PRODUCT INFORMATION


# MAPLE-EXPRESS

Optimal Features Only

## HIGH SPEED PL MAPPING SYSTEM

DWOPTRON
spectroscopy
Instrumentation

# High Speed High Performance PL Mapping System designed for LED Manufacturing Plants


## SUMMARY

Maple-Express is express version of manual PL mapping system Maple-Express tailored taking space and cost constraints into consideration. 4G technology evolved from DongWoo Optron's PL mapping systems Maple-II and Maple-X 308, merging two technologies into one, highlights the speed, productivity, robustness, safety, and special extra features that differentiates Maple-Express from other competing products in the market. For examples; blistering mapping speed that breaks the barrier of 2 inch wafer in 2mm step in less than 30 seconds; optional multiple spectrometer control; optional multiple laser support; concurrent measurement and analysis of photoluminescence, film thickness, and reflectivity; double PL peak segregation; susceptor editing; edge exclusion; highest user controlled step resolution (0.1 / 0.5 / 1.0 / 2.0 / 4.0mm); stealth quiet motorized stage; use of a highly sensitive, low noise linear array CCD detector driving dead accurate intensity measurement; auto monitoring of laser power; full operational history log; user security control; use of FFT filtering removing unwanted glitch; optional power vaccine against power surge or unexpected shut down; optional sample monitoring through an imaging CCD camera; beam path control; laser power control. Maple-Express is a lighter, economical solution that does all and all you need to quality control heavily loaded LED manufacturing lines at really affordable price.


## APPLICATIONS

- LED manufacturing quality control
- LD manufacturing quality control
- Epi-wafer auto PL mapping
- General photoluminescence
- III-V material photoluminescence
- Thin film thickness measurement
- Fluorescence

## BENEFITS

**Industry Proven Robustness**

Like wine maturity in technology is a big deal in the production lines that do not have any room for even the smallest flaw. Maple-Express technology have been crafted based on years industry user experiences and actual field applications bearing in mind the importance of the robustness in the production lines. Hardware and software have been forged to suite the most harsh production environment to perfection. Refined robustness of the hardware and software have been approved by the users. With Maple-Express users can have peace of mind without worrying about unexpected interruptions.

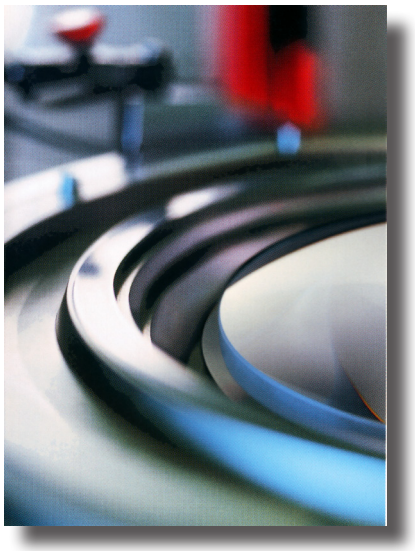
**Readiness to apply**

Every production lines bears seemingly little differences in process but this can be amplified later when a new test equipment is put into action. This is a place where experience and know-how plays an important role. Because Maple-Express has been built upon the actual industry experiences it can be put into any production lines without any kind of customization. Every software and hardware interfaces required by professional users and experts are optimally placed where they should be. Users unfamiliar to LED production will gain invaluable experience and know-how melted into Maple-Express by simply using it.

# Technical Specification

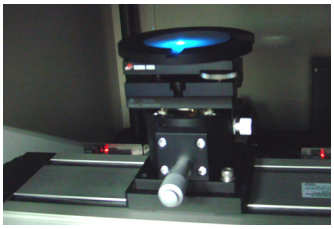
## Maple-Express overall technical specification

