

# Encapsulation

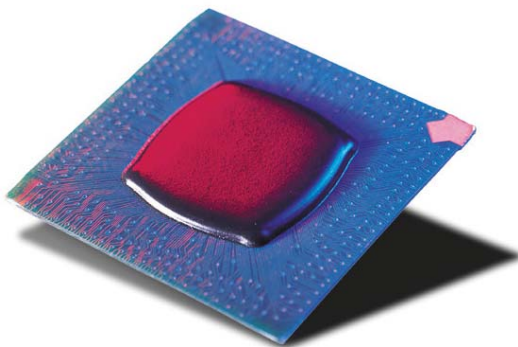
## Dam & Fill - Glob Top

### PROCESS

Encapsulation processes are used to protect fragile die or wire bonds. There are two primary processes used to achieve the encapsulation. Dam and Fill is a precise method of encapsulating high I/O count, wire bonded die. Without the encapsulation, wire bonds would be exposed and subject to damage, rendering the product useless. Dam and fill is a two-part process consisting of a dam being dispensed first, followed by fill material.

As an alternative to dam and fill, a glob top process can be done. The primary difference between the two processes is that glob top does not utilize a dam, and, therefore, can cover a varying area on the substrate; this is due to material flow. Typically, glob top is used on low cost products and when the wetted area is not critical.

A successful encapsulation process results in complete encapsulation of wire bonds void of air entrapment.



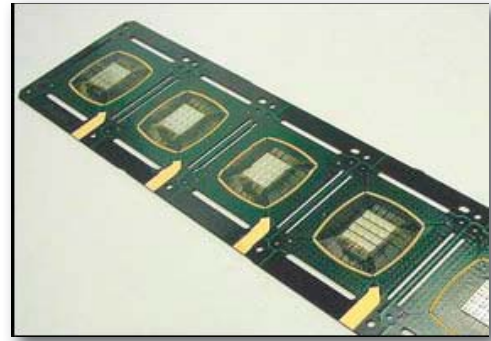
### EQUIPMENT

GPD Global® recommends the MAX II Series or DS Micro II system for doing either a Dam and Fill or Glob Top process in a production environment. Both of these systems are equipped with heat capability which reduces the viscosity of material being dispensed, which in turn eliminates air trapped in the encapsulant.

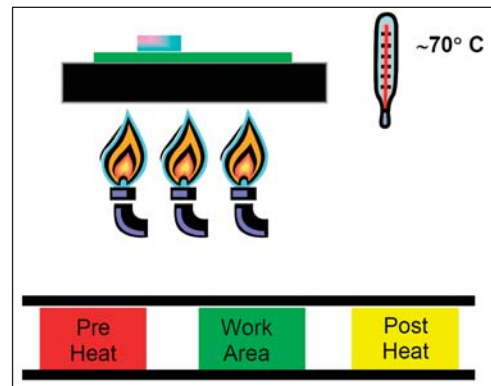
The recommended valve for dispensing encapsulation materials is the LX Auger Valve. GPD Global® has designed this valve with high volume production in mind. The valve is attached to the system through our exclusive Taper-Lock™ toolless mounting hardware. The auger has been designed with an aggressive feed and manufactured with carbide to give a high wear resistance to abrasive encapsulation materials.

# CASE STUDY — Dam & Fill

TEST SUBSTRATE	
Product	27 mm <sup>2</sup> (1.06 in <sup>2</sup> ) – 6 units
Dispense Area	19 mm <sup>2</sup> (0.748 in <sup>2</sup> )
Dam Material	Hysol FP4450
Fill Material	Hysol FP4451



SYSTEM CONFIGURATION	
System	MAX II Series or DS Micro I/II
Heating	
Pre Heat	Non-Contact – Boost to 70° C
Work Area	Custom Fixturing – Maintain 70° C
Post Heat*	Non-Contact – Up to 100° C
Valves	
Dam	LX Auger 8P – Deep – No Heat
Fill	LX Auger 8P – Deep – 45° C Heat
*Post Heat may not be required for process - Consult GPD Global®	



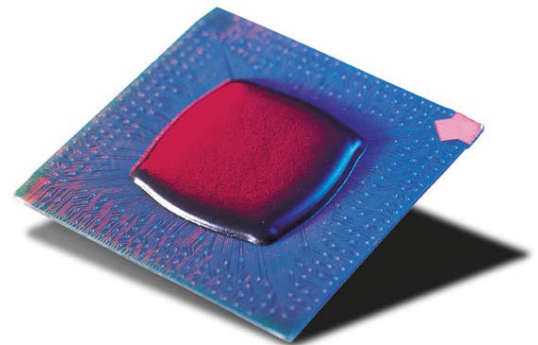
**MAX II Series**  
Heated, compact dispense platform. Shown with Pre- and Post Heaters



