QUALITY ASSURANCE

LEADING QUALITY WITH YOU
Leading quality with you
We hone quality to match our customers’ needs and provide continuous QCD service.

1. Quality policy: Leading quality with you

The products of Socionext are utilized in various fields and are playing very important roles in our customers’ products. We reinforce our high-quality and reliable technology that has been developed in the global market and through cooperation with our partner companies to realize qualified products that meet the varying QCD (Quality, Cost, and Delivery) needs of our customers. Additionally, through management of the planning and design stages, we provide optimum quality to our customers.

2. Organization of QA

Socionext has organized itself to maintain and manage quality systems, promote design quality, develop reliability technology, support customer quality, offer feedback from Failure analysis, collaborate with subcontractors, and promote management.

Quality Assurance Division
- Quality System Department
  (Quality/Environment system, Design quality)
- Reliability Assurance Department
  (Reliability Engineering, Customer quality support, Failure analysis)
- Product Quality Department
  (Product review, Subcontractor management)
3. Quality Assurance System

To provide customers with products that match their needs in a timely and continuous planning through design, prototyping, certification, and mass production all the way to fashion, we have established and implemented a system which goes from product the market.

<table>
<thead>
<tr>
<th>Function</th>
<th>Customer</th>
<th>Sales</th>
<th>Customer support</th>
<th>Design Department</th>
<th>Engineering</th>
<th>QA</th>
<th>Subcontractor contact</th>
<th>Logistics</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business unit</td>
<td>Requirements</td>
<td>Sales business units</td>
<td>Customer technical support</td>
<td>Design Department</td>
<td>Engineering</td>
<td>QA</td>
<td>Subcontractor contact</td>
<td>Logistics</td>
<td>Production</td>
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<tr>
<td>Planning stage</td>
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<td></td>
<td>Technology/Test/Package</td>
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<tr>
<td>Design and prototyping stage</td>
<td>Design verification</td>
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<td></td>
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<tr>
<td>Mass production transition stage</td>
<td>Customer evaluation</td>
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<tr>
<td>Product/shipping stage</td>
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<td>Mass production</td>
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</tbody>
</table>

**Legend:**
- PR: Planning Review
- DR: Design Review
- PA: Product Assurance
- Review: Responsible business unit
- Participating business unit
- Other activities: Executing business unit
- Support business unit
- Route:
4. Honing from the source (DR)

Each step at the development process, such as market, research, product planning and development planning is completed with design review before starting mass production. In our quality assurance program, design review consists of six steps: product planning validity review (PR), product development plan review (DR0), product design validity review (DR1), mass production transition validity review (DR2), mass production start review (DR3), and pre-shipment audit (PA). We place particular emphasis on the product planning validity review (PR) and product development plan review (DR0). By identifying problems at an earlier stage, we are able to resolve issues to hone quality from the source. Also, we optimize our review contents to ensure that nothing is left out.

**Table:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR</td>
<td>Product planning validity review</td>
<td>We consider the target quality and target reliability to be used for the new product and confirm product development with the agreement of all related offices.</td>
</tr>
<tr>
<td>DR0</td>
<td>Product development plan review</td>
<td>We clarify the resources and work required to develop the new product and establish a plan that accounts for everything.</td>
</tr>
<tr>
<td>DR1</td>
<td>Product design validity review</td>
<td>Completing the planned design work, we check that the basic design matches the customer’s requirements.</td>
</tr>
<tr>
<td>DR2</td>
<td>Mass production transition validity review</td>
<td>We confirm the necessary specifications for mass production prototyping based on results obtained from prototype evaluation.</td>
</tr>
<tr>
<td>DR3</td>
<td>Mass production start review</td>
<td>We use the mass production prototype to evaluate the characteristics of the product and confirm the necessary specifications and facilities for mass production.</td>
</tr>
<tr>
<td>PA</td>
<td>Pre-shipment</td>
<td>We conduct feedback based on initial flow management results and in-process fault information.</td>
</tr>
</tbody>
</table>

5. Subcontractor management

To assure optimal quality for fabless manufacturers, we build close relationships of cooperation with domestic and overseas foundries and partner companies that have the optimal technology. Through this, we achieve quality management equivalent to in-house fabs.

- **<Quality Control and Improvement ITEMS>**
  - QA system review by Audit
  - Quality Meeting
  - Supplier Performance Review
  - Continual Improvement
  - Corrective and Preventive Action
  - Yield Improvement
- **<Control ITEMS>**
  - Quality Performance result
  - Inspection results
  - Reliability data
  - Production Performance result

Information shared data monitoring, speedy response (Investigation, Failure analysis), from data acquisition to prompt feedback in the communication. Subcontractor production faults and process changes managed through change management.
6. Change management

When changing design and processes, the QA and related business units, which draft the changes, review the details. They perform reliability evaluation of critical characteristics, and compare it to the current product and strictly check that there is no discrepancy in quality or reliability. The system is such that major changes have to be finally approved by the QA business units. The customer is notified of changes in quality, reliability, electrical characteristics, and appearance before changes are made.

7. Traceability

We employ fabrication management system so that manufacturing history can be traced if a quality problem arises in the market or a process. Products are marked upon shipping to make visible what they are and what their manufacturing history is.

