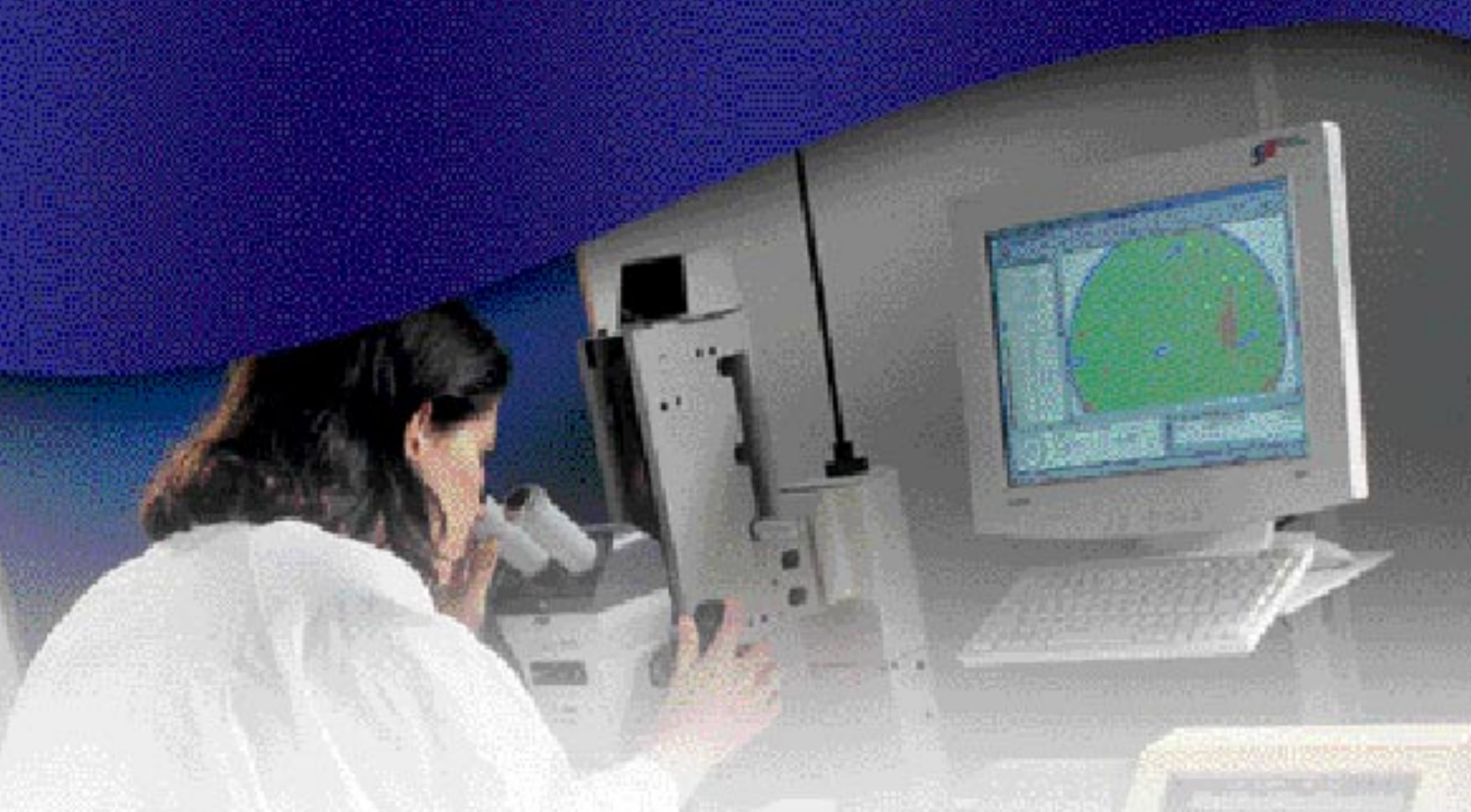


**SE-PROBE** *the intelligent interface between  
your prober and the future*



# *Do you want to save money on your sort floor?*



**Efficiency is very important on a modern sort floor. By using SE-PROBE as your prober control system, you have the ability to add functionality to your wafer probers. Easy migration to your “work-stream” environment can be done at various levels due to the open software structure of this powerful tool. The integrated optimiser solution guarantees fast and efficient multi site probing and offline inking. SE-PROBE will monitor your sort floor performance and is able to create reports. The data analysis functionality will provide information on the quality of your products and will highlight possible problems. With all these features, SE-PROBE will definitely improve your sort floor performance and reduce your sort floor costs!**

