Max. Number of Layers: 7
Max. Board Thickness: .066"
Min. Hole Size: .01"
Aspect Ratio: 7:1 Through-Hole
Min. Conductor Width/Space: .005"/.004"
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: Liquid Photoimageable
Finish System: ENIG
Additional Fab Capabilities: Blind Vias, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 66982
Speedy Circuits, Inc. 5331 McFadden Avenue, Huntington Beach, CA, 92649-1204 US	Same Address as Manufacturer	Phone: 714-898-4901 Fax: 714-891-0607 EMail: sales@speedycircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-08-016434, VQE-10-021007
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: .11"
Min. Hole Size: .015" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: Electrolytic Ni (no Au), HASL, Hot Oil Reflow of Plated Sn/Pb
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-08-016434, VQE-10-021007
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: .11"
Min. Hole Size: .015" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
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
Additional Fab Capabilities: Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-08-016434, VQE-10-019157, VQE-10-021007
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: 18
Max. Board Thickness: .13"
Min. Hole Size: .002" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Desmear, Plasma Etchback
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb
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: 66982
Speedy Circuits, Inc. 5331 McFadden Avenue, Huntington Beach, CA, 92649-1204 US	Same Address as Manufacturer	Phone: 714-898-4901 Fax: 714-891-0607 EMail: sales@speedycircuits.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/6
Qualification Letters: VQE-08-016434
Composition: H - Homogenous thermoplastic base material printed boards
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: 12" x 18"
Max. Number of Layers: 2
Max. Board Thickness: .036"
Min. Hole Size: .02" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 2:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Finish System: Hot Oil Reflow of Plated Sn/Pb

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/5, MIL-PRF-31032/6
Qualification Letters: VQE-09-018657
Composition: M - Mixed based material printed boards
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant; With or without woven or non-woven E-glass, Polytetrafluoroethylene (PTFE) resin, ceramic filler
Max. Panel Size: 12" x 18"
Max. Number of Layers: 10 Woven E-Glass, Hydrocarbon Resin, Ceramic Filler - Homogenous
Max. Board Thickness: .1"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, HASL, Hot Oil Reflow of Plated Sn/Pb
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/5, MIL-PRF-31032/6
Qualification Letters: VQE-09-018657
Composition: S - Homogenous thermosetting base material printed boards
Rigid Base Material: Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 12" x 18"
Max. Number of Layers: 10 With or Without Woven or Non-woven E-Glass, PTFE Resin, Ceramic Filler and Woven E-Glass, Epoxy Resin - Mixed
Max. Board Thickness: .068"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 6:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Plasma Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Solder Resist: Liquid Photoimageable
Finish System: Electrolytic Ni / Hard Au, Electrolytic Ni / Soft Au, 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:	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
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: .1"
Min. Hole Size: .025" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 4:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Permanganate Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Finish System: HASL
Additional Fab Capabilities: Foil Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-14-028079
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 12" x 18"
Max. Number of Layers: 10
Max. Board Thickness: .1"
Min. Hole Size: .025" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 4:1 Through-Hole
Min. Conductor Width/Space: .005"/.005"
Hole Preparation: Permanganate Desmear
Hole Wall Conductive Coating: Electroless Copper
Copper Plating: Direct Current Plate
Finish System: HASL
Additional Fab Capabilities: Foil Lamination

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 1WQ42
TTM Technologies (Santa Ana) 2630 South Harbor Boulevard, Santa Ana, CA, 92704 US	Same Address as Manufacturer	Phone: 714-241-0303 Fax: 714-241-0708 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-05-8644, VQE-06-011211
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: .2"
Min. Hole Size: .013" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14:1 Through-Hole, 1:1 Microvia
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: Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Sequential Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-05-8644, VQE-06-011211, VQE-12-023569
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: .2"
Min. Hole Size: .013" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14:1 Through-Hole, 1:1 Microvia
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: ENIG, HASL, Hot Oil Reflow of Plated Sn/Pb, ImmAg, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Sequential Lamination

