

# Capability manual

File number: PE-P-III-01

VER: A

DATE: 2006-9-6

File name: Capability manual

## GENERAL DATA

### 1. PCB Layers

Single side, double sides, Multilayers(3~12L)

### 2. PCB size and tolerance

Minimum size: 20 x 20 mm; Maximum size: 500 x 600 mm; Tolerance: +/-0.1 mm min.

### 3. PCB thickness and tolerance(mm)

Thickness	Layers	SS/DS	4-L	6-L
Outline Finish				
Routing		0.3~2.4	0.5~2.4	0.75~2.4
Punching		0.3~1.6	0.5~1.6	0.75~1.6
V-cut		0.6~2.4	0.6~2.4	0.75~2.4

Tolerance ThK.	Layers	SS/DS	ML
For 0.3~0.8		+/-0.0762	+/-0.10
For 0.8~1.2		+/-0.10	+/-0.127
For 1.2~		+/-0.127	+/-10%

Finish Surface: Gold Flash, Minimum Thickness: 0.20 mm

Finish Surface: HASL, Minimum Thickness: 0.60 mm

Finish Surface: All, Maximum Thickness: 3.2 mm

### 4. Drilled Hole Size and Tolerance

4.1 Minimum PTH Hole Size 0.15mm, Minimum PTH Slot size 0.4mm x 0.8mm

4.2 Minimum NPT Hole Size 0.20mm, Minimum NPT Slot Size 0.5mm x 1.0mm

#### 4.3 Tolerance

PTH: +/-0.05mm(Gold flash & Entek), +/-0.075/-0.05mm(HAL) min.

NPTH: +/-0.05mm

### 5. Base material

#### 5.1 Copper Clad Laminate

5.1.1 Standard Size(inch): 42x 48, 41x49, 36x48,43X49

5.1.2 Thickness(mm): 0.1, 0.15, 0.2, 0.25, 0.3, 0.35, 0.4, 0.46, 0.51, 0.6, 0.71, 0.8, 0.9, 1.0, 1.1, 1.2, 1.4, 1.5, 1.6, 2.0, 2.4,3.2

5.1.3 Copper THK: 0.5OZ(18um), 1OZ(35um), 2OZ(70um),3OZ(105um),.....6OZ(210um)

5.1.4 Laminate Type: CEM-1, CEM-3, FR4, FR1, FR2

5.1.5 Flammability: 94HB, 94-V0(V1,V2)

#### 5.2 Prepreg

type	1080	2116	7628
Thickness	2.8mil+/-0.3mil	4.6mil+/-0.5mil	7.4mil+/-0.5mil
Size	49.5"x300mm	49.5"x300mm	49.5"x150mm

### 6. Surface Finish and Thickness

5.1 HASL 1~38um in hole, 2.54~25.4um on SMT

5.2 Gold Flash Ni: 2.5~7.62um, Au: 0.025~0.0762um

5.3 Selective Gold Plating Ni: 2.5~7.62um, Au: 0.05~0.25um

5.4 Immersion Gold Ni: 2.5~7.62um, Au: 0.05~0.127um

5.5 Gold-Edge Contacts Ni: 2.5~7.62um, Au: 0.127~1.27um

5.6 Entek M2602 (For single side and Double sides)

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## 7. Solder mask

6.1 Heat Cured Ink: ZSR-150 (PA-5B, NA-402)

6.2 LPI resist ink: Green gloss (FSR-8000-9G05, R500-2G, PSR2000—G35A, PSR4000-  
LDSM-3000 G-7, APR-8000 G-102)

Green matte (LM-600 5GM)

White (LSM-3000NW)

Black (FSR-8000(10C10))

Red (LSM-3000SR)

Blue (FSR 8b89, LSM-3000NSBL)

Yellow (LSM-3000NSY-6)

6.3 UV Ink: Green (UVS-1000)

White (UVM-1800W)

## 8. Legend Ink

7.1 White: (ZM-400WF)

7.2 Black: (BK-3)

7.3 Yellow: (ZM-400YR)

## 9. Carbon Ink: PR-406, TU-15ST (15 Ohm / square)

## 10. Peelable Mask: B99-84B, PETERS SD 2955

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## **CAPABILITY of Individual PROCESS**

### 1. Drill Process

- 1.1 Min. drill bit: 0.2mm , Max. drill bit: 6.5mm  
 1.2 Min. working panel size: 6"x6" , Max. working panel size: 24"x20"  
 1.3 Hole Position tolerance: +/-3mil(primary drilled) , +/-5mil (Secondary drilled)  
 1.4 Min slot drill bit: 0.5mm

### 2. PTH and Panel Plating

- 2.1 Max. aspect ratio: 6 : 1  
 2.2 Copper plating thickness: 5~10um

### 3. Imaging (Outer)

- 3.1 Minimum Line Width/Spacing 4mil/4mil(0.5OZ), 6mil/6mil(1OZ)  
 3.2 Minimum SMT Pitch 16mil , Std. SMT Pith 20mil  
 3.3 Minimum Bonding Pitch 9mil , Std. Bonding Pitch 12mil  
 3.4 Minimum Theoretic Annual Ring 5mil , Std. Annual Ring 6mil  
 3.5 Minimum Mesh Gap: 8mil  
 3.6 Maximum Size of D/F Tending Hole D5.5mm, Slot Width 4.5mm(Board Thk. 0.8mm)  
 3.7 Registration Tolerance of Pattern to Reference Hole: +/-2mil(min.) , +/-3mil(std.)  
 3.8 Film Compensation Value of Pattern:

Item	0.5 OZ	1 OZ	2 OZ
Outer(except F/G board)	0.04mm	0.08mm	0.12mm
Inner	0.02mm	0.04mm	0.08mm

### 3.9 Minimum Spacing :

Item	Line-Line	Line-Logo	Line-Plane	Copper or Line-Npth	Pad or Line-Edge(R)
<b>Spacing</b>	<b>4mil</b>	<b>5mil</b>	<b>4mil</b>	<b>8mil</b>	<b>10mil</b>
Item	Via Pad-Via Pad	Comp.Pad-Comp.Pad	Pad or Line-Edge(V)	Pad or Line-Edge(P)	
<b>Spacing</b>	<b>4mil</b>	<b>4mil or 10mil</b>	<b>14mil</b>	<b>12mil</b>	
Item	Line-Via Pad	Line - Comp. Plane	Via Pad -Plane	Comp. Pad-Plane	
<b>Spacing</b>	<b>4mil</b>	<b>6mil</b>	<b>4mil</b>	<b>6mil</b>	

### 3.10 Imaging (Inner)

- 4.1 Minimum Line Width/Spacing 4mil/4mil(0.5OZ), 6mil/6mil(1OZ)  
 4.2 Minimum Theoretic Annual Ring of Signal Pad & Thermal Pad 6mil  
 4.3 Minimum Theoretic Annual Ring of Non-Functional Pad 10mil  
 4.4 Minimum Clearance of Isolation Pad 12mil(via) or 10mil(PTH>1mm)  
 4.5 Film Compensation Value of Pattern(Refer to 3.5)  
 4.6 Registration Tolerance of Layer to Layer: +/-3mil(min.) , +/-4mil(Std.)  
 4.6 Minimum Spacing :

Item	Line-Line	Line-Pad	Copper or Line-Npth	Pad or Line-Edge(R)
<b>Spacing</b>	<b>4mil</b>	<b>4mil</b>	<b>8mil</b>	<b>10mil</b>
Item	Pad- Pad	Line-Plane	Pad or Line-Edge(V)	Pad or Line-Edge(P)
<b>Spacing</b>	<b>5mil</b>	<b>4mil</b>	<b>14mil</b>	<b>16mil</b>
Item	Pad -Plane	Plane-Plane	Line - PHT Edge(isolated)	
<b>Spacing</b>	<b>5mil</b>	<b>10mil</b>	<b>6mil(4L) or 8mil(&gt;6L)</b>	

### 5. Pattern Plating

#### 5.1 Hole wall copper plating thickness

Board type	Bonding	Flash gold	HAL&Entek
<b>Copper thickness</b>	<b>5um~10um</b>	<b>10um~20um</b>	<b>18um~35um</b>

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5.2 Surface copper plating thickness:

Board type	Bonding	Flash gold	HAL&Entek
Copper thickness	5um~10um	10um~25um	20um~40um

6. Etching

6.1 Etch factor: 1.5 max., 1.0 Std.

6.2 Etch tolerance :

Board type	Flash gold	HAL	
Line width tolerance (min.)	+/-12%	+/-20%(L>5mil)	+/-1mil(L<=5mil)

7. Solder Mask(LPI) Printing:

7.1 Registration Tolerance of Solder Mask to Pattern : +/-2mil (min), +/-3mil(Std)

7.2 Solder Mask Thickness : 10um~ 40um on line surface, 6um min. at line edge

7.3 Minimum Solder Mask Dam :2mil (single)

7.4 Plugged Hole Size: 0.6mm(Max.)

7.5 Minimum Sold mask hide 0.35mm

7.6 Minimum Spacing of Solder Mask Opening to Line : 3mil

7.7 Minimum solder bridge:4 mil

8. Silkscreen Printing

8.1 Legend Printing

8.1.1 Minimum Line Width 6mil, Minimum Height of Legend 40mil

8.1.2 Registration of Legend to Reference Hole +/-6mil

8.2 Carbon Printing

8.2.1 Minimum Line Width / Spacing 10mil / 14mil

8.2.2 Registration of Carbon to Reference Hole +/- 7mil

8.3 Peelable Mask

8.3.1 Thickness of Mask 0.2mm~0.4mm

8.3.2 Maximum Size of Tenting hole 4.0mm

9. Profile finish:

9.1 Outline Finish Tolerance : +/-0.1mm(min.), +/-0.13mm(Std.)

9.2 Routing

9.2.1 Minimum Milling Cutter Size 0.8mm

9.2.2 Minimum Radius of Inner Corner 0.4mm

9.2.3 Minimum Position Tolerance of Routing Hole (Slot) or Edge to Drill hole +/-5mil

9.2.4 Minimum Position Tolerance of Routing Hole to Routing Hole(Slot)+/-3mil

9.2.5 Minimum Position Tolerance of Routing Hole(slot) to Routing Edge +/-4mil

9.3 Punching

9.3.1 Minimum Size of Punching Hole (Slot) 1.0mm

9.3.2 Maximum Size of Puncing Board(panel) 350mm x 270mm

9.3.3 Maximum Thickness of Punching Board 1.6mm

9.3.4 Minimum Position Tolerance of Punching Hole (Slot) or Edge to Drill hole +/-5mil

9.3.5 Minimum Position Tolerance of Punching Hole to Punching Hole(Slot)+/-3mil

9.3.6 Minimum Position Tolerance of Punching Hole(slot) to Punching Edge +/-4mil

9.4 V-cutting

9.4.1 Minimum Size of V-cut Board 50mm x 85 (v-cut direction)mm

9.4.2 Minimum Thickness of V-cut Board 0.6mm

9.4.3 Minimum Space of V-cut Line Per customer requirement

9.4.4 Minimum Space of v-cut Line to Panel Edge 3mm

9.4.5 Minimum Position Tolerance of V-cut Line to Primary Drilling Hole +/-7mil

9.4.6 Minimum Position Tolerance of V-cut Line to Second Drilling Hole +/-9mil

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9.4.7 Minimum Position Tolerance of V-cut Line to Routing Edge +/-6mil

9.4.8 Minimum Position Tolerance of V-cut Line to Punching Edge +/-7mil

9.4.9 Minimum Position Tolerance of V-cut Line to V-cutline +/-4mil

9.4.10 Registration Tolerance of V-cut lines +/-4mil

9.4.11 V-Cut residual +/-4mil

## 10. E-Testing

10.1 Test Voltage 50V~300V

Commonly: 200V~300V

10.2 Isolated Resistance 1K ohm~100M ohm

Commonly: 20M ohm~40M ohm

10.3 Continuity Resistance 10 ohm~20K ohm

Commonly: 50 ohm~100 ohm

## 11. FQC

11.1 Warp & Twist

Board Thk.	<0.5mm	0.5~0.8mm	1.0~1.2mm	>1.5mm
Warpage	<b>1.5% max.</b>	<b>1% max.</b>	<b>0.75% max.</b>	<b>0.5% max.</b>