## **Efficiency improvement**

Although SE-PROBE is a system which is in-between the tester and the prober we still can bring probe time reduction in most cases. On the older probe equipment (like the EG2001) the probe time reduction mainly comes from the added functionality of control map based probing. Only those die will be probed which possibly could be “good-die”. All positions on the wafer

containing known “bad edge die” and monitor chip locations will be skipped. This reduces the number of touchdowns and therefore the total probe time. Also the latest generation probers have benefits of using SE-PROBE. The communication overhead can be reduced. Real time wafer mapping is now done by SE-PROBE. SE-PROBE is a multi tasking application and sends the prober to the

next location while doing the map update. In case of multi-site probing more efficiency is offered by the optimiser tool. Minimizing the number of touchdowns and control the prober using the optimised probe route have brought close to 25% probe time reduction. (test done on 4-site product on EG4090).

### Customer integration

SE-PROBE is the missing link for total test-cell control and the ability to integrate your wafer prober into your “work-stream” environment. The open software structure makes it possible to customize SE-PROBE. Using DLL hooks and over 150 API functions, special requirements or additional functionality can be implemented. SE-PROBE minimizes the possibilities to make mistakes during the set-up and gives full central control over the entire sort floor. After wafers are tested the results are stored in the selected map format(s) on the selected wafer map server(s).

### Dynamic test cell control

The ongoing battle to reduce cost of test requires dynamic instead of static testing. SE-PROBE can offer many ways of testing;

- For those components where a 100% test is required parallel testing is the way to go.
- For all other products dynamic testing can help to achieve the goal of cost reduction. Starting with a sample test over the wafer

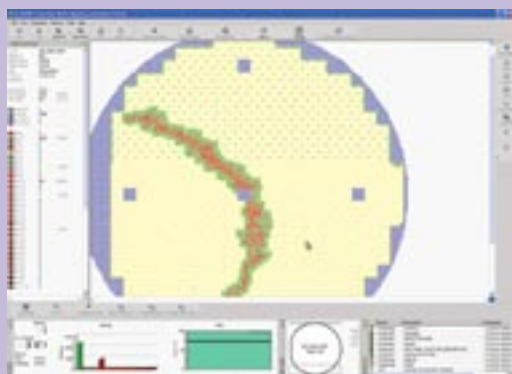
and depending on yield, decide how to proceed. If the yield is extremely good the next wafers could be tested with a reduced sample pattern or reduced test program. If the yield is questionable the sample density can be increased. Also the system could concentrate only on those spots where rejects are found and test with a more intense test program. Even Smart Sample Probe is a possibility. (See below). To know how a certain wafer/lot has been tested the full history is stored wafer by wafer.

### Smart Sample Probe

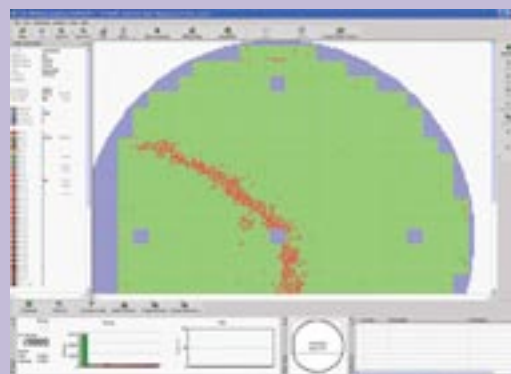
To reduce probe time on well-established products, chip manufacturers often decide to perform only a sample test over the wafer. The risk with just sample testing is that not all rejects are found. (Normally those reject show up at final test).

SE-PROBE offers a Smart Sample routine that is based on sample test but when a reject is found SE-PROBE dynamically extends its sample pattern in areas where clustered rejects are located.

The difference in wafer yield found by using Smart Sample Probe compared to a 100% test is rather small. Smart Sample Probe offers the user almost the quality of 100% test but combines this with the probe time reduction of sample test. For example only 0.3% yield difference in combination with over 80% time reduction has been achieved compared to 100% test.



Smart Sample Probe



Graphical User Interface

## Information Management

### Graphical User Interface

SE-PROBE offers a modern graphical user interface consisting of a real-time wafer map window, which displays; the wafer map, the current device under test (DUT) and the test results. Selectable toolbars and dockable windows can customize the interface.

The optional console screen can replace the prober monitor. SE-PROBE offers the same graphical user interface independent of which type of prober is connected.

### Data Management

Network integration in combination with internal workstation resources allows you to fully control how data is gathered and stored. Product setup files can be stored on the network server. If network connection is lost, maps will be stored locally on the workstation and automatically uploaded to the network after connection is restored.

Remote monitoring allows the user to access the prober from any location on the network, even through the World Wide Web. The possibilities are unlimited but are protected by full authorisation control.

### Yield Management

SE-PROBE offers the user extensive real time yield monitoring capabilities. Warning levels can be set as well as automatic actions such as reprobing, probe tip scrub, operator assistance request, etc...

### Inkless Wafer Sort

SE-PROBE offers full integration with OCR/Barcode reader systems to ensure wafer integrity. By using intelligent routines, reference die integrity is offered, which makes inkless wafer sort a reality.

### Reports

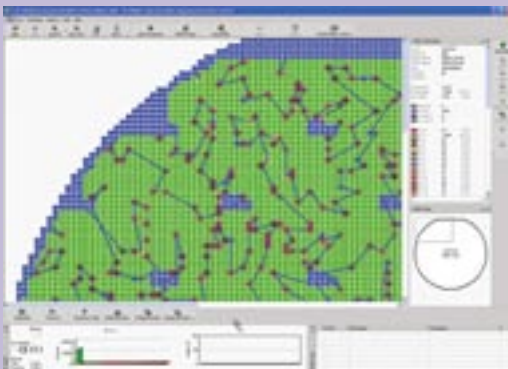
With SE-PROBE all information is just a mouse click away.

SE-PROBE offers a wide range of reports; wafer & lot summary reports, probe card performance & yield reports as well as product recipe reports. Each report can be customised. Data being stored during production such as system events can easily be used to create custom reports. MTBA and MTBF of the test cell can easily be generated.

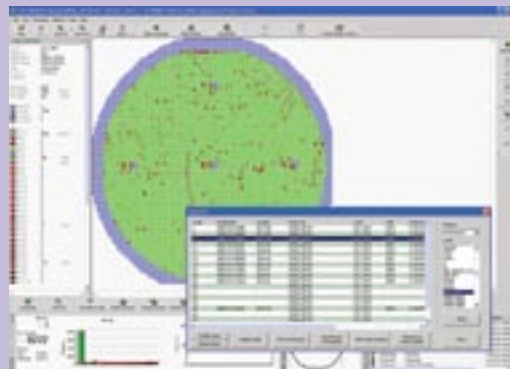
### Trace ability

Performing offline inking or inkless wafer sort, wafer and lot integrity is extremely important. SE-PROBE can use a barcode, 2D or OCR system to uniquely identify each lot/wafer. This information is stored in the wafer maps and with all production data. With the track lot tool the user can easily retrace all actions that have been performed on a specific wafer including retrieving maps of each pass.

This functionality together with the reference die integrity allows full control over your maps and all events, making the step towards inkless production possible.



*Ink route optimisation*



*Tracklot tool*

## Multi-site wafer probing

### Free designable probe pattern lay-out

With the increasing demand for more freedom in probe card layout design, SE-PROBE has a free designable probe card layout editor.

With this pattern layout editor you can make any possible layout in any amount of sites, even with gaps between the sites. SE-PROBE's internal probe engine will calculate with this pattern how to step over the wafer. If you create a multi-site probe card that fits on a sample raster, you can run multi-site sample probe.

### Yield charts

During production a yield chart can be displayed on screen. For multi-site probing each site is represented by a different color. This way a direct feedback is given to the user regarding yield difference between the sites. Test- and/or probe card- problems can now easily be detected. The consecutive fail monitoring can be used for site-to-site fail monitoring.

### Yield tracking

When the probe card Database is being enabled it is possible to display a yield trend plot per probe card. This yield trend is also on a site-to-site base.

This yield trend helps you to verify if the right probe card lifetime is being selected.