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 65916
TTM Technologies (Santa Clara)	Same Address as Manufacturer	Phone: 408-486-3184
407 Mathew Street, Santa Clara, CA, 95050 US		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
Rigid Base Material: BF: Aramid Fabric, Nonwoven, Epoxy Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .076"
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
Controlled Impedance: Differential

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
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: .12"
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
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, Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-03-003888, VQE-10-020500, VQE-10-020581, VQE-11-022973, VQE-14-028240, VQE-14-028262
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: .12"
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, HASL
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: 65916
TTM Technologies (Santa Clara)	Same Address as Manufacturer	Phone: 408-486-3184
407 Mathew Street, Santa Clara, CA, 95050 US		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-14-028262
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: 16
Max. Board Thickness: .12"
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, HASL
Additional Fab Capabilities: 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-03-003895, VQE-10-020500, VQE-10-020581, VQE-11-022973, VQE-14-028240
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: .031" 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
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
Composition: H - Homogenous thermoplastic base material printed boards, 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: .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
Additional Fab Capabilities: Blind Vias, Sequential Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 65916
TTM Technologies (Santa Clara) 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
Rigid Base Material: BI: Aramid Fabric, Nonwoven, Polyimide Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 14
Max. Board Thickness: .12"
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

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

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

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
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: .004" Laser Ablated Plated Hole Size Before Plating, .0079" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 14:1 Through-Hole, 1:1 Microvia
Min. Conductor Width/Space: .004"/.003"
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: 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 Core, Copper Invar Copper, Embedded Resistors, 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
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: .13"
Min. Hole Size: .004" Laser Ablated Plated Hole Size Before Plating, .0118" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 11:1 Through-Hole, 1:1 Microvia
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: 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 Core, Copper Invar Copper, Embedded Resistors, 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
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: .1"
Min. Hole Size: .032" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Microvia, 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
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, 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 (Stafford) 4 Old Monson Road, Stafford, CT, 06075 US	Same Address as Manufacturer	Phone: 860-684-5881 Fax: 860-684-7425 EMail:

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
Rigid Base Material: BI: Aramid Fabric, Nonwoven, Polyimide Resin
Max. Panel Size: 18" x 24"
Max. Number of Layers: 10
Max. Board Thickness: .1"
Min. Hole Size: .004" Laser Ablated Plated Hole Size Before Plating, .0118" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Microvia, 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: 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, 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
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: 1:1 Microvia, 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
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, Sequential Lamination,
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: Custom
Qualification Letters: VQE-03-003348, VQE-10-019855, VQE-11-023287
Rigid Base Material: With or without woven or non-woven E-glass, Polytetrafluoroethylene (PTFE) resin, ceramic filler
Max. Panel Size: 18" x 24"
Max. Number of Layers: 12
Max. Board Thickness: .11"
Min. Hole Size: .0197" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 3.3:1 Through-Hole
Min. Conductor Width/Space: .006"/.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, 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: Embedded Resistors
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

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

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: Custom
Qualification Letters: VQE-03-003348, VQE-10-019855, VQE-11-023287
Composition: M - Mixed based material printed boards
Rigid Base Material: Woven Glass Reinforced, Hydrocarbon Resin with Ceramic Fill
Max. Panel Size: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .175"
Min. Hole Size: .0177" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9:1 Through-Hole
Min. Conductor Width/Space: .006"/.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, 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: Buried Vias, Embedded Resistors
Controlled Impedance: Differential, Single-Ended

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
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: 18" x 24"
Max. Number of Layers: 24
Max. Board Thickness: .125"
Min. Hole Size: .013" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Microvia, 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
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 Core, Sequential Lamination
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: 5L706
TTM Technologies (Stafford) 4 Old Monson Road, Stafford, CT, 06075 US	Same Address as Manufacturer	Phone: 860-684-5881 Fax: 860-684-7425 EMail:

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
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 Polyimide with Acrylic Adhesive
Max. Panel Size: 18" x 24"
Max. Number of Layers: 11
Max. Board Thickness: .07"
Min. Hole Size: .35" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 1:1 Microvia, 2:1 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: 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, 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: 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
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: 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
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 20" x 26"
Max. Number of Layers: 16
Max. Board Thickness: .12"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 15:1 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: 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:	PLANT LOCATION:	CAGE Code: 0GN71
Viasystems North Jackson 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: VQ(VQE-03-003121), VQ(VQE-03-003214), VQ(VQE-07-012925), VQ(VQE-10-020405)
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/Au, HASL, ImmAg, Ni/Pd/Au, OSP
Additional Fab Capabilities: Blind Vias, Buried 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-03-003121), VQ(VQE-03-003214), VQ(VQE-07-012925), VQ(VQE-10-020405)
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: .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, HASL, ImmAg, Ni/Pd/Au, OSP
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQ(VQE-03-003121), VQ(VQE-03-003214), VQ(VQE-07-012925), VQ(VQE-10-020405)
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: 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: Non-Conductive
Solder Resist: Dry Film, Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni/Au, HASL, ImmAg, OSP
Additional Fab Capabilities: Blind Vias, 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: 0BSG1
Viasystems Technologies Corp., LLC - Anaheim 3140 East Coronado Street, Anaheim, CA, 92806 US	Same Address as Manufacturer	Phone: 714-688-7296 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
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: Liquid Photoimageable
Finish System: HASL
Additional Fab Capabilities: Foil Lamination

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-09-018147)
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: .009" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 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: Conductive, Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Additional Fab Capabilities: Blind Vias, Buried Vias, Foil Lamination
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:
Viasystems Technologies Corp., LLC - Cleveland
7 Ascot Parkway, Cuyahoga Falls, OH, 44223 US

PLANT LOCATION:
Same Address as Manufacturer

CAGE Code: 7Z463
Phone: 330-572-3400
Fax: 330-572-3434
EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-00-000289, VQE-01-000910, VQE-05-008414, VQE-06-010963, VQE-15-028749
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: .126"
Min. Hole Size: .01" 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
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-00-000289, VQE-01-000910, VQE-05-008414, VQE-06-010963, VQE-15-028749
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: .126"
Min. Hole Size: .013" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 5.1 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: Dry Film, Liquid Photoimageable
Finish System: HASL, Hot Oil Reflow of Plated Sn/Pb
Additional Fab Capabilities: 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-01-000909, VQE-06-010963, VQE-14-027433
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: 7
Max. Board Thickness: .07"
Min. Hole Size: .026" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 2.6:1 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
Solder Resist: Liquid Photoimageable
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: 7Z463
Viasystems Technologies Corp., LLC - Cleveland 7 Ascot Parkway, Cuyahoga Falls, OH, 44223 US	Same Address as Manufacturer	Phone: 330-572-3400 Fax: 330-572-3434 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/3, MIL-PRF-31032/4
Qualification Letters: VQE-01-000909, VQE-06-010963, VQE-14-027433, VQE-15-208749
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: 12
Max. Board Thickness: .126"
Min. Hole Size: .013" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 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: Dry Film, Liquid Photoimageable
Finish System: HASL
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: 75815
Viasystems Technologies Corp., LLC - Denver 10570 Bradford Road, Littleton, CO, 80127-4211 US	Same Address as Manufacturer	Phone: 303-972-4105 Fax: 303-933-2934 EMail:

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-02-000317, VQE-05-007627, VQE-05-009014, VQE-09-018719, VQE-10-020224, VQE-12-024984, VQE-13-026251, VQE-13-026429
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: .005" Laser Ablated Plated Hole Size Before Plating, .0118" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole, 1:1 Microvia
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, 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-02-000317, VQE-05-007627, VQE-05-009014, VQE-09-018719, VQE-10-020224, VQE-12-024984, VQE-13-026251, VQE-13-026429
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: .125"
Min. Hole Size: .005" Laser Ablated Plated Hole Size Before Plating, .0118" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 Through-Hole, 1:1 Microvia
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, 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: 01KV9
Viasystems Technologies Corp., LLC - Forest Grove	Same Address as Manufacturer	Phone: (503) 992-4789
1521 Poplar Lane, Forest Grove, OR, 97116 US		Fax:
		EMail: randy.collins@viasystems.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-09-017325), VQ(VQE-09-018901), VQ(VQE-10-019896)
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: .13"
Min. Hole Size: .003" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.8:1 Microvia, 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, 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: VQ(VQE-09-017325), VQ(VQE-09-018901), VQ(VQE-10-019896)
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: .13"
Min. Hole Size: .003" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.8:1 Microvia, 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, 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:

Viasystems Technologies Corp., LLC - Milpitas

1992 Tarob Court, Milpitas, CA, 95035 US

CAGE Code: 0SFV5

Phone: 408-263-0940

Fax: 408-263-9115

EMail: Karl.Knowles@viasystems.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-12-024360
Rigid Base Material: GF: Woven E-Glass, Epoxy Resin, Flame Resistant
Max. Panel Size: 18.5" x 24.5"
Max. Number of Layers: 22
Max. Board Thickness: .115"
Min. Hole Size: .009" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 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
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Controlled Impedance: Differential, Single-Ended

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQE-12-024360
Rigid Base Material: GI: Glass Base, Woven, Polyimide Resin, Heat Resistant
Max. Panel Size: 18.5" x 24.5"
Max. Number of Layers: 22
Max. Board Thickness: .115"
Min. Hole Size: .009" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10:1 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
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL
Controlled Impedance: Differential, Single-Ended

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 0MHG5
Viasystems Technologies Corp., LLC - San Jose	Same Address as Manufacturer	Phone: 408-938-7219
355 Turtle Creek Court, San Jose, CA, 95125-1316 US		Fax: 408-280-0641
		EMail: arnold.amaral@viasystems.com

CAPABILITIES BY TECHNOLOGY/ASSOCIATED SPECIFICATION

Specification: MIL-PRF-31032/1, MIL-PRF-31032/2
Qualification Letters: VQ(VQE-08-016481), VQ(VQE-08-016632)
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: .13"
Min. Hole Size: .004" Laser Ablated Plated Hole Size Before Plating, .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 0.8:1 Microvia, 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, Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni, Electrolytic Ni / Hard Au, HASL
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: VQ(VQE-08-016481), VQ(VQE-08-016632)
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: .13"
Min. Hole Size: .008" Drilled Plated-Through Hole Before Plating, .008" Laser Ablated Plated Hole Size Before Plating
Aspect Ratio: 0.8:1 Microvia, 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, Pulse Plate
Hole Fill/Via Plug: Non-Conductive
Solder Resist: Liquid Photoimageable
Finish System: ENIG, Electrolytic Ni / Hard Au, HASL
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:	PLANT LOCATION:	CAGE Code: 0K703
Viasystems Technologies Corp., LLC - Sterling	Same Address as Manufacturer	Phone: 703-652-2200
1200 Severn Way, Sterling, VA, 20166-8904 US		Fax: 703-652-2272
		EMail:

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)
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: .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, 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)
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, Resistors
Controlled Impedance: Differential, Single-Ended

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)
Composition: H - Homogenous thermoplastic 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: 9
Max. Board Thickness: .0844"
Min. Hole Size: .0135" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 7.4:1 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
Solder Resist: Liquid Photoimageable
Finish System: ENIG, HASL

SECTION I
LIST OF MANUFACTURERS' QUALIFIED CAPABILITIES FOR EACH TECHNOLOGY

MANUFACTURER INFORMATION:	PLANT LOCATION:	CAGE Code: 3AF82
Viasystems 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
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: .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
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: .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: 65745
Westak of Oregon	Same Address as Manufacturer	Phone: 503-359-3593
3941 24th Avenue, Forest Grove, OR, 97116 US		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
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: .11"
Min. Hole Size: .01" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 9.3:1 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
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
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: .008" Drilled Plated-Through Hole Before Plating
Aspect Ratio: 10.6:1 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
Controlled Impedance: Differential, Single-Ended

SECTION II
LIST OF MANUFACTURERS AND ASSOCIATED SPECIFICATION

Manufacturer	Address	CAGE Code	MIL-PRF-31032/1	MIL-PRF-31032/2	MIL-PRF-31032/3	MIL-PRF-31032/4	MIL-PRF-31032/5	MIL-PRF-31032/6	Custom
AC Universal Circuits LLC	8860 Zachary Lane North, Maple Grove, MN, 55369-4524 US	45032	☑	☑	☐	☐	☐	☐	☐
Accurate Circuit Engineering	3019 S. Kilson Drive, Santa Ana, CA, 92707 US	0MNN9	☑	☑	☐	☐	☐	☐	☐
Advanced Circuits - Tempe Division	229 S. Clark Drive, Tempe, AZ, 85281-3073 US	6RJS1	☑	☑	☐	☐	☐	☐	☐
Airborn Flexible Circuits, Inc.	11 Dohme Avenue, Toronto, M4B 1Y7, Ontario Canada	38661	☐	☐	☑	☑	☐	☐	☐
American Standard Circuits	475 Industrial Drive, West Chicago, IL, 60185 US	4AA34	☑	☑	☐	☐	☐	☐	☐
Amphenol Printed Circuits	91 Northeastern Boulevard, Nashua, NH, 03062 US	57034	☑	☑	☑	☑	☐	☐	☐
Calumet Electronics Corp.	25830 Depot Street, Calumet, MI, 49913-1985 US	65337	☑	☑	☐	☐	☐	☐	☐
Cirexx International, Inc.	791 Nuttman Street, Santa Clara, CA, 95054 US	4MEG7	☑	☑	☑	☑	☐	☐	☐
Colonial Circuits, Inc.	1026 Warrenton Road, Fredericksburg, VA, 22406-6200 US	6T499	☑	☑	☑	☑	☑	☑	☐
Compunetics Inc.	700 Seco Rd, Monroeville, OH, 15146 US	30598	☑	☑	☐	☐	☐	☐	☐
Cosmotronic, Inc.	16721 Noyes Avenue, Irvine, CA, 92606-5176 US	63695	☑	☑	☑	☑	☑	☑	☐
Dynamic & Proto Circuits, Inc.	869 Barton Street, Stoney Creek, L8E 5G6, Ontario Canada	38898	☑	☑	☐	☐	☐	☐	☐
Electro Plate Circuitry, Inc.	1430 Century Drive, Carrollton, TX, 75006 US	79616	☑	☑	☐	☐	☑	☑	☐
Electrotek Corp.	7745 S. 10th Street, Oak Creek, WI, 53154 US	66030	☑	☑	☐	☐	☐	☐	☐

SECTION II
LIST OF MANUFACTURERS AND ASSOCIATED SPECIFICATION

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

☑ 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	

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

☑ 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	

Graphic Plc
Lords Meadow Industrial Estate, Crediton, Devon, EX17 IHN UK
CAGE Code: U4538

☑ 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	

Hamby Corporation
27704 Avenue Scott, Valencia, CA, 91355-1218 US
CAGE Code: 07284

☑ 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	

Hans Brockstedt GmbH
Clara-Immerwahr-Strabe 7, 24145 Kiel Germany
CAGE Code: C4831

☑ 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	

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

☑ 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	

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

☑ 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	

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

☑ 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	

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

☑ 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	

Loan 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	

Lockheed Martin Mission Systems & Training
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	

Micom Corp.
475 Old Highway 8 NW, New Brighton, MN, 55112 US
CAGE Code: 34076

☑ 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	

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	

SECTION II
LIST OF MANUFACTURERS AND ASSOCIATED SPECIFICATION

PNC, Inc.
115 East Centre Street, Nutley, NJ, 07110 US
CAGE Code: 66766

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

Printed Circuits, Inc.
1200 West 96th Street, Bloomington, MN, 55431-2606 US
CAGE Code: 65114

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

Pro-Tech Interconnect Solutions LLC
4300 Peavey Road, Chaska, MN, 55318 US
CAGE Code: 3CP65

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

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

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

Sanmina-SCI (Owego)
1200 Taylor Rd., Owego, NY, 13827 US
CAGE Code: 4GZ84

- [x] MIL-PRF-31032/1
- [ ] MIL-PRF-31032/4
- [ ] Custom
- [x] 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

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

Speedy Circuits, Inc.
5331 McFadden Avenue, Huntington Beach, CA, 92649-1204 US
CAGE Code: 66982

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

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

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

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

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

TTM Technologies (Santa Clara)
407 Mathew Street, Santa Clara, CA, 95050 US
CAGE Code: 65916

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

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

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

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

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

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

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

Viasystems Technologies Corp., LLC - Anaheim
3140 East Coronado Street, Anaheim, CA, 92806 US
CAGE Code: 0BSG1

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

SECTION II
LIST OF MANUFACTURERS AND ASSOCIATED SPECIFICATION

Manufacturer			
Viasystems Technologies Corp., LLC - Cleveland 7 Ascot Parkway, Cuyahoga Falls, OH, 44223 US CAGE Code: 7Z463	☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/2 ☑ MIL-PRF-31032/3	☑ MIL-PRF-31032/4 ☐ MIL-PRF-31032/5 ☐ MIL-PRF-31032/6	☐ Custom
Viasystems Technologies Corp., LLC - Denver 10570 Bradford Road, Littleton, CO, 80127-4211 US CAGE Code: 75815	☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/3	☐ MIL-PRF-31032/4 ☐ MIL-PRF-31032/5 ☐ MIL-PRF-31032/6	☐ Custom
Viasystems Technologies Corp., LLC - Forest Grove 1521 Poplar Lane, Forest Grove, OR, 97116 US CAGE Code: 01KV9	☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/3	☐ MIL-PRF-31032/4 ☐ MIL-PRF-31032/5 ☐ MIL-PRF-31032/6	☐ Custom
Viasystems Technologies Corp., LLC - Milpitas 1992 Tarob Court, Milpitas, CA, 95035 US CAGE Code: 0SFV5	☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/3	☐ MIL-PRF-31032/4 ☐ MIL-PRF-31032/5 ☐ MIL-PRF-31032/6	☐ Custom
Viasystems Technologies Corp., LLC - San Jose 355 Turtle Creek Court, San Jose, CA, 95125-1316 US CAGE Code: 0MHG5	☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/3	☐ MIL-PRF-31032/4 ☐ MIL-PRF-31032/5 ☐ MIL-PRF-31032/6	☐ Custom
Viasystems Technologies Corp., LLC - Sterling 1200 Severn Way, Sterling, VA, 20166-8904 US CAGE Code: 0K703	☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/3	☐ MIL-PRF-31032/4 ☐ MIL-PRF-31032/5 ☐ MIL-PRF-31032/6	☐ Custom
Viasystems Toronto Inc. 8150 Sheppard Avenue East, Scarborough, M1B 5K2, Ontario Canada CAGE Code: 3AF82	☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/3	☐ MIL-PRF-31032/4 ☐ MIL-PRF-31032/5 ☐ MIL-PRF-31032/6	☐ Custom
Westak of Oregon 3941 24th Avenue, Forest Grove, OR, 97116 US CAGE Code: 65745	☑ MIL-PRF-31032/1 ☑ MIL-PRF-31032/2 ☐ MIL-PRF-31032/3	☐ MIL-PRF-31032/4 ☐ MIL-PRF-31032/5 ☐ MIL-PRF-31032/6	☐ Custom