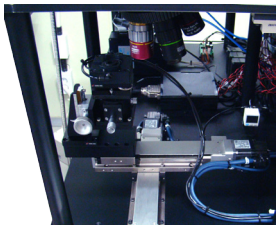

| | Option (O) Default (D) |
|---|---|
| Spectrometer (VIS/NIR) | |
| VIS Spectrometer | (D) |
| • Low Noise Linear Array CCD | 1,024(D) / 2,048(O) pixels |
| • Wavelength Range | 200~1,100nm |
| • Resolution | 3.5nm @100μm slit with 600gr/mm 1,024pix |
| NIR Spectrometer | (O) |
| • Low Noise Linear Array CCD | 512 pixels |
| • Wavelength Range | 900~1700nm |
| • Resolution | 2nm @10 um slit with 150gr/mm |
| Laser | |
| • Available Wavelength(s) | 266nm (O), 325nm (O), 375nm (D), 405nm (O), 442nm (O), 532nm (O), 658nm (O), 785nm (O), 1064nm (this option requires additional spectrometer) |
| • Maximum Number of Lasers | Maximum 2 lasers (O) |
| • Power Control from PC | Depending on laser model |
| • Monitoring | Depending on laser model |
| Thin Film Thickness Measurement Unit | (O) |
| • Principle | Reflectometry |
| • Light Source | Tungsten Halogen lamp (100W) |
| • Film Thickness Range | 1μm~15μm |
| • Resolution | 1um |
| High Speed Servo Motorized Stage | (D) |
| • Loading | Manual loading on a vacuum chcuk |
| • Orientation | X and Y-axis |
| • Step Resolution | 0.5/1.0/1.5/2.0mm |
| • Wafer Size Supported | 2” (D), 4” (D), 6” (D), 8” (O) |
| • Mapping Speed | 2” <13sec @ 2mm step 5ms exposure |
| Software | |
| • Management Protocol | SECS-GEM (O) |
| • Analytical Parameters | Peak λ (D), Dominant λ (D), Peak Intensity (D), FWHM (D), Integrated Intensity (D), Thickness (O), Reflectivity (O) |
| PL, Thickness, Refelctivity Measurement | Concurrently measured (O) |
| PL Accuracy | <1nm ±0.5nm (D) |
| Data Processor | (D) |
| • Main Board | Intel Core2DUO E7500(2.93GHz) 2GB |
| • Display | 21” Wide TFT LCD Monitor |
| Mechanical Characteristics | |
| • Physical Dimension (WxHxD) | 760X450X560mm |
| • Equipment Weight (Kg) | <35 |
| • Vacuum | 50-60Cm/Hg |
| Electrical Characteristics | |
| • Input Voltage | AC Single 220 (+/- 10%) VAC, 60Hz |
| • Total Power Consumption | 2.5KW |
| Environmental Characteristics | |
| • Clean Room | Class~10000 |
| • Temperature | 15~35 °C |
| • Humidity | <85%RH with no condensation |



# Technical Highlights

## Hardware

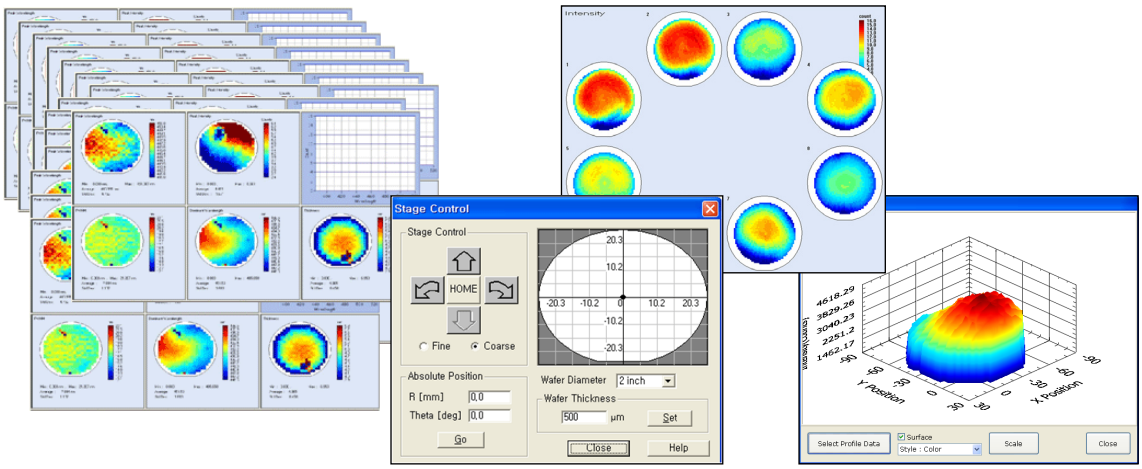




| | Option (O) Default (D) |
|---|---|
| Automation | |
| • High Speed Servo X-Y Stage | Stealth quiet high speed servo X-Y stage maps 2” wafer @ <13sec @ 2mm step 5ms exposure. (D) |
| • Fine Step Resolution | 0.5/1.0/1.5/2.0mm (D) |
| • Management Protocol | SECS/GEM (O), Proprietary FTP (O) |
| • Capacity | One Maple-Express can cover more than 10 MOCVDs. |
| Powerful Spectrometer | |
| • 101.6mm Focal Length Spectrometer | 200~1,100nm, 1,024 pixels, resolution 3.5nm @100µm slit with 600gr/mm (D) |
| Sensitive Detector | |
| • Low Noise Linear Array CCD | Highly sensitive Low Noise Linear Array CCD with 1,024(D) / 2,048(O) pixels for VIS and 512 pixels for NIR(O). |
| Wide Range of Lasers | |
| • Multiple Laser Support | Maximum 2 lasers can be used (O) |
| • Supported Wavelength(s) | 266nm (O), 325nm (O), 375nm (D), 405nm (O), 442nm (O), 532nm (O), 658nm (O), 785nm (O), 1064nm (this option requires additional spectrometer) |
| • PC Power Monitor | Depends on the laser model |
| • Power Control | Depends on the laser model |
| Scalable Filter Mechanism | |
| • Filter-wheel | Filter-wheel allows to cover wider range of lasers. (O) |
| • ND Filter | Variable ND filter allows to fine control laser power intensity. (O) |
| • FFT Filter | Removes unwanted fringe and glitch(s) to smooth out the results. (D) |
| Auxiliary Power Options | |
| • Power Vaccine | 1.5 minutes protection against power surge or power shut down. (O) |
| • UPS | User defined auxiliary power supplied. (O) |
| Imaging CCD | Sample monitor CCD available (O) |
| Powerful Data Processor | (D) |
| • Main Board | Intel Core2DUO E7500(2.93GHz) 2GB |
| • Display | 21” Wide TFT LCD Monitor |

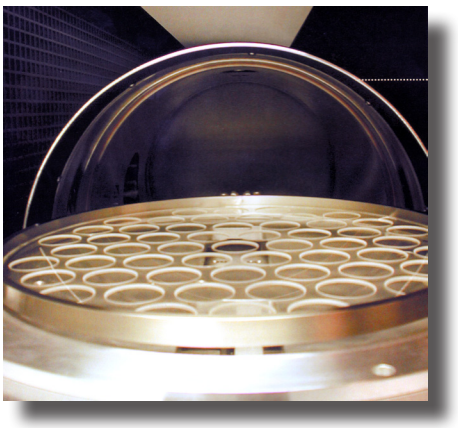
# Technical Highlights

## Software




| | Option (O) Default (D) |
|---|---|
| Application Software | |
| • Concurrent Measurement | Photoluminescence, thickness, and relative reflectivity are simultaneously measured and analyzed on the same display. (O) |
| • Real Time PL Intensity | Real time measured PL intensity and histogram are displayed in parallel. (D) |
| • Susceptor Editor | Powerful editor program allows to design your own susceptor and view in user friendly GUI environment. (D) |
| • Double Peak Isolation | Intelligently separate main peak from peaks incurred from a special layer adjacent to MQW. (D) |
| • Edge Exclusion | This allows to utilize areas otherwise excluded. (D) |
| • History Log | Full operation history and exceptions are logged for later operator analysis. (D) |
| • Secured Access | 3 different user access level (Operator/Engineer/Factory) is granted (D) |
| • Threshold/Max/Min | User defined threshold, Max, and Min values. (D) |
| • Single Point Measurement | Maximum 9 points can be chosen |
| • Image Monitoring | Subject sample can be monitored on screen (O) |
| Hardware Control | |
| • Step Resolution | User defined or controlled step resolution (0.5mm / 1.0mm / 1.5mm / 2mm) for finer operation. (D) |
| • Stage Control | Versatile servo X-Y stage control allows to navigate 9 different points. (D) |
| • Filter-wheel Control | Different filter is chosen for a corresponding laser (O) |
| • Variable ND Filter Control | Allows to fine control ND filter (O) |
| • Spectrometer Switch | Maximum 2 spectrometers can be used alternatively and the correnspondingbeam path is also software switched (O) |
| • Laser Power Control | Depending on laser model used laser power is software controlled (D) |

# Maple-Express Service Plan



| Description | Expected Action | |
|---|---|---|
| Response Time | 1. Domestic: within 24 hours by domestic technical support engineers<br>2. Overseas:<br>A. Within 48 hours by an authorized local distributor or agent.<br>B. Within 48 hours + international traveling time when service is required from the HQ engineers. | |
| A/S Plan | Standard Service<br>1. Every month: routine system check and service.<br>2. Every 6 months: monthly system diagnostic and service.<br>3. Every 12months: precision system diagnostic and service. | Emergency Service<br>1. Emergency defect troubleshoot: onsite service within 24hours. Replacement/ repair and calibration.<br>2. Backup system provided when service interrupt is expected.<br>3. Operator Vacancy: operation training for new personnel. |
| Cost | 1. In the first year the light bulb is provided free of charge.<br>2. Application software upgrade and maintenance free of charge.<br>3. Other replaced parts charged based on the actual part price.<br>4. Call for a special service plan package. | |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