## Maps

### Wafer Maps

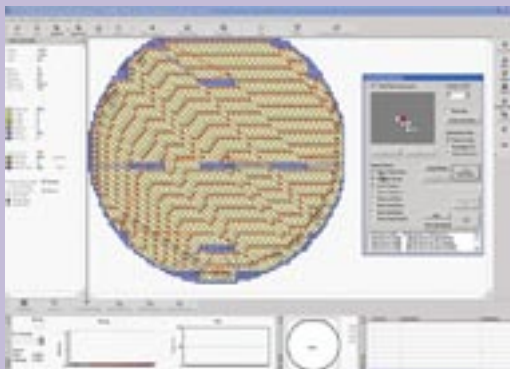
SE-PROBE displays the wafer map real-time during test. Color-coded dice indicates the test results. The die and wafer size are displayed with the correct aspect ratio. It is possible to zoom in and out on the wafer map to view more information about a particular die. The X/Y coordinates are displayed

relative to the reference die. The reference die can be selected anywhere on the wafer and is the link between the physical position on the wafer and the SE-PROBE control map. By clicking on a bin group in the "wafer information" window, only die in this bin group are shown. The rest of the wafer map will dim.

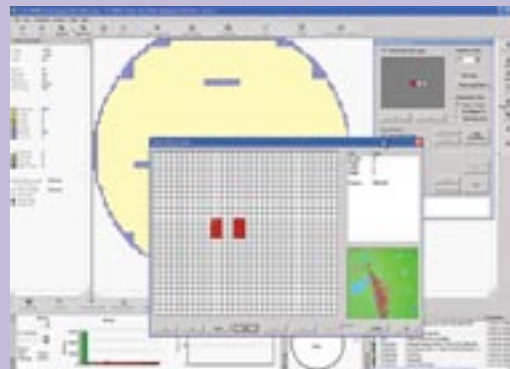
### Control Maps

SE-PROBE uses a product related control map. The control map is created in the Product Setup wizard and contains all die positions on the wafer. Using the controlmap editor, special positions such as sample die, reference die, first die, etc., can easily be controlled. Sample areas can be created die by die manually or automatically; for example, every Nth die, every Nth row or column.

A built-in optimiser can inform you of the most optimal way to probe the wafer. Special instructions such as no touchdowns in restricted areas or only on wafer can be selected. By using overlay map converters, it is easy to import existing overlay maps



Control map editor with optimiser tool



Probe card pattern layout editor

with, for example, wafer stepper information or visual inspection information. A grid can be generated on the map to indicate the mask or reticle size and its stepping pattern. SE-PROBE also offers the possibility to import wafer maps in various formats and generate a control map automatically.

### Composite Maps

SE-PROBE offers composite map generation for enhanced yield and process analysis. In combination with an added mask/reticle grid it is a powerful feedback to the wafer fab process.

### Touchdown Maps

SE-PROBE offers the user the possibility to display the number of touchdowns per die. The die color will change from green to red as the number of touchdowns reach the user specified touchdown limit.

SE-PROBE offers two possibilities when the touchdown limit is reached;

- 1) The die will be contacted again but becomes a reject regardless of the test result.
- 2) The system refuses to touchdown to prevent losing the die.

Per wafer this touchdown information is stored in the primary SE-PROBE wafer map.

At each successive probe session the touchdown information will be updated.

## SE-PROBE is built around Wizards

### Product Setup Wizard

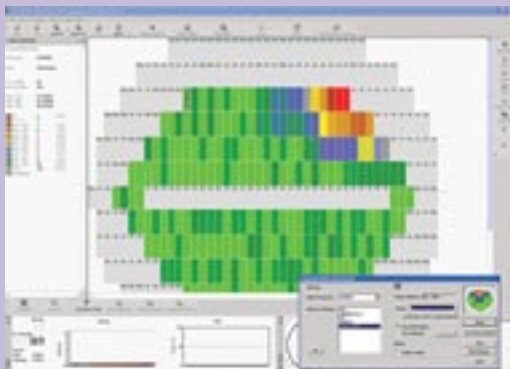
The Product Setup Wizard guides the user in creating a new product on the prober. It is no longer necessary to be a specialist on a certain prober to create new setups. Sample probe set-up can be easily generated using up to 3 customizable levels linked by “if-then-else” structures. Multi-site probing is also available using a wide range of probe patterns. Yield monitoring, consecutive failed bins, probe tip scrub, retest at last known good, are only a few examples of the supported features.

