Open Source Hardware

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State of the Union

EC President von der Leyen's address

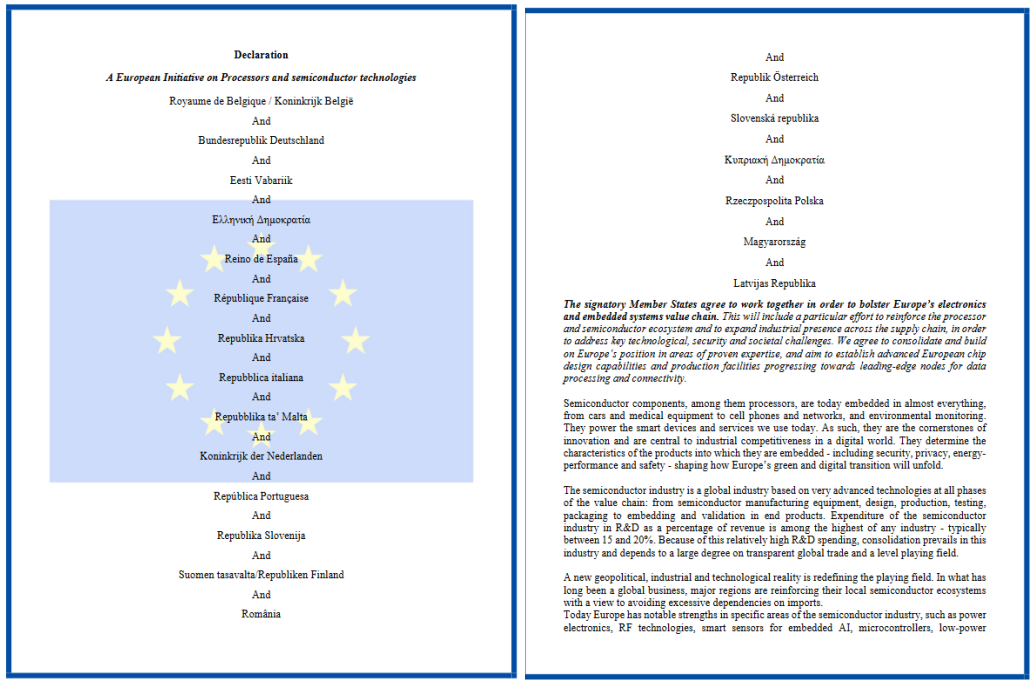
16th September 2020

"Building the world we want to live in:
A Union of vitality"

"*we want the European industry to develop our own next-generation microprocessor that will allow us to use the increasing data volumes energy-efficient and securely*."

European Commission

Processors & Semiconductors declaration



Declaration

A European Initiative on Processors and semiconductor technologies

Royaume de Belgique / Koninkrijk België

And

Bundesrepublik Deutschland

And

Eesti Vabariik

And

Ελληνική Δημοκρατία

And

Reino de España

And

République Française

And

Republika Hrvatska

And

Repubblica italiana

And

Repubblika ta' Malta

And

Koninkrijk der Nederlanden

And

República Portuguesa

And

Republika Slovenija

And

Suomen tasavalta/Republiken Finland

And

România

And

Republik Österreich

And

Slovenská republika

And

Κυπριακή Δημοκρατία

And

Rzeczpospolita Polska

And

Magyarország

And

Latvijas Republika

The signatory Member States agree to work together in order to bolster Europe's electronics and embedded systems value chain. *This will include a particular effort to reinforce the processor and semiconductor ecosystem and to expand industrial presence across the supply chain, in order to address key technological, security and societal challenges. We agree to consolidate and build on Europe's position in areas of proven expertise, and aim to establish advanced European chip design capabilities and production facilities progressing towards leading-edge nodes for data processing and connectivity.*

Semiconductor components, among them processors, are today embedded in almost everything, from cars and medical equipment to cell phones and networks, and environmental monitoring. They power the smart devices and services we use today. As such, they are the cornerstones of innovation and are central to industrial competitiveness in a digital world. They determine the characteristics of the products into which they are embedded - including security, privacy, energy-performance and safety - shaping how Europe's green and digital transition will unfold.

The semiconductor industry is a global industry based on very advanced technologies at all phases of the value chain: from semiconductor manufacturing equipment, design, production, testing, packaging to embedding and validation in end products. Expenditure of the semiconductor industry in R&D as a percentage of revenue is among the highest of any industry - typically between 15 and 20%. Because of this relatively high R&D spending, consolidation prevails in this industry and depends to a large degree on transparent global trade and a level playing field.