■ Marking example

![Marking example diagram]

- **SOCIONEXT SC XXXXX**
  - **Part number**
  - **Reference number** (management code)
  - **Code for week of manufacture**
  - **Year of manufacture: last two digits. 2015: “15”**

- **Main traceable details:**
  - Manufacturing history
  - PCM/measurement results
  - Primary test results
  - Wafer appearance inspection results
  - Inspection results
  - Final test results
  - Shipping inspection results
  - Etc.
8. Failure Analysis

We thoroughly analyze products with defects found by customers. We identify the cause, address the problem, and prevent recurrence of the defect. We also conduct fault analysis and improvement for products with defects found in evaluation during development or in process faults at subcontractors.

![Analysis photos]

- Operate defect
- Defect in evaluation

- Defect in initial stages
- Fault at subcontractor

Use Failure Analysis to identify cause, prevent recurrence, and improve quality

<table>
<thead>
<tr>
<th>Defect point identification</th>
<th>Equipment name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission microscope</td>
<td></td>
</tr>
<tr>
<td>OBIC (Optical Beam Induced Resistance Change)</td>
<td></td>
</tr>
<tr>
<td>OBIC (Optical Beam Induced Current)</td>
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<tr>
<td>LSI tester</td>
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<tr>
<td>Beam tracer</td>
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<tr>
<td>TDR (Time Domain Reflectometry)</td>
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<tr>
<td>Manual prober</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Grinding/etching</th>
<th>Equipment name</th>
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</thead>
<tbody>
<tr>
<td>Plasma dry etcher</td>
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<tr>
<td>Grinding machine</td>
<td></td>
</tr>
<tr>
<td>Draft (acid, HF, organic)</td>
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</tr>
<tr>
<td>Precision grinding system (CMP machine)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Observation</th>
<th>Equipment name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEM + element analysis machine (EON)</td>
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<tr>
<td>FIB (focused ion beam machine)</td>
<td></td>
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<tr>
<td>X-ray observation machine</td>
<td></td>
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<tr>
<td>SAT (ultrasonic test machine)</td>
<td></td>
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<tr>
<td>Optical microscope</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Other</th>
<th>Equipment name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermomax</td>
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<tr>
<td>Semiconductor parameter analyzer</td>
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<tr>
<td>Laser opener</td>
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<tr>
<td>Plastic mold opener</td>
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</tbody>
</table>

- FIB (focused ion beam machine)
- Scanning electron microscope
- Beam tracer
- SAT (ultrasonic test machine)
9. Customer quality support

Socionext provides detailed support in order to supply our customers stably with products in which they can feel satisfied. Specifically, we thoroughly analyze products with defects found by the customer, identify the cause, take counter-measures to prevent recurrence of the defect, and report on the status and counter-measures. We always put great effort into our analysis data for products with defects found by the customer, as it directly guides our quality improvement.

10. Environmental activities

The Socionext aims to represent a business that contributes to a rich and sustainable low-carbon society in harmony with local communities. Our environmental efforts start from the environmental awareness of each one of our staff as we work with customers and communities to resolve environmental issues. In developing and supplying environmentally friendly devices and solutions that save energy and space, we contribute to reducing the environmental load of our customers’ products.

■ Product environmental support

The Socionext advances product design and development that is friendly to the environment, through conformance to regulations. By developing energy-saving products and supplying products that conform to various national laws and regulations, we deliver you peace of mind.

The products of Socionext and the packing and packaging materials comply with the EU REACH regulations**, EU RoHS directive**, China RoHS directive*** and other laws and regulations (excluding exceptions for applying usage prohibition measures):

**1. The regulations in the EU with the purpose of registering, evaluating, authorizing and restricting chemicals (Registration, Evaluation, Authorisation and Restriction of Chemicals)

2. The directive that prohibits the use of specific hazardous substances in electronic and electrical equipment sold in the EU (Restriction of Hazardous Substances)

3. The directive that prohibits the use of specific hazardous substances in electronic and electrical equipment sold in the People’s Republic of China (Regulatory ordinance preventing pollution from the production of electronic and information products)

11. ISO certification structure

We acquired ISO9001 certification and use the production lines of partner businesses with ISO/TS16949 certification, an automotive industry sector standard, while readying our system for global expansion. In addition, we acquired ISO14001 certification, an international standard for environmental management systems (EMS), and continuously implement initiatives for reducing environmental burdens.
12. Locations in Japan and Abroad

Our Worldwide Support Organization Provides High Quality Service to Customers

- Global HQ
- Business Unit HQ
- Group Company HQ
- Design, Development and Sales Offices
- Liaison office

**JAPAN**
- Sendai
- Akiunno
- Headquarters (Shin-Yokohama)
- Kozoji, Mie
- Kyoto
- Osaka

**ASIA**
- Seoul
- Shanghai
- Chengdu
- Taipei
- Hong Kong
- Shenzhen
- Singapore

**EUROPE**
- Braunschweig
- Munich
- Istanbul
- Lima
- Langen
- Maidenhead

**NORTH AMERICA**
- Sunnyvale (CA)
- Milpitas (CA)
- Nashville (TN)