### Reference Die Wizard

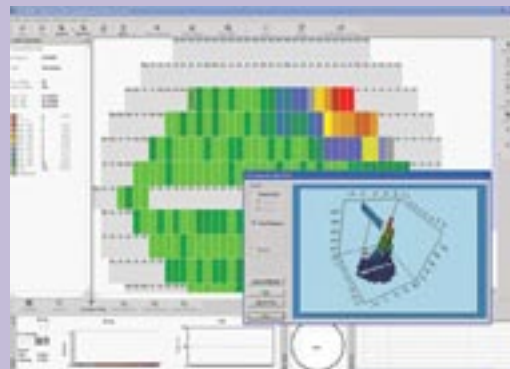
The Reference Die Wizard guides you through the selection of the reference die. This die-position is used to make the link between the physical position on the wafer and the SE-PROBE control map position. Once the reference die is set, SE-PROBE will use this position to ensure reference die integrity.

### Start Production Wizard

The Start Production Wizard guides you through the settings required to start production. Lot selections, probe card, sequence of wafers, partial or complete

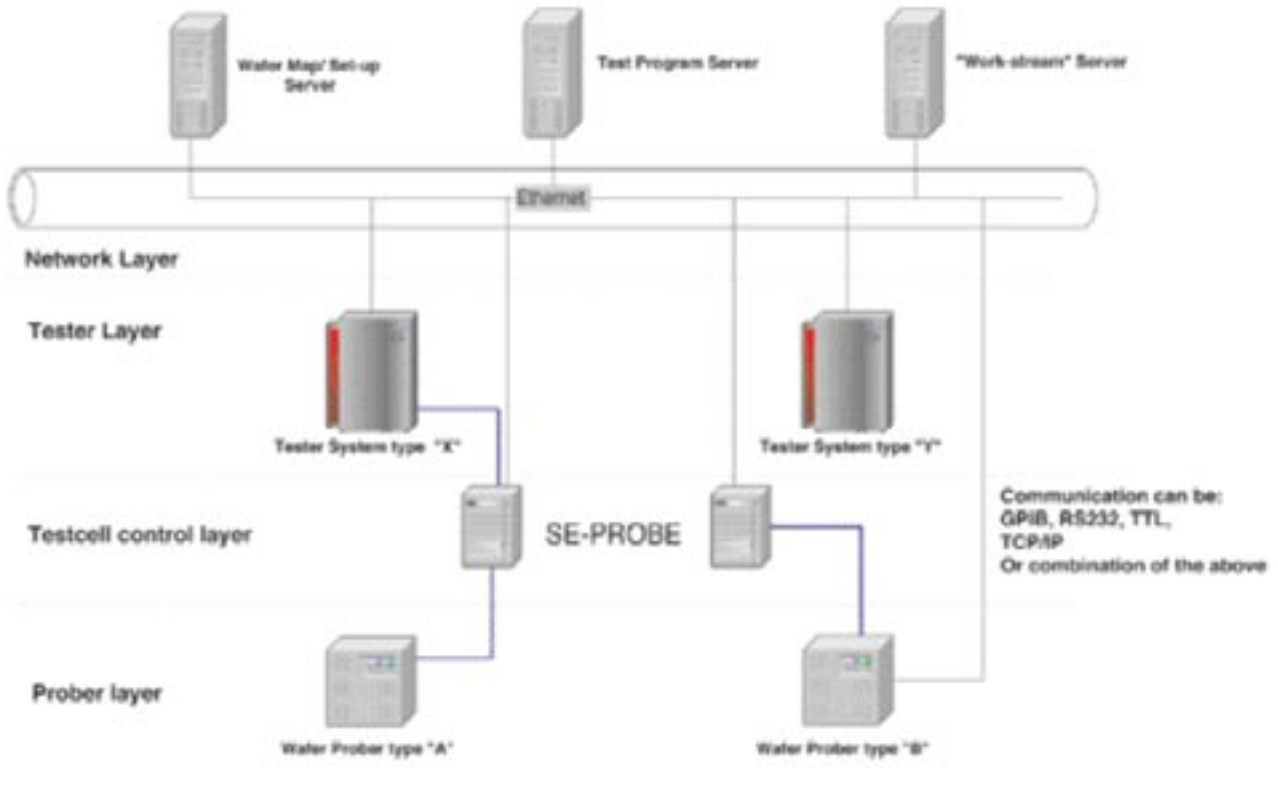


Composite map

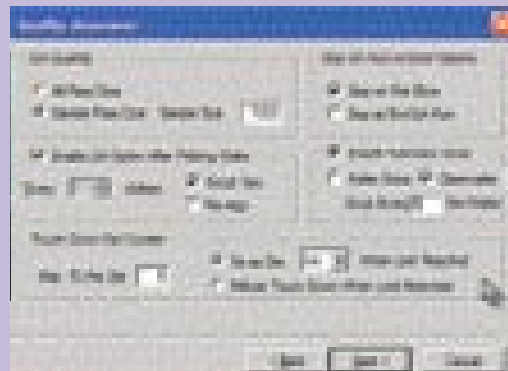


3D Composite wafer map

Network integration, SE-PROBE as test cell controller



Touch down map



Quality assurance window

## Specifications

### Wafer

- 1.6M die per wafer
- 3" ... 12" support
- Bin colors free selectable
- Bin names free selectable per product
- Supports industry standard maps
- (ARRAY, XY, SECS, SNI, ESC, TRIAGE, ASCII, SE-PROBE, EG4090, STDF, etc.)
- Unlimited passes per wafer (also in SE-PROBE wafer map format)

### Probing

- Wizard guidance
- Reprobe and retest possibilities
- Sample probe (3 levels and full wafer)
- Smart sample probe
- Multi site up to 256 sites (higher numbers prepared)
- Optimized probe pattern
- Free selectable probe pattern
- Off-line simulation
- Speed probing
- Touchdown counter and limits per die

### Inking

- Direct inking
- Offline inking
- Inkless
- Control map inking
- Optimized route inking
- Delayed inking
- Speed inking

### Control map editor

- Full screen control map editor
- Sample / ink / skip and probe dice
- Integrated probe card pattern optimiser
- Integrated ink edge optimiser (short ink path)
- Integrated multi site pattern short route
- Smart sample patterns

### Graphical user interface

- Dockable toolbars
- Dockable information windows
- Windows and toolbars can be sized/moved/disabled
- Toolbar layout can be customised
- Bin and die colors can be changed
- Windows NT4, 2000-pro and XP
- Touchdown map

### Security

- Unlimited users
- Unlimited user groups
- Security rights per group