A new geopolitical, industrial and technological reality is redefining the playing field. In what has long been a global business, major regions are reinforcing their local semiconductor ecosystems with a view to avoiding excessive dependencies on imports.
Today Europe has notable strengths in specific areas of the semiconductor industry, such as power electronics, RF technologies, smart sensors for embedded AI, microcontrollers, low-power

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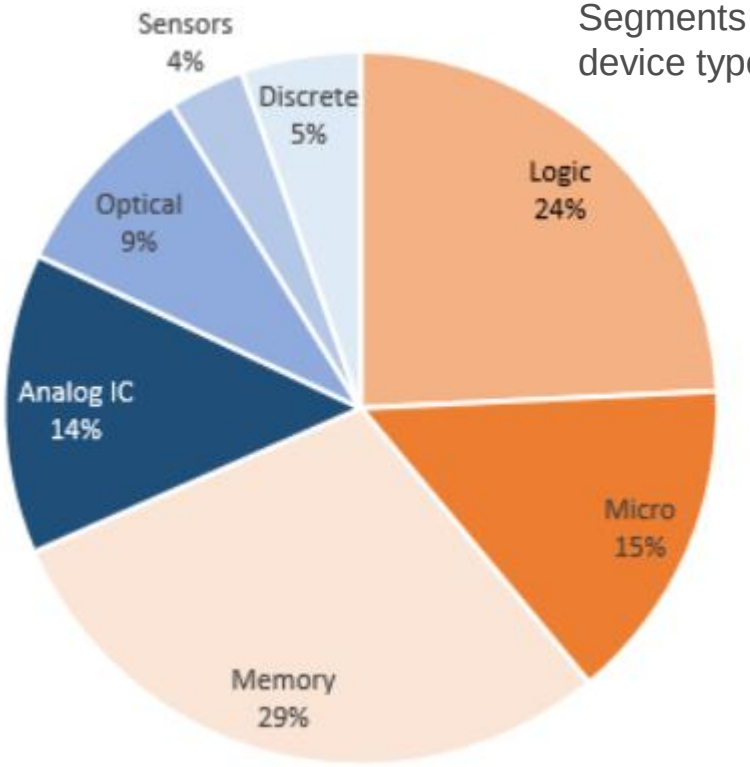
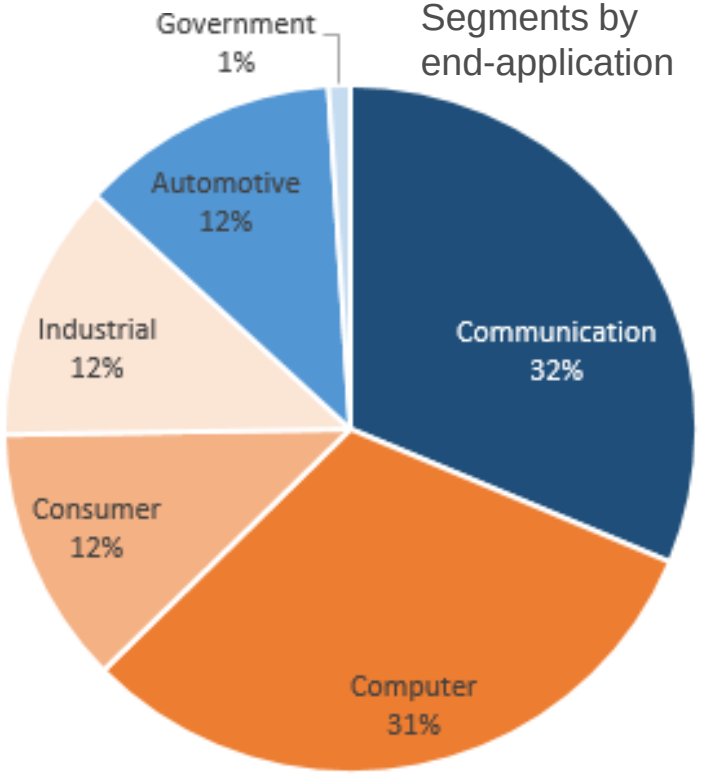
European Commission

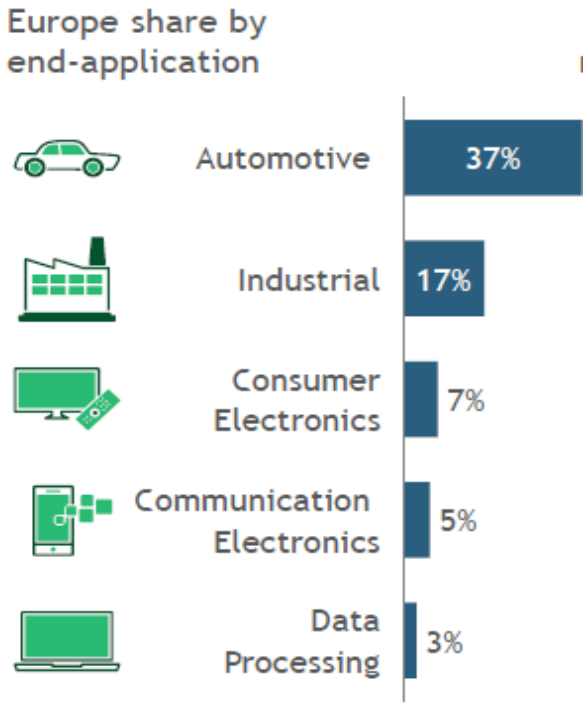
Semiconductor market segments

Segments by device type



Segments by end-application





- Micro = MPU 71% +MCU 25% +DSP 4%

Reinforce the European processor ecosystem

- Need for an alternative processor ecosystem due to:
  - uncertainty about established processor IP providers,
  - geopolitics,
  - creation of healthy competition in processor IP

- Clear and increasing interest for open source hardware and RISC-V solutions in Europe

Reinforce the European processor ecosystem

- Open source hardware IP:
  - Most important inroads already in the entry-level segment
  - Mid-range devices are now attracting interest and entries worldwide
  - High-end processor/accelerator segment making first steps

Vertical	Entry-level	Mid-range	High-end / AI
Automotive	Embedded controllers, ultra-low power	Real-time / safety-critical: Vision, motion control, engine management, safety, infotainment	ADAS/autonomous driving processors, sensor fusion
Industrial automation	Embedded controllers: ultra-low power, smart sensing	Embedded processors, sensor fusion; edge-cloud management	High-performance processors with AI acceleration, edge server processors
Communication	Baseband connectivity for wireless communication 5G/6G	Edge server processors, 5G/6G private networks, RF mgmt	5G/6G Base station front-end processors, V-RAN
Data infrastructure		Edge AI node processor	Processors for edge/fog servers; CPUs and accelerators (servers, HPC)
Other (Healthcare, CE, Defence, Aerospace…)	Embedded controllers in wearables and healthcare devices	Embedded processors	High-end Processors, AI

Reinforce the European processor ecosystem

Some points for discussion…

- Creation of a complete processor IP ecosystem is a long-term endeavour
- Ensure availability of a sustainable and reliable open hardware IP supply
- Maturity of the IP components for industrial use

Reinforce the European processor ecosystem

Some points for discussion…

- Scalability (over various performance/power ranges) and interoperability of processor IP offering is crucial
- Cover various market segments from low-end to high-end
- Exploit the commonalities in the processors' development for the different markets -> design "families" of processors
- Accelerator-type of extensions for specific workloads

Reinforce the European processor ecosystem

Some points for discussion …

- Well-maintained cutting-edge open source *infrastructure* to support the development of processors
- Moving from the IP to the complete processor chip requires different investments for different markets (IoT vs high-end)
- Europractice-type of service for open source hardware chips?

Key Digital Technologies Joint Undertaking

2021-2027 budget

European Union: 1.8 billion euros
Participating States: 1.8 billion euros
Industry Associations: 3.6 billion euros

Start: Q4 2021

- Reinforce Europe's strategic autonomy in electronic systems and components to support future needs of vertical industries and the economy at large
- Establish EU scientific excellence and innovation leadership in emerging components and systems technologies including activities related to low TRLs and promote the active involvement of SMEs
- Ensure that components and systems technologies address Europe's societal and environmental challenges.

European Commission

Objectives of the workshop

- identify research challenges on open-source hardware that could be included as Work Programme topics in the first calls of the KDT JU.
- setup a working group to define a European high-level strategy for an open-source hardware ecosystem, addressing:
  - objectives,
  - scope,
  - mapping of current activities,
  - a draft technology implementation roadmap
  - investments/resources/activities needed.

Thank you

European Commission