Next Page

OMB Control Number: 0694-0143
Expiration Date: March 31, 2022

REQUEST FOR PUBLIC COMMENT: RISKS IN THE SEMICONDUCTOR PRODUCT SUPPLY CHAIN

This form is intended to be used to submit comments on challenges currently facing the semiconductor product supply chain. All comments are invited, with this form designed to facilitate submission of information from sellers of integrated circuits (in Sections 2 through 5) and purchasers of integrated circuits or related products (in Sections 6 through 8).

Indicate here if this form contains business confidential information, or if all information contained throughout this form is public:	**PUBLIC**		

Those submitting a form containing business confidential information will need to submit a non-confidential version of the same form that does not contain the business confidential information.

A.	Organization Name	Anonymous - A&D manufacturer
	Street Address	
	City	
	State	
	Zip Code	
	Country	
	Website	

From the list below, identify your organization's primary and additional participation in the semiconductor product supply chain. Please mark all applicable rows.

	Segment		Participation
B.	Integrated Circuit Design		
	Front End Fabrication		
	Back End/Assembly Test/Packaging		
	Electronic Manufacturing Services / Printed Circuit Board Assembly		
	IC Distributor		
	Equipment Supplier		
	Material Supplier		
	Electronic Component Supplier		Additional
	Intermediate or End User of Semiconductor Products		Primary
	Other	(specify here)	

Next Step:
Sections 2 through 5 of this form are intended to be filled out by organizations that have primary or additional participation in the following segments: Integrated Circuit Design, Front End Fabrication, Back End/Assembly Test/Packaging, Electronic Manufacturing Services / Printed Circuit Board Assembly, and IC distributor.

Sections 6 through 8 of this form are intended to be filled out by organizations that purchase integrated circuits.

If your organization’s responses do not reasonably fit in the above sections, please provide comments in Section 9.

BURDEN ESTIMATE AND REQUEST FOR COMMENT

Public reporting burden for this collection of information is estimated to average 4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information to BIS Information Collection Officer, Room 6883, Bureau of Industry and Security, U.S. Department of Commerce, Washington, D.C. 20230, and to the Office of Management and Budget, Paperwork Reduction Project (OMB Control No. 0694-0143), Washington, D.C. 20503.

Previous Page Next Page

Table of Contents

Section 2: Semiconductor Providers - Product Capabilities

A. Indicate the technology nodes (in nanometers), semiconductor material types, and device types which this organization is capable of providing (design and/or manufacture). A blank response is counted as "No Capability".

Technology Node (nm)		Semiconductor Material Type		Device Type (Organizations participating in the Electronic Manufacturing Services / Printed Circuit Board Assembly segment should list device types under "Other")	
6,000 - 10,000		Amorphous Silicon		Analog/Linear Technologies	
3,000 - <6,000		Bulk Silicon		Digital Logic Technologies	
1,500 - <3,000		Silicon on Insulator		Digital Signal Processors	
1,000 - <1,500		Silicon Germanium		Field Programmable Gate Arrays	
800 - <1,000		Silicon on Sapphire		Structured ASICs	
500 - <800		Silicon Carbide		Standard Cell ASICs	
350 - <500		Gallium Arsenide		Custom ASICs	
250 - <350		Gallium Nitride		3D/2.5 ASICs	
180 - <250		Indium Phosphide		System-on-Chip	
130 - <180		Antimonides		Other Processors	
90 - <130		Organic Technologies		Mixed Signal Technologies	
65 - <90		Carbon Based Technologies (e.g. nanotubes)		Nonvolatile Memory	
45 - <65		Superconducting Materials		SRAM	
32 - <45		Other (specify here)		DRAM	
28 - <32				MEMS Technologies	
14 - <28				Optical/Photonic Technologies	
7 - <14				MMIC Technologies	
<7				Other RF Technologies	
				Other (specify here)	

B. Point of Contact

Name	Title	Phone Number	E-mail	State	Country

Clarifying Comments (if applicable):	

Previous Page Next Page

This response was identified as PUBLIC on the Organization Information tab.

Section 3: Semiconductor Providers - Integrated Circuit Production

For any integrated circuits you produce--whether fabricated at your own facilities or elsewhere--identify the primary integrated circuit type, product type, relevant technology nodes (in nanometers), and actuals or estimates of annual sales for the years 2019, 2020, and 2021 based on anticipated end use.

Integrated Circuit Type						Integrated Circuit Production				
	Primary IC Type	Product Type	Primary Technology Node (nm)	Smallest Technology Node (nm)	Largest Technology Node (nm)			2019	2020	2021 (Projected)
Total						Total	$ (millions) Units Capacity (Units)			
Aerospace						Aerospace	% of Total $			
Automotive						Automotive	% of Total $			
Healthcare/Medical						Healthcare/Medical	% of Total $			
Industrial						Industrial	% of Total $			
IT/Computers - Personal and Consumer Products						IT/Computers - Personal and Consumer Products	% of Total $			
IT/Computers - Servers						IT/Computers - Servers	% of Total $			
Mobile Devices						Mobile Devices	% of Total $			
Network Infrastructure						Network Infrastructure	% of Total $			
Other (specify here)						Other	% of Total $			
Clarifying Comments (if applicable):										

Previous Page

Next Page

This response was identified as PUBLIC on the Organization Information tab.

Section 4a: Semiconductor Providers - Products

For the semiconductor products that your organization sells, identify those with the largest order backlog. Then for each product, identify the product attributes, sales in the past month, and location of fabrication and package/assembly. The total should account for all semiconductor products that your organization sells, not only the sum of those listed with the largest order backlogs.
This information will carry over into subsequent questions.

	Product					Most Recent Monthly Sales		Production				
	Product Name	Integrated Circuit Type	Material	Node (nm)	Product Description	$ (millions)	Units	Fabricated By	Fab Location	Packaged/Assembled By	Packaging/Assembly Location	Distributed By
	Total (all semiconductor products, including those not listed below)											
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

Clarifying Comments (if applicable):	

Previous Page

Next Page

This response was identified as PUBLIC on the Organization Information tab.

Section 4b: Semiconductor Providers - Customers

For the top semiconductor products identified in Section 4a, list each product's top three current customers and the estimated percentage of that product's sales accounted for by each customer.

	Product Name (auto-generated from 4a)	Customer 1			Customer 2			Customer 3		
		Customer Name or Industry	Customer Location (City, State/Country)	% of Sales	Customer Name or Industry	Customer Location (City, State/Country)	% of Sales	Customer Name or Industry	Customer Location (City, State/Country)	% of Sales
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Clarifying Comments (if applicable):	

Previous Page Next Page

This response was identified as PUBLIC on the Organization Information tab.

Section 4c: Semiconductor Providers - Product Lead Times

For each phase of the production process, identify whether your organization carries out the step internally or externally. For the top semiconductor products identified in Section 4a, estimate each product's (a) 2019 lead time and (b) current lead time (in days), both overall and for each phase of the production process. Provide an explanation of any current delays or bottlenecks.

	Product Name (auto-generated from 4a)	Total Lead Time		Design phase		Acquisition of manufacturing inputs		Front End Manufacturing Process		Back End manufacturing process (ATP)		Electronic Manufacturing Services / Printed Circuit Board Assembly		Time in Outbound Transit/Shipping		Other		Explanation of Delays/Bottlenecks
	Internal/External --->																	
		2019	Current	2019	Current	2019	Current	2019	Current	2019	Current	2019	Current	2019	Current	2019	Current	
	Total (all semiconductor products)																	
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Clarifying Comments (if applicable):	

Previous Page Next Page

This response was identified as PUBLIC on the Organization Information tab.

Section 4d: Semiconductor Providers - Product Inventories

For the top semiconductor products identified in Section 4a, list each product's 2019 and current inventory (in days), for finished product, in-progress product, and inbound product. Provide an explanation for any changes in inventory practices.

	Product Name (auto-generated from 4a)	Finished Inventory		In-Progress Inventory		Inbound Inventory		Explanation of Inventory Changes
		2019	Current	2019	Current	2019	Current	
	Total (all semiconductor products)							
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
Clarifying Comments (if applicable):								

This response was identified as PUBLIC on the Organization Information tab.

Section 5: Semiconductor Providers - Disruptions

A. What are the primary disruptions or bottlenecks that have affected your ability to provide products to customers in the last year?

	Disruption/Bottleneck	Supplier of Delayed Input	Primary Product Impacted (from Section 4a)	Explanation
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

B.

What is your organization's book-to-bill ratio for the past three years?	2019	Explanation of any changes:	
	2020		
	2021		
If the demand for your products exceeds your capacity, what is the primary method by which your organization allocates the available supply?		Explanation:	
Does your organization have available capacity?		If Yes, what is preventing the filling of that capacity?	
Is your organization considering increasing its capacity?		If Yes, in what ways, over what timeframe, and what impediments exist to such an increase?	
What factors does your organization consider when evaluating whether to increase capacity?			

C.

Has your organization changed its material and/or equipment purchasing levels or practices in the past three years?	Explanation:	
What single change (and to which portion of the supply chain) would most significantly increase your ability to supply semiconductor products in the next six months?		

Clarifying Comments (if applicable):	

This response was identified as PUBLIC on the Organization Information tab.

Section 6: Semiconductor Product Consumers

A. From the list below, identify the market segments that your organization currently serves:

Market Segment		Primary/Secondary/Other	Defense/Commercial
Aerospace		Primary	Both
Automotive			
Healthcare/Medical			
Industrial			
IT/Computers - Personal and Consumer Products			
IT/Computers - Servers			
Mobile Devices			
Network Infrastructure			
Other	(specify here)		
Other	(specify here)		

B. Provide a general description of the types of products your organization sells that rely on semiconductors:

We provide aerospace and defense products and systems that rely on semiconductors.

Clarifying Comments (if applicable):	

Previous Page Next Page

This response was identified as PUBLIC on the Organization Information tab.

Section 7a: Consumers - Inputs

For the semiconductor products that your organization purchases, identify those that present the greatest challenge for your organization to acquire. Then for each product, identify the product attributes and average monthly purchases in 2019 and 2021, as well as average monthly orders in 2021. Then estimate the quantity of each product your organization would purchase in the next six months barring any production constraints, as well as the amount your organization expects to actually be able to purchase.
This information will carry over into subsequent questions.

	Product					2019 Average Monthly Purchase		2021 Average Monthly Purchase		2021 Average Monthly Orders		Ideal Monthly Purchase Quantity, Next 6 Months		Expected Monthly Purchase Quantity, Next 6 Months	
	Supplier	Product Description	Semiconductor Type	Material	Node	$ (millions)	Units	$ (millions)	Units	$ (millions)	Units	$ (millions)	Units	$ (millions)	Units
	Total (all semiconductor products)														
1	Xilinx	Military, Industrial and Commercia	Field Programmable Gate Arr	Bulk Silicon	>45nm - 14nm	$5.00	19000+								
2	Microchip	Military, Industrial and Commercia	Field Programmable Gate Arr	Bulk Silicon	>45nm - 14nm	$4.00	66000+								
3	Intel (Altera)	Military, Industrial and Commercia	Field Programmable Gate Arr	Bulk Silicon	>45nm - 14nm	$2.00	30+								
4	Micron	Memory devices	DRAM	Bulk Silicon	>45nm - 14nm	$1.00	18000+								
5	Analog Devices	Commercial, Military and Space A	Analog/Linear Technologies	Bulk Silicon	>45nm - 14nm	$4.00	17000+								
6	Texas Instruments	Commercial, Military and Space A	Digital Logic Technologies	Bulk Silicon	>45nm - 14nm	$3.00	15000+								
7															
8															
9															
10															

Clarifying Comments (if applicable):	

This response was identified as PUBLIC on the Organization Information tab.

Section 7b: Consumers - Input Lead Times and Inventory

For each of the top semiconductor products identified in Section 7a, estimate each product's lead times (between when your organization places the order and receives the order) and your organization's inventory for (a) 2019 and (b) currently (in days). Provide an explanation of any current delays or bottlenecks.

	Supplier Product (auto-generated from 7a)	Lead Time		Inventory		Explanation of Delays/Bottlenecks and Changes in Inventory Practices
		2019	Current	2019	Current	
	Total (all semiconductor products)					
1	Xilinx - Military, Industrial and Commercial Grade FPGAs	22 weeks	52 weeks+			Bottlenecks: wafer die from large OEM's like TSMC, also delays with substrate and packaging suppliers. Inventory is limited, we buy based on contract funds
2	Microchip - Military, Industrial and Commercial Grade FPGAs, Analog & Linear Ics	26 weeks	52 weeks+			Bottlenecks: wafer die from large OEM's like TSMC, also delays with substrate and packaging suppliers. Inventory is limited, we buy based on contract funds
3	Intel (Altera) - Military, Industrial and Commercial Grade FPGAs	24 weeks	52 weeks+			Bottlenecks: wafer die from large OEM's like TSMC, also delays with substrate and packaging suppliers. Inventory is limited, we buy based on contract funds
4	Micron - Memory devices	15 weeks	44 weeks+			Bottlenecks: wafer die from large OEM's like TSMC, also delays with substrate and packaging suppliers. Inventory is limited, we buy based on contract funds
5	Analog Devices - Commercial, Military and Space Analog and Digital Ics	17 weeks	50 weeks+			Bottlenecks: wafer die from large OEM's like TSMC, also delays with substrate and packaging suppliers. Inventory is limited, we buy based on contract funds
6	Texas Instruments - Commercial, Military and Space Analog and Digital Ics	20 weeks	52 weeks+			Bottlenecks: wafer die from large OEM's like TSMC, also delays with substrate and packaging suppliers. Inventory is limited, we buy based on contract funds
7						
8						
9						
10						
	Clarifying Comments (if applicable):					

Previous Page Next Page

This response was identified as PUBLIC on the Organization Information tab.

Section 8: Consumers - Supply Chain Disruptions

A. What are the primary disruptions or bottlenecks that have affected your ability to provide products to customers in the last year?

	Disruption/Bottleneck	Primary Semiconductor Input Impacted (from Section 7a)	Supplier of Delayed Input	Your Organization's Primary Product Impacted	Explanation
1	Schedule delays - COVID related	Xilinx - Military, Industrial and Commercial Grade FPGAs	TSMC, Samsung, other raw m	Printed Cicuit Boards supporting major end items	
2	Schedule delays - COVID related	Microchip - Military, Industrial and Commercial Grade FPGAs, Analog & Linear Ics	TSMC, other raw material sup	Printed Cicuit Boards supporting major end items	
3	Schedule delays - COVID related	Intel (Altera) - Military, Industrial and Commercial Grade FPGAs	TSMC, Intel, other raw materia	Printed Cicuit Boards supporting major end items	
4	Schedule delays - COVID related	Micron - Memory devices	Micron	Printed Cicuit Boards supporting major end items	
5	Product allocation	Intel (Altera) - Military, Industrial and Commercial Grade FPGAs	TSMC	Printed Cicuit Boards supporting major end items	
6	Product allocation	Xilinx - Military, Industrial and Commercial Grade FPGAs	Samsung	Printed Cicuit Boards supporting major end items	
7	Schedule delays - COVID related	Analog Devices - Commercial, Military and Space Analog and Digital Ics	raw material suppliers	Printed Cicuit Boards supporting major end items	
8	Schedule delays - COVID related	Texas Instruments - Commercial, Military and Space Analog and Digital Ics	raw material suppliers	Printed Cicuit Boards supporting major end items	
9					
10					

B.

Is your organization limiting production due to lack of available semiconductors?	No	Explanation	
What percentage of your current production has your organization had to defer, delay, reject, or suspend in the past year?		Explanation	Unable to determine this percentage at this time; impact currently appears to be manageable delays
Is your organization considering or carrying out new investments to mitigate semiconductor sourcing difficulties?	Considering	Explanation	

C. What semiconductor product types are most in short supply, and by what estimated percentage relative to your demand? What is your view of the root cause?

	Product	Percent of your demand you are able to fill	Explanation
1	Field Programmable Gate Arrays	90%+	Global shortage causing significant lead-time delays and allocation (Intel FPGAs); mitigation described on Tab 9. Demand exceeds supply- reduced capacity due to COVID and unforeeseen 2021 worldwide demand.
2	Consumer Integrated Circuits	100%	Currently able to fill demand but extended lead times. Extended lead times for product due to demand exceeding supply - reduced capacity due to COVID and unforeeseen 2021 worldwide demand.
3	Memory Devices	100%	Currently able to fill demand but extended lead times. Extended lead times for product due to demand exceeding supply - reduced capacity due to COVID and unforeeseen 2021 worldwide demand.

D.

Has your organization changed its material and/or equipment purchasing levels or practices in the past three years?	Yes	Explanation:	We are buying as far ahead as possible, generating either internal funds or requesting customer funds ahead of contracts to secure PO's in a constrained market
What single change (and to which portion of the supply chain) would most significantly increase your ability to purchase semiconductors in the next six months?	Better forecasting of customer demand, if we know exactly the product and needs our customers have over the next 2 years, we can buy ahead and have product ready on the shelf. But poor forecasting and drop in demands are problematic in today's constrained environment		
What percentage of your orders are fulfilled by distributors versus through direct purchase orders to semiconductor product manufacturers?	Direct Purchase from OEM 5%	Distributor 95%	
For the semiconductor products your organization purchases, how long (in months) are the typical purchase commitments?	12 months	How, if at all, do your organization's purchase commitments differ for products in short supply?	Buying further out based on funding (2+ yrs)

E. Has your organization faced “de-commits” (defined as a notification from a supplier that expected or committed supply will not be delivered in the agreed-upon time and quantity) in recent months? If this is a significant issue, please explain (e.g., nature of product, supplier, impact)

Yes we are seeing de-commits on a case by case basis. This is occuring in FPGAs, and can be tied to product allocation. It is a significant issue, we are havaing regular meetings with suppplier leadership to address

Clarifying Comments (if applicable):	

This response was identified as PUBLIC on the Organization Information tab.

Section 9: General Comments

Use this space to provide any general comments that do not reasonably fit in other sections of the form. Please limit your response to the space available; supplemental information can be submitted as a separate attachment on regulations.gov.

A. Microelectronics, both leading edge and legacy, are critical to aerospace and defense (A&D) products. A&D demand is a relatively small percentage of global semiconductor industry demand, but the global semiconductor shortage is causing longer lead times. This has resulted in, currently, manageable delays in our product lines and a strain on our supply chain personnel to expedite deliveries to meet our delivery schedules. If the semiconductor shortage does not correct itself, we anticipate the impact to our company would be more severe. Of particular concern is the global semiconductor shortage affecting availability of commercial FPGA's - a product line usually conducted by "fabless" manufacturers who source the fabrication overseas. Our primary mitigation effort is to conduct material expedites and escalate concerns to suppliers. Additionally, we are conducting extensive market analysis for existing inventory, accounting for extended semiconductor lead times when preparing proposals, and as needed, working with our customers to modify delivery schedules. We also design Application Specific Integrated Circuits (ASICs) to meet demanding system requirements thus requiring access to DoD approved foundries for these components. There a significant challenge in producing these ASICs because there are limited, appropriate US-based DoD approved foundries. We would like to take this opportunity to provide the following additional recommendations:

1. The USG should consider procuring & stockpiling critical materials such as starting silicon, or other semiconductor material such as wafers, and create a wafer bank reserved for A&D customers.
2. Improve visibility from USG programs of Semiconductor needs both near term and long term to help assure supply and to identify concerns in the future build schedules.
3. Request government funding vehicle to procure lead-time constrained items ahead of contract award.
4. Share supplier concerns and best practices across the DIB.
5. Improve access, expanding narrow use of licensing exemptions (e.g., ITAR or EAR) to facilitate exports for manufacturing processes.
6. Fully appropriate funds authorized by the CHIPS for America Act to spur capital investments in the establishment and modernization of domestic IC design, manufacturing, and packaging facilities. Funding language should require benefiting companies to address DoD and DIB need for foundry access, and support defense-specific specialty microelectronics, including but not limited to, leading-edge CMOS, GaN MMICs, and radiation hard electronics.
7. Many of the areas noted here will require public/private partnership to be successful. Therefore, continuing dialog and partnership with the DoD and DIB is critical.

Previous Page

Section A: Definitions

Term	Definition
Authorizing Official	An executive officer of the organization or business unit or another individual who has the authority to execute this survey on behalf of the organization.
Capability	The ability to perform standardized design and/or manufacturing steps for producing integrated circuit products within an organization's own facilities and its own employees with little or no outsourcing.
Complementary Metal Oxide Semiconductor (CMOS)	A class of semiconductor used in digital logic circuits employed in microcontrollers, microprocessors, memory, and other devices. The technology is also used in analog circuits such as sensors, transceivers, data converters and other systems.
Customer	An entity to which an organization directly delivers the product or service that the facility produces. A customer may be another organization or another facility owned by the same parent organization. The customer may be the end user for the item but often will be an intermediate link in the supply chain, adding additional value before transferring the item to yet another customer.
Design Facility	A facility with personnel who use design software, intellectual property blocks, