

Application Process

GaAs Wafer Backthinning is a highly used process within the semiconductor industry. Logitech has a full range of tried and tested products aimed at this process. The use of a PM/LP/DL system for the lapping process and PM/LP/DP system for the polishing process, using a Logitech precision jig as the holding fixture is ideal for this activity.

The use of a Logitech bonding unit is recommended for bonding glass carriers to the wafers. Once bonded the carriers are mounted by vacuum chucking on to the jigs. A digital gauge indicator on the jig shows the material removal during the process. This enables the user to process wafers to a pre-determined, programmed thickness without the need to supervise. The system described here provides the user with the capability to take their materials from the initial lapping stages straight through to the final polish using a Logitech system that has been produced especially for their processing needs.

Expected results from a Logitech 6" GaAs Wafer Backthinning System are:

- **Thickness Uniformity:** +/- 3µm over a 152mm (6") diameter wafer
- **Flatness:** 6 µm over a 152mm (6") diameter wafer
- **Surface Roughness:** Within 3nm Ra over a 500µm trace
- **Minimum Thickness:** Typically 100µm

(process results will vary slightly according to the quality of sample being used)

Complete Systems for the precise thinning of

III-V Semiconductors, I.R., Opto-electronic & Other similar materials

Technology Transfer

Training and process technology transfer at Logitech cover equipment and wafer handling, cleaning, bonding, gauging and process adjustments, with which the operator needs to be familiar. Logitech are dedicated to complete success and through training at our purpose built laboratories or at client premises, the team ensures that personal training is provided at a level relevant to the clients process requirements.

Years of experience has identified that instruction manuals alone do not provide operators with the levels of knowledge and success that are achievable through personal training and practical experience. Logitech are so committed to this programme of technology transfer that it provides a full three day training course, with all material processing systems purchased. Courses cover all aspects of system operation, maintenance and customer focussed process trials. This unique approach ensures successful installation, optimum use and maintenance of Logitech systems.



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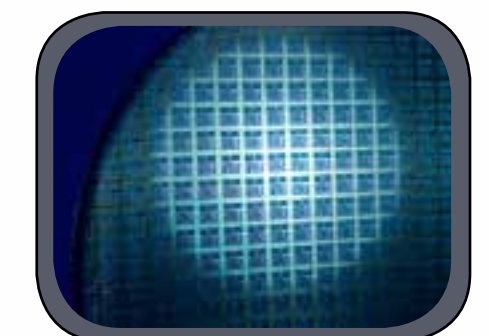
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Where applications demand precise tolerances and optimum surface finish. Complete with detailed operating technology, full technology transfer and comprehensive support.

Client Support

Support is provided directly by Logitech and via an extensive global network of Logitech trained dealers. This enables us to provide a consistently high level of localised support and services from our technical base in Scotland.

A 12 month warranty is provided for all Logitech machines purchased. The client support policy at Logitech aims to resolve any client issues, be it mechanical, electrical or technological, in a fast and effective manner. The "no quibble" policy for replacement of faulty components ensures that any response to client difficulty is immediate.



Precision Materials Processing

Introduction

Logitech Limited has a wealth of knowledge and problem solving skills in wafer surfacing, thinning and geometric control. Our team of experts work with you to integrate the relevant processes and systems into your thin or ultra thin wafer fabrication programme.

Established in 1965, Logitech has many years experience in design and manufacture of high precision equipment and in sophisticated materials processing. Our expert products and service, provide a quick and effective route to complete success in any device fabrication process.

This brochure provides a brief analysis of semiconductor related applications for Logitech systems and illustrates the range of precision equipment available for processing materials such as Silicon, Gallium Arsenide and Cadmium Zinc Telluride. You will also find information on quantity requirements and accuracies achievable.

Comprehensive technology transfer and customer support is provided by Logitech with every full system purchased.



DP4 polishing system provides high geometric accuracy, simultaneously processing up to four 8" wafers or multiple smaller wafers

Application Analysis

Our technical team work, in confidence, with customers to identify the most relevant system for optimum results on their particular wafer processing issues. Initial discussions provide a detailed understanding of production quantity, wafer thickness, surface finish and geometric tolerance requirements.

Typical options in this area are;

- Wafer-support disc bonding of low, medium or high precision
- Jig controlled mechanical lapping and polishing using single or multi-workstation machines
- Mild chemo-mechanical or aggressive chemical etch polishing within a controlled environment
- CMP processing using a dedicated PM, LP, DP, Tribo or Orbis system
- Gauging and inspection facilities to suit the required end result

Logitech's unique consultative approach ensures that customers achieve the best possible results from the advanced Logitech machine system and application processes.

Whatever your cutting, shaping and surface finishing requirements, Logitech equipment and support can enhance your process. Laser rods, windows, mirrors, opto-electronic materials, metals, crystals, glass, ceramics are all easily handled by the comprehensive range of Logitech products.



Logitech Chemical Mechanical Polishing System

Products & Services

Logitech offer systems which cover the complete range of production capacities and accuracies. From R&D applications processing a few high accuracy wafers to detailed production units, processing high quantities of ultra-thin high accuracy wafers.

Logitech Systems

Logitech systems are designed to be flexible with changing production requirements in terms of accuracy and outputs. The family of products enable customers to start with a single workstation machine and add other single or multi workstation machines as necessary. This approach provides two major benefits:

- Low initial investment during the development stages
- Ability to create a multi-machine production unit instead of relying on a single machine.

APD annular saw



Wafer slicing: Due to the expanse of crystal growing, sawing operations must minimise material waste (kerf loss), making the Logitech APD range of annular saws ideal. The highly tensioned blades ensure minimal kerf loss and reduces wafer damage, enabling users to cut very fine wafers with a greater yield per crystal than is possible on other types of saw.

Wafer bonding: High yield processing of delicate, ultra thin materials (typically below 100µm) normally requires temporary or permanent bonding of wafers to support discs. The techniques and equipment used depend on wafer thickness, uniformity requirements, sample diameter and whether there are fabricated devices on the wafer. Logitech supply products to meet the most demanding requirements. Options range from hand bonding to high volume precision bonding systems.

Wafer Lapping: Optimum geometric control is achievable through the use of high precision fixtures during lapping processes. Fine mechanical lapping is normally used for backlapping or thinning of wafers, such as bulk removal of material using Aluminium Oxide abrasives. Wafers are mounted using Logitech holding fixtures such as PP5, PP6 and PP8 jigs. Lapping systems are based on the standard single workstation PM5 or DL1 and the multi workstation LP50 or DL4. Versions of the PM5 and LP50 are available with automatic plate flatness control, providing greater levels of repeatability and improved sample quality. Further information on our precision jigs can be found at www.logitech.uk.com.

Wafer Polishing: Processes involving chemical action are essential for polishing III-V and II-VI semiconductor wafers where minimal crystalline damage, under the polished surface, is required. Equipment used for this process must resist chemical attack and rapidly extract the corrosive fumes.

Chemical Mechanical Polishing: Versions of the PM5, LP50, DL, DP and Jigs are available for chemo-mechanical polishing using "Chemlox" polishing fluid (a Sodium Hypochlorite based solution). Used in conjunction with a Chemcloth pad, these polishing systems greatly improve wafer quality for IR alignment.

The Logitech Orbis and Tribo systems have been designed specifically for chemical mechanical polishing. Through a combination of automated process parameter control and unique processing versatility, the **Tribo and Orbis Systems** repeatedly provide nanometer accuracy for most materials used in device fabrication processes. The precision engineered solutions utilise cutting edge technology to enhance and redefine your CMP research and analysis abilities.

Chemical Polishing: Logitech has a number of dedicated chemical polishing tools, culminating in the CP series of machines. The CP machines, constructed from corrosion resistant materials, are suitable for small or large quantity processing. Fume extraction hoods are available to help ensure user safety. The Logitech range is ideal for use with aggressive polishing fluids such as Bromine, Methanol, Ammonia or Peroxide/Alkaline. These products are largely used in the production of damage free surfaces and geometric precision.

Further information can be found at www.logitech.uk.com.

Measurement & Inspection

A complete range of measurement and inspection products are available for use in precision materials processing. The GI20 interferometers for flatness measurement including non-reflective surfaces, suitable for checking ground/lapped/polished surfaces. These grazing incidence interferometers allow rapid and accurate measurements to be made "in progress".

The LI10 Fizeau Interferometers rapidly and accurately measure polished surfaces, with a reference flatness of lambda/10. Contact and non-contact measurement gauges are available for the accurate measurement of wafer thickness.

Further information on the Logitech range of measurement & inspection products can be found at www.logitech.uk.com.

Semiconductor System Range				
	Positional Accuracy	Speed	Capability (Max)	
Wafer Slicing & Dicing				
	Positional Accuracy	Speed	Dicing	Slicing
APD1	y-axis 7.5µm/x-axis 5µm	100 - 5000 rpm	102mm	55mm
APD2	y-axis 7.5µm/x-axis 5µm	100 - 3000 rpm	152mm	78mm
AWS1	-	0 - 400 rpm	-	102mm
Wafer Bonding				
	Average Process Time	Max Head Temperature	Wafer Diameter Process (Max)	
WSB (1 or 3 station unit)	45 mins	180 °C	102mm (4") or 152mm (6")	
WSB3000	60 mins	188 °C	300mm (12")	
Wafer Lapping Systems				
	No Workstations	Removal rates	Flatness	Wafer Process (Max)
PM5	1	5-10µm/min	<2µm: 2" & 4" <4 to 6: 6" & 8"	Up to 100mm (4")
LP50	3	5-10µm/min	<2µm: 2" & 4" <4 to 6: 6" & 8"	150mm (6") or smaller multiples
DL1	1	5-10µm/min	<2µm: 2" & 4" <4 to 6: 6" & 8"	Up to 200mm (8")
DL4	4	5-10µm/min	<2µm: 2" & 4" <4 to 6: 6" & 8"	4 of 200mm (8") or smaller multiple
Wafer Polishing Systems: Chemical Mechanical Polishing				
	No Workstations	Av. Surface Roughness	Wafer Process (Max)	
PM5: CMP model avail	1	<3nm	Up to 100mm (4")	
LP50: CMP model avail	3	<3nm	150mm (6") or smaller multiples	
Tribo	2	<3nm	Up to 100mm (4")	
Orbis	2	<3nm	2 of 200mm (8") or smaller multiples	
DP1	1	<3nm	300mm (12") or smaller multiples	
DP4	4	<3nm	250mm (10") or smaller multiples	
Wafer Polishing Systems: Chemical Polishing				
	No Workstations	Av. Surface Roughness	Wafer Process (Max)	
CP3000	3	<10nm	150mm(6") or 3 of 83mm (3.25")	
CP4000	9	<10nm	200mm (8") or 9 of 76mm (3")	
Measurement & Inspection				
CG-10	Linear measuring range: 10mm	Accuracy over range: 1µm	Up to 300mm (12")	
NCG-2	Measurement range: ±1.25mm	Accuracy: ±1µm	Up to 150mm (6")	
LI10 Fizeau Interferometer	Surface Roughness: <20nm	Fringe Spacing: 0.335µm	100mm (4")	
GI20	Surface roughness: 1nm to 300nm Ra	Fringe spacing: 2µm	150mm (6")	
LG2 Autocollimators	Typical setting accuracy: >2 arc secs	Adjustment Range: ±3 mins of arc	Aperture: 25mm (1")	

A large selection of accessories, components and consumables are available to enhance and support Logitech semiconductor systems.