

OB1B

Thinking

Pat Barrett

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We Will Discuss

- CAD Software
- Rapid Prototyping
- Rapid Injection Molding
- Cost Comparisons
- Gotchas - what I've learned

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The Hope

- Creative - do it your way
- Fast
- Precise
- Flexible
- Inexpensive

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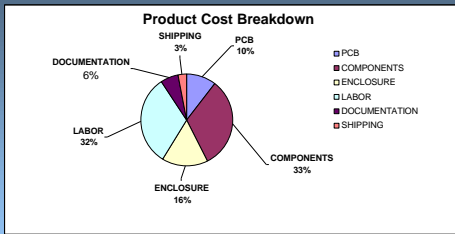
The Reality

- Yes, it's creative
- It can be fa\$t
- Precise ...or precisely wrong
- It can be inexpensive

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Actual Product Costs



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The Drawing

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CAD Software Vendors

- Alibre \$500
- Cadvance \$800
- VersaCAD \$800
- AudoCAD \$????
- SolidWorks \$5,000

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Alibre Demo

- The Software
- The PDF output

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The Prototype

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Rapid Prototyping Terms

- SLS - Selective Laser Sintering
- SLA - Stereo Lithography
- LOM - Laminated Object Manufacturing
- EBM - Electron Beam Melting
- 3DP - 3D Printing
- FDM - Fused Deposition Modeling

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More RP Terms

- Ballistic Particle Manufacturing
- Adaptive Slicing
- Directed Light Fabrication
- Additive Fabrication
- (Yadda, yadda...)

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Fused Deposition Modeling

- Stratasys™ Dimension Elite SST
 - ◆ An “Additive Fabrication Technology”
 - ◆ Uses thermoplastic (we used ABS)
 - ◆ Uses heat

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Increasing the Quantity

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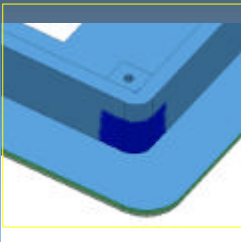
Rapid Injection Molding

- Uses aluminum tooling
Good for perhaps 10K pieces
- Cost
Midway between
Rapid Prototyping and Hard Tooling

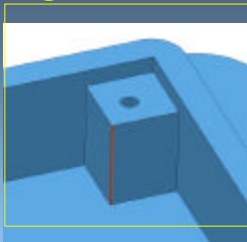
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Manufacturing Issues



Excess Thickness

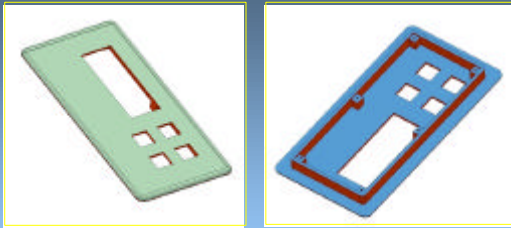


Need Radius

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Issue - The Finish



Some textures will require 3-5° Draft

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RIM - Cost Estimates

www.protomold.com		1	2
#Cavities			
Delivery	Business days	15	15
Material	#433904000 ABS	-	-
Unit Cost	(25 to 100 pieces)	\$3	\$2
Finish - Rear			
PM-F0	Non-cosmetic	(incl below)	(incl below)
Finish - Front			
PM-F0	Non-cosmetic	\$2,650	\$4,070
PM-F1	Few toolmarks	\$2,725	\$4,220
SPI-C1	600 stone	\$3,000	\$4,770
SPI-B1	600 paper	\$3,080	\$4,935
PM-T1	Light bead blast	\$3,260	\$5,295
PM-T2	Med. Bead blast	\$3,260	\$5,295
SPI-A2	High Polish	\$3,755	\$6,285

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RIM - Cost Summary

Choose 2 cavities	
So, 20K parts per mold	
Choose a med. bead blast finish	\$5,295
At \$2 per part is	\$40,000
TOTAL	\$45,295
This is	\$2.26 per piece
*These are the low-volume prices, extrapolated upward.	

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CNC Machining

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Comparing CNC Machining

www.firstcut.com			
QTY	UNIT PRICE	TOTAL COST	
01	\$188	\$188	
02	\$145	\$290	
05	\$133	\$665	
10	\$128	\$1,280	
25	\$125	\$3,125	
50	\$124	\$6,200	

The Conventional Process

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Bonus - Labels

- Create artwork with Illustrator, PaintShopPro, or etc.
- Save as JPG
- Upload to Costco or Snapfish
- Get a real photo!

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Resources

- The Rapid Prototyping Home Page
<http://www.rapidprototypinghomepage.com>
- Rapid Prototyping Glossary of Terms
http://www.sunmantechology.com/resources_gls_rpg.html
- Wikipedia has a ton of good info

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Contacts

- www.alibre.com
- www.cadalyst.com
- www.medicaldesign.com
- www.protomold.com
- www.firstcut.com

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Demos and Questions



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Thank You

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