- Login/logout/temporary login as...

### Recovery

- Network down recovery
- Suspend/resume; wafer/lot
- Automatic saving

### Integrity

- OCR system integration
- Wafer integrity
- Reference die integrity check on wafer start

### Performance monitoring

- Yield monitoring
- Consecutive bin/fail monitoring
- Auto retest/recovery on consecutive fail
- Retest last known good
- Wafer yield degradation monitoring

### Probe card monitoring

- Touchdown counters
- Unlimited number of probe cards
- Probe card reports
- Probe card limit check during testing, wafer start and/or lot start

### Analysis tool

- Track lot and track wafer
- Composite map pass/fail
- Composite map bin(s)
- Composite map 3D view/zoom/print

### Reporting

- Lot summary
- Extended lot summary (25 wafer maps per page + composite)
- Wafer summary
- Probe card summary
- Probe card performance
- Product recipe
- Control map report
- Composite map

### Customisability

- Extensive application programming interface (API)
- Multiple hooks
- GUI integration (e.g. prober console)
- Complete factory automation
- Wafer identification systems (OCR, barcode, 2D)
- Alarm pole (3 colour and alarm)
- PC-based alignment system (on same PC as SE-PROBE)
- Optical inspection system (PC based)

### Databases

- Log database – system events/errors
- Product recipe – product probe settings
- Production database – production data
- Probe card – probe card counters and limits
- Security – user information and group rights

### Support

- Electroglas 20xx, 3001, 40xx
- KLA 1007E, 1011, 1201
- TEL 19S, 20S, P8, P12
- ISK APM-86, APM-88, APM-90, UF190, UF200, UF300
- All testers (including: Advantest, Agilent, Teradyne, TMT, Eagle Test, SZ, LTX, etc.)

### Interfaces

- GPIB(IEEE-488)
- RS232
- RDP
- TTL
- Direct (TCP/IP)
- API/hooks

Salland Engineering is convinced that we can improve your wafer probers and make your sort process more efficient. Give us the challenge and together we can determine the Return Of Investment.

SE-PROBE the new dimension to wafer probing!

**Salland Engineering** Life is a test



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