**DS Micro II**  
Heated dispense platform. Boards up to 15" x 9" (381 mm x 229 mm)

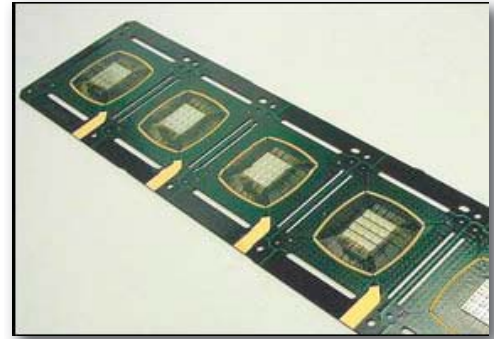


CYCLE TIME ANALYSIS		
PROCESS STEPS	PROCESS TIME (SEC)	TOTAL TIME
Transport in	2.0	2.0
Fixturing	1.0	1.0
Fiducial Alignment	0.55 x 2	1.1
Surface Sense	1.5	1.5
Dispense Dam	3.5 x 6	21.00
Dispense Fill	2.8 x 6	16.8
Product Release	1.0	1.0
<b>TOTAL TIME</b>		<b>44.4 sec/strip</b>
<b>UPH</b>		<b>485 BPH</b>

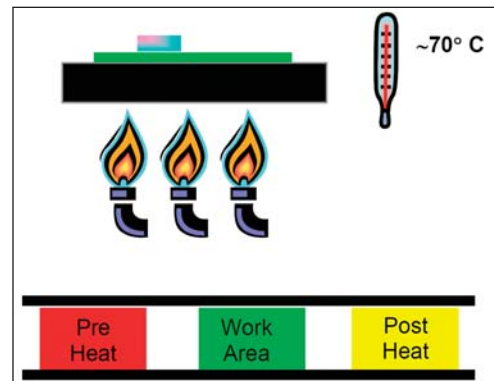


# CASE STUDY — Glob Top

TEST SUBSTRATE	
Product	9.5 mm <sup>2</sup> (0.375 in <sup>2</sup> ) – 6 units
Dispense Volume - approximate	0.0275 in <sup>3</sup> (0.451 CC)
Encapsulation Material	Hysol FP4460



SYSTEM CONFIGURATION	
System	MAX II Series or DS Micro I/II
Heating	
Pre Heat	Non-Contact or Contact – Boost to 70° C
Work Area	Custom Contact Vacuum Fixturing – Maintain 70° C
Post Heat*	Non-Contact or Contact – Up to 100° C
Valves	
Glob Top	LX Auger 8P – Deep – 50° C Heat
*Post Heat may not be required for process - Consult GPD Global®	



**MAX II Series**  
Heated, compact dispense platform. Shown with Pre- and Post Heaters



**DS Micro II**  
Heated dispense platform. Boards up to 15" x 9" (381 mm x 229 mm)



CYCLE TIME ANALYSIS		
PROCESS STEPS	PROCESS TIME (SEC)	TOTAL TIME
Transport in	2.0	2.0
Fixturing	1.0	1.0
Fiducial Alignment	0.55 x 2	1.1
Surface Sense	1.5	1.5
Dispense Glob Top	2.5 x 6	15.00
Product Release	1.0	1.0
<b>TOTAL TIME</b>		<b>21.6 sec/strip</b>
<b>UPH</b>		<b>999 BPH</b>



## EXCLUSIVE SYSTEM FEATURES

- **Unibody Frame with MAX II Series** — Extremely stable platform for precise dispensing and thermal management
- **ClearVu™ Vision** — Programmable zoom and focus
- **Illuminator Intensity Control** — Controls illuminator brightness for hard-to-find fiducials. Intensity values are stored with the fiducial pattern and are automatically adjusted when a program is executed.
- **Precision Laser Surface Sensing** — Accurately locates the surface of a substrate without contact. Spot size is 70 micron (0.0027")
- **Taper-Lock™ Mounting Hardware** — Allows valves and tools to be removed from the system without the need for allen wrenches or other tools.
- **Toolless Valve Cleaning** — Valves have been designed to be disassembled without tools, making for easy valve maintenance.
- **Automatic Needle Calibration** — Standard system feature that automatically calibrates the position of a dispense tip. Complete process takes approximately 30 seconds.
- **Auto Needle Cleaning** — For some materials that tend to drool, this is an automatic method for cleaning the tip of a needle, ensuring that the first dispense looks as good as the last.
- **FLOware® Software** — Proprietary software that makes programming substrates and converting data a snap. Additional process monitoring features allow system and operator productivity to be monitored and saved for later recall.
- **Non-Contact, Universal Pre- and Post Heaters** — Eliminates the need for expensive customized tooling for the Pre- and Post Heat areas. The pre and post heaters can handle any substrate up to 12" x 12" (305 mm x 305 mm) without change over.
- **Available Non-Contact Work Area Heat** — Allows one fixture to be used for a variety of substrates as long as the package dimensions do not change.

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