Consumer Physics – SCiO Molecular Sensor

Pocket handheld spectrometer

MEMS/Imaging report by Stéphane ELISABETH

February 2017
Views & Dimensions

Front view.

Back view.

Total Weight:
Module Opening

Note: The Front Carter part is removed by unscrewing screws (above circled in blue)

Battery removal removal (back view)
Electronic Board – Top Side – Main Components Markings
Spectrometer Head – Package View and Dimensions

- Dimensions of the Spectrophotometer without Flex: 18.6 mm x 12.7 mm x 6.8 mm

Module with flex – Top View

Module with flex – Back View

Module – Side View

Module – Global View
Spectrometer Head – Spectrometer Module – Filter Array Cross-Section

- The filter array corresponds to a filter developed by [Insert Development Name].

**Spectrometer Head – Top View**

**Filter Array Cross-Section – SEM view**

**Graphical Representation of a **

**Filter Array – Top View – Optical view**
The polymer used to fixed the glass plate and the filter array is a [unknown to be identified].
Spectrometer Head – Spectrometer Module – CIS View & Dimensions

Die Area: _mm²
(_mm x _mm)

Nb of PGDW per _inch wafer: _

Pad number: _

Connected: _

Pixel array: _mm²
(_mm x _mm)

CIS resolution: _Mp

⇒ Pixel area: _μm²
⇒ Pixel size: _μm

Die marking

Image Sensor Die – Top view
• RAM is present on the logic circuit.
• RAM cell size: \( \mu \text{m}^2 \)
Main Steps of Economic Analysis

- We perform the economic analysis of the Image Sensor front-end with the IC Price+ tool.
- We perform the economic analysis of the microlenses with the MEMS CoSim+ tool.
The **Assembly cost** for the Filter & Lenses array Module ranges from according to yield variations.

The largest portion of the manufacturing cost is due to the **Filter Module Cost**.

We estimate a gross margin of 40% for **Filter & Lenses Array Module** which results in a **Filter & Lenses Array Module price ranging from**
### Electronic Board - B.O.M. Cost

<table>
<thead>
<tr>
<th>Type</th>
<th>Part reference</th>
<th>Article qty</th>
<th>Description</th>
<th>Package</th>
<th>Pin nb</th>
<th>Manufacturer</th>
<th>Data sheet</th>
<th>Side</th>
<th>Unit cost</th>
<th>Total cost</th>
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<tr>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
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<td>0.1580</td>
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</tr>
</tbody>
</table>

There is a total of **5** components on the Electronic Board. The material cost of the Electronic Board is estimated at **0.353 USD**.
Related report

How has Consumer Physics patented its SCiO molecular sensor?
Released in March 2017


About Knowmade

Headquartered in Sophia Antipolis, France, Knowmade is a Technology Intelligence and IP Strategy consulting company providing patent search, patent analysis, patent valuation, IP landscape, scientific literature landscape, technology scouting, technology transfer and technology tracking.

Its service offer consists of custom studies, on-demand tracking, analysis reports and strategy consulting.

Knowmade combines information search services, scientific expertise, powerful analytics and visualization tools, and proprietary methodologies for analyzing patents and scientific information. With a solid focus on Microelectronics, Compound Semiconductors, LED, MEMS, Nanotechnology and Biotechnology, Knowmade supports research laboratories, industrial companies and investors in their business development.
**Consumer Physics SCiO Molecular Sensor Patent-to-Product Mapping**

*How has Consumer Physics patented its SCiO molecular sensor?*

**REPORT OUTLINE**
- March 2017
- PDF (80+ slides)
- €3,990 (corporate license)
- €5,990 (bundle price)

**KEY FEATURES OF THE REPORT**
- **Essential IP analysis** of Consumer Physics’ patent portfolio including:
  - Time evolution of patent publications and countries of patent filings
  - Current legal status of patents
  - Citation network and competitive IP networks
  - Inventor identification
- **Deep insight on technology data**, including teardown analysis, of the SCiO spectrometer’s components
- **Key patents related to the SCiO spectrometer’s features and held by Consumer Physics**

**OBJECTIVES OF THE REPORT**
- Understand Consumer Physics’ IP strategy
- Identify **key patents** held by Consumer Physics, and related to product features
- Understand the **IP environment** of Consumer Physics’ portfolio
- Find the **link between patented technological solutions and the marketed product**

**RELATED REPORTS**
- SCiO Molecular Sensor from Consumer Physics: Mobile Spectrometer Dongle - Reverse costing and technology analysis

**CONSUMER PHYSICS, PIONEER OF THE POCKET-SIZED MOLECULAR SENSOR**

Consumer Physics Inc. develops and distributes molecular sensors, marketing its product under the SCiO brand name. According to Consumer Physics, the SCiO spectrometer is the world’s first pocket size molecular sensor. The company had over 13,000 backers on Kickstarter and ended up raising over $2.7 million.

Consumers can use SCiO to scan objects including fruit, vegetables, dairy food, meat, fish and medications. They can even scan their own bodies to measure total body fat. The SCiO app also includes a DIY applet that allows anyone to scan materials of their choosing and analyze the difference between their molecular identities.

Consumer Physics has won numerous awards including an ‘Enabled by Optics’ award from OSA, The Optical Society, in 2016, the World Economic Forum Technology Pioneers Award 2015, the United Nations Netexplo Award 2015 and was a CES Innovation Honoree in 2016. SCiO has regularly appeared in top ‘products to watch’ lists on Forbes, CNN, and Fortune, and has been covered numerous times by the media on television, in print and online. But what technologies are behind Consumer Physics’ success and what are the main features claimed by its patents?

**A CLEAR LINK BETWEEN PRODUCTS AND PATENTS**

Combining the data obtained by System Plus Consulting’s teardown of the SCiO molecular sensor with Knowmade’s IP analysis, this report highlights IP related to this pocket-sized spectrometer. Moreover, it analyzes Consumer Physics’ patent portfolio in order to understand the company’s IP strategy and to identify main IP competitors.

**Benefit from KnowMade and System Plus Consulting’s combined added value, highlighting product features and related patents**
**PATENT-TO-PRODUCT MAPPING**

System Plus Consulting tore down the SCiO molecular sensor. Knowmade then compared the features this revealed to Consumer Physics’ IP portfolio. The selected features are mainly related to the spectrometer package, spectrometer module, illumination module and temperature sensor module. The report identifies key patents held by Consumer Physics related to these technology features. For each product feature, we have established links between patented technologies, including legal status, and the product.

**DEEP TECHNOLOGY ANALYSIS**

System Plus Consulting has analyzed the technology using optical microscopy, scanning electron microscopy and energy-dispersive X-ray spectroscopy. Knowmade has combined this with deep IP study, helping to understand the architecture and operation of the SCiO molecular sensor. For each key feature, we have selected the main claims and relevant parts of the description for highlighting the patented technology used in the handheld spectrometer.

**PATENT PORTFOLIO ANALYSIS AND IP COMPETITIVE ENVIRONMENT**

We have analyzed Consumer Physics’ patent portfolio, including publication trends, country of publication and main inventors, and identified IP competitors. Consumer Physics’ portfolio is recent and cited only by four assignees. Consumer Physics itself cites 109 patent families, representing around 90 assignees. Combining the citation network with analysis of the content of citing/cited patents, we have ranked Consumer Physics’ IP competitors of to establish a general view of the IP competitive environment.

**ASSIGNEES CITED IN THE REPORT INCLUDE:**

VERIFOOD, NANOLAMBDIA, DIGIMARC, APPLE, CHEMIMAGE, HP, PHILIPS, RARE LIGHT, SHARP, TEXTRON SYSTEMS, VIAVI SOLUTIONS, THERMO SCIENTIFIC PORTABLE ANALYTICAL INSTRUMENTS, CANON
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ABOUT KNOWMADE
Headquartered in Sophia Antipolis, France, Knowmade is a Technology Intelligence and IP Strategy consulting company. We provide Patent Search, Patent Analysis, Patent Valuation, IP Landscape, Scientific Literature Landscape, Technology Scouting, Technology Transfer and Technology Tracking. Our service offer consists of custom studies, on-demand tracking, analysis reports and strategy consulting. We combine information search services, scientific expertise, powerful analytics and visualization tools, and proprietary methodologies for analyzing patents and scientific information. With a solid focus on Microelectronics, Compound Semiconductors, LED, MEMS, Nanotechnology and Biotechnology, Knowmade supports research laboratories, industrial companies and investors in their business development. http://www.knowmade.fr

ABOUT SYSTEM PLUS CONSULTING
Headquartered in Nantes, France, System Plus Consulting specializes in technology and cost analysis of electronic components and systems in the fields of Integrated Circuits, Power Devices and Modules, MEMS and Sensors, LED, Image Sensors, Packaging including wafer level, Electronic Boards and Systems. The company offers custom reverse costing analyses, standard reverse costing reports and costing tools. These analyses are used by Purchasing Departments to measure their suppliers’ cost structure, R&D Departments to confirm technological choices depending on their impact on costs, and Benchmarking/Marketing Departments to monitor the products on the market. http://www.systemplus.fr
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