



Providing interconnection solutions through innovative products.

MIDWEST PRINTED CIRCUIT SERVICES

www.MidwestPCB.com

## Company Overview:

- ✓ Established in 1984
- ✓ 47,000 Square Feet
- ✓ Manufacturing Shifts : 2 (3 when demand warrants)
- ✓ Number of Employees: 65
- ✓ CAGE Code: OYYS4
- ✓ NAICS: 334412 (PCB Mfg.)
- ✓ DUNS: 115377194
- ✓ U.L. FILE Number: E97745
- ✓ Lead-times: 1-3 Day (Quickturn) / 3 Weeks (Standard)
- ✓ Military / Medical / Commercial Applications
- ✓ Rigid, Flexible, and Rigid-Flex Printed Circuit Boards
- ✓ Proud to be American Owned and Operated
- ✓ Every Product is Manufactured in our U.S.A Facilities
- ✓ Combined Management Experience of over 200 years
- ✓ A "Trusted" Source of Supply
- ✓ Dedicated to Total Customer Satisfaction!

### Technology

- ✓ Printed Circuit Boards up to 24 Layers (higher layer counts are subject to review of data)
- ✓ Rigid, Flex and Rigid-Flex Printed Circuit Boards
- ✓ Blind/Buried Vias
- ✓ Sequential Lamination and Controlled Depth Drill/Plating Capability
- ✓ Heat Sink and Metal Core Printed Circuit Boards
- ✓ Controlled Impedance +/- 10% (+/- 5% on request)
- ✓ Thin and heavy copper weights
- ✓ Exotic Mixed substrates / Multiple Core Types
- ✓ Extreme Environment

### Capabilities

- ✓ Via size to .006
- ✓ Lines/Space to .003"
- ✓ Via in Pad
- ✓ LPI and Dry Film Solder Mask
- ✓ NASA – Meets or Exceeds Out-gassing Requirements
- ✓ Fully Automated CAM
- ✓ Peelable Solder Mask
- ✓ Raised Profile Plating
- ✓ Deep Ni/Au, Immersion Gold (ENiG), Silver, OSP
- ✓ Lead Free Solder

### Thermal Management

- ✓ External Heat Sink Boards
- ✓ Internal Metal Core Boards
- ✓ Thermagon Construction (10x thermally conductive substrates & pre-pregs)

### Common Materials

- ✓ FR4 – 370HR/185HR, VT-47, ITEQ 180A
- ✓ Getek
- ✓ FR408
- ✓ Rogers
- ✓ Polyimide – BT Epoxy
- ✓ Thermagon
- ✓ Teflon/Duroid/PTFE
- ✓ Flexible and Rigid/Flex



## Commitment to Quality

ISO 9001:2008

MIL-PRF-31032/1 and 2 GF and GI Materials

MIL-PRF-31032/3 and 4

MIL-PRF-50884

MIL-PRF-55110 GF & GI

IPC 6013 Class 3 (Flex & Rigid Flex)

IPC 6012 Class 3 and 3A (Space and Military Avionics)

AS9100D (In process)

NADCAP 7119 (In process)

Approved for Manned Space Flight

IPC Class 3 Standard

UL Listed

ITAR Registered

ROHS Compliant

## SERVICES

### Quick-Turnaround:

Prototype

Production

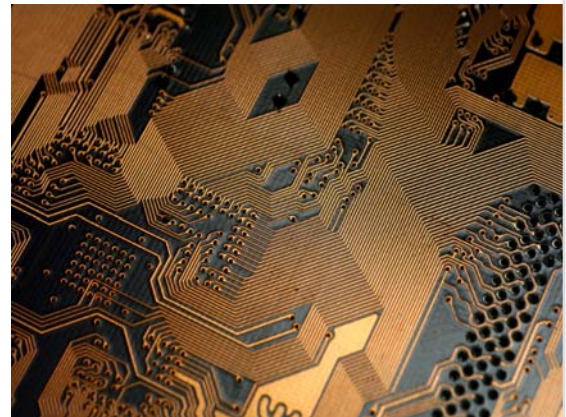
Full Production

Design/Layout

Engineering

Assembly

Stocking Programs



## Contacts:

### Quoting

MPCS@MidwestPCB.com

### Customer Support

Bob Denbo

Rdenbo@MidwestPCB.com

### Customer Service

Carol Main

Cmain@MidwestPCB.com



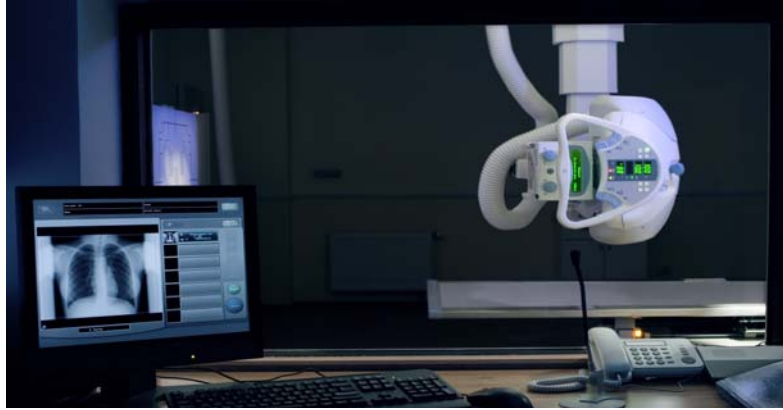
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## Technology Road Map:

	<u>Current</u>	<u>Future</u>
<b>Minimum Drill Size</b>		
Blind/Buried Via	0.006"	0.006"
Through Via	0.010"	0.008"
<b>Line Width / Space</b> (Half Oz Copper)		
Inner Layers	0.003"/0.003"	0.002"/0.002"
Outer Layers	0.004"/0.004"	0.003"/0.003"
<b>Laser Vias – Stacked</b>	2 each	4 each
<b>Laser Vias – Filled</b>	Yes	Yes
Aspect Ratio	0.5:1	0.75:1
<b>Metal Core Filling</b>	100% In House	100% In House
<b>Metal Core Machining</b>	100% In House	100% In House
<b>Impedance Control</b>		
Standard	10%	10%
Advanced	8%	7.5%
<b>Testing Capability</b>		
Pitch	250V In House 0.004"	250V In House 0.004"
High Pot	Up to 5KV	Up to 5KV



## Process Capabilities:

### Shop Tolerance:

Minimum Inner/Outer Line Width	.003"
Minimum Inner/Outer Space, Trace/Trace	.003"
Minimum Inner/Outer Space, Trace/Pad	.003"
Minimum Space, PCB Edge to Conductor	.008"
Layer-to-Layer Registration	+/- .003"
Maximum Finished PCB Thickness	.250"
Minimum Board Thickness Tolerance	+/- 5%
Dimensions – Hole Location	+/- .003"
Dimensions – Fab O. D.	+/- .004"
Fabrication Radius	+/- 5 deg.
Warpage (inch per inch) (flatness of finished board)	.005"
Minimum Component Pitch	.008"
Minimum Dielectric Thickness	.003"
Maximum Number of Layers	24

### Standard

### Drilling:

Minimum Drill Size	.006"
Maximum Drill Hole Size (above 0.257 is routed)	.257"
Maximum Aspect Ratio	14:1

### Standard

### Testing Capabilities:

Minimum Component Pitch	.006"
Type of Test Equipment	Flying Probe
Type of Test Equipment	Double Sided Tester

### Standard

### Surface Finishes Available:

HASL Minimum Thickness (lead and lead free)	.0003
Immersion Gold Minimum Thickness	2 u in.
Immersion Gold Co-plan	+/- 1 u in.
Entek Organic Coating	Co-Planarity = To Cu. Plate
Electroless Nickel (ENIG and ENIPEG)	150 u in - .250 u in.

### Standard

### Electrical Characteristics:

Impedance Tolerance	+/- 8%
Note: Minimum Tolerance +/- 5 ohms	

### Standard

### Materials Available:

\* Stocking programs available

	<u>Tg</u> (Degrees C)	<u>DK</u>
FR4-04; Standard Multifunctional	150	4.3
FR4-06; High Performance Epoxy Laminate	170	3.93
FR4-08; High Speed, High TG	180	3.67
GETEK	180	3.6
Polyimide	230-260	4.0 – 4.6
BT Epoxy	185	3.6 – 4.1
Thermagon	105	4.1 – 4.3
IT180A	180	4.3
VT47	180	4.57
370HR	180	4.04
185HR	180	4.01

Teflon/Duroid/PTFE  
Flexible and Rigid/Flex  
Al Clad (LED)

Call for latest specs.



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## Recent Equipment Additions

### Mach3 Labs Antares 700X

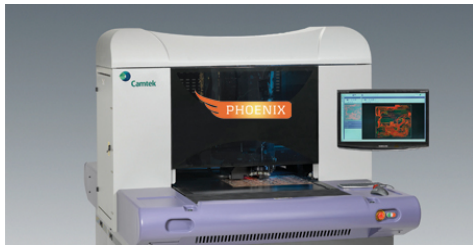
Precision X-Ray Drill



This dedicated X-ray drill optimizer is partially automated and will dramatically increase our registration accuracy for high layer count multilayers.

### Camtek Phoenix HDI

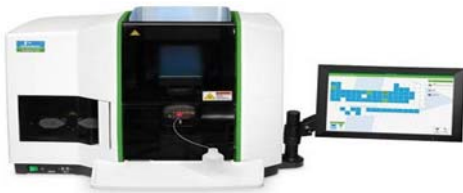
Automatic Optical Inspection



This addition to our automatic optical inspection department enhances our ability to scan both inner and outer layers to the highest degree of accuracy.

### Perkin Elmer PinAAcle 500

Automatic Absorption Spectrometer



With exceptional sensitivity and precision our laboratory analysis has now reached the "PinAAcle" of performance and efficiency.



### Orbotech Paragon 8800 LDI

Laser Direct Imaging

Located in the clean room of our photo department, the addition of the Orbotech LDI provides superior registration with dynamic imaging modes for all ranges of PCB products. This addition greatly enhances our capabilities, increases yields and expedites our time to market.

### Orbotech Sprint 120 Inkjet

Legend Printer



With this addition PCB and panel traceability is assured with multiple serialization and bar-coding options defined per panel, strip or individual PCB. Located in the clean room of our screening department the Inkjet offers piece to piece consistency of image print & accuracy.



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## Highlighted Equipment

### IT/Engineering CAD/CAM

- ✓ Gerber Crescent 30 ¼ Mil Resolution Plotter
- ✓ Gerber Escort 30 Automatic Film Loader
- ✓ Fully Integrated Genesis & Pentalogix CAM Systems
- ✓ CAM, ET, AOI, Laser Plotting & Drilling Network
- ✓ M2M Management System w/ Barcode Tracking
- ✓ Kodak Kodamatic 66S+ Automatic Film Loader
- ✓ 5 CAM Stations with Design Rule Check
- ✓ Test Fixturing & Net List Extraction Software

### N.C Drilling, Routing, Milling

- ✓ Mach3 Labs Antares 700x Precision X-ray Drill
- ✓ 2 Mania Micronic 86, 200k spindles
- ✓ Excellon System 2000
- ✓ Milltronics VKM 3 – Milling Machine Center
- ✓ Accu-Score AS-150-MAX Scoring Machine
- ✓ 3 Excellon Mark VI Drill, CNC 6
- ✓ 3 Excellon Mark VI Router, CNC 6
- ✓ Bevelmaster Beveler
- ✓ Wysong Hydraulic Laminate Shear
- ✓ Edgemaster Semi-automatic Beveler

### Multilayer Lamination

- ✓ TMP Vacuum Lamination Press – 4 Opening
- ✓ PHI 4 Opening Hot/Cold Press w/ Vacuum Assist
- ✓ SOMACA Caul Plate Scrubber
- ✓ RAMCO Wide Belt Sander
- ✓ Multiline Inner-layer Registration Punch
- ✓ Multiline OPE-9000 - 4 Camera Automatic Post Etch Punch
- ✓ Multiline Core Punch & Depinner
- ✓ Real Time X-Ray

### Laboratory/Chemical Analysis

- ✓ Fischerscope Multiple Measuring System
- ✓ Real Time Plating Thickness Measuring
- ✓ Perkin Elmer PinAAcle 500 Spectrophotometer – AA Unit
- ✓ HACH DR/2000 Direct Reading Spectrophotometer
- ✓ Buehler Ecomet Cross Sectioning Saw
- ✓ Analytical Balance, Omega Meter 600
- ✓ UPA Microderm MP-700
- ✓ UPA Caviderm CD-8 with CPS-111B Probe Stand
- ✓ Olympus Scope and Camera with Javelin Monitor
- ✓ (3) Buehler Ecomet IV Variable Speed Polisher/Grinder
- ✓ Ohaus Precision Scale

### Quality Control/Inspection

- ✓ Camtek Phoenix-HDI AOI System
- ✓ Mania AOI T8T DTS
- ✓ Microcraft Flying Probe Electrical Tester EMMA EMX 6151
- ✓ Microcraft Flying Probe Electrical Tester EMMA ELX 6146 with High Pot Capabilities
- ✓ (3) Glenbrook X-Ray's
- ✓ Buehler/Olympus Microscope & Software System
- ✓ Oxford Instruments Advanced XRF Coating Thickness Measurement System
- ✓ Micro-Vu Q16 Precision Measurement System
- ✓ Polar Instruments CITS 880s Controlled Impedance Tester
- ✓ TTI 33,000 Test Point Universal Grid Tester
- ✓ TTI Dual Access Tester - Fine Pitch SMD Test Probes
- ✓ High Pot Tester to 5000V

### Wet Processing

- ✓ 48' Semi Automatic Electroless Copper Line with Hoist
- ✓ ENIG/Silver Line
- ✓ (2) Electrolytic Copper Pattern Plating Lines
- ✓ 75 Gallon Deep Nickel Tank
- ✓ Various Aldonex Remote Rectifiers (25 to 10,000amp)
- ✓ Serfilco Carbon and Polypro Filtration System
- ✓ Oxide Conversion System
- ✓ Technic Mini FFP Tab Plater
- ✓ AEM American Pro Wet Sanding Machine
- ✓ Chemcut 107I Oscillating Scrubber
- ✓ International Supplies Pumiflex SHD/A24
- ✓ International Supplies Board Cleaner/Washer
- ✓ DEA 24" Conveyorized Developing and Rinsing Unit
- ✓ Chemcut 547 Conveyorized Tin Stripping Line
- ✓ Chemcut 547 Conveyorized Resist Stripping Line
- ✓ Chemcut 547 XLI Alkaline Etching System
- ✓ ASI Inner Layer Scrubber
- ✓ Chemcut Desmear & Etch Back Line (Permanganate)
- ✓ Argus 5000 Conveyorized Hot Air Leveling
- ✓ Argus 5000 Hot Air Leveling RoHS Lead Free Solder Line
- ✓ In Line Pre-Clean, Fluxer and Post Clean Unit

### Imaging

- ✓ Orbotech Paragon 8800 LDI
- ✓ Orbotech Sprint 120 Inkjet Legend Printer
- ✓ Multiline Dual Camera Registration Up-Punch
- ✓ (3) Circuit Automation DP1500 LPI Solder Mask Coater
- ✓ (2) Dynachem Epic 110 Drying/Curing Tunnel Oven – (1) Tack Cure, (1) Full Cure
- ✓ Multiline Artwork Registration Film Punch
- ✓ Colight 1630, 1530, & (2) 1330 Exposure Units
- ✓ OLEC Accuprint AP30
- ✓ (2) Dynachem Dry Film Soldermask Laminator
- ✓ (2) New Dynachem 1500c Automatic Cut Sheet Laminators
- ✓ DuPont HRL 24 Air Activated Laminator
- ✓ LC-2400 Electro-Static Cleaner
- ✓ (2) Autoroll Exacta 360
- ✓ Burgess Industries 24' Ammonia Film Processor
- ✓ X-Rite Densitometer
- ✓ Anti-Static Auto Film Cleaner
- ✓ Rich Automation Vertical Developer
- ✓ Chemcut 547 LPI and Dry Film Solder Mask Developer
- ✓ Multiline Opti-Line Film Punch
- ✓ Multiline Registration Table
- ✓ Nuarc FT40V3UPNS Flip Top Plate Maker
- ✓ EI-150 Digital Exposure Integrator & Timer
- ✓ Precision Quincy LPI Oven with Chart Recorder
- ✓ (3) Blue Chip Precision Screen Presses / Backlight
- ✓ Violux 3002 Exposure Unit / Vacuum Frame

### Environmental Regulatory Assurance

- ✓ J-Mark Systems Treatment System
- ✓ Serfilco 4 Cubic Foot Filter Press
- ✓ Gravity Settler
- ✓ Sludge Dryer



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## Partial Client List



**NORTHROP GRUMMAN**

**DELPHI**  
Connection Systems

**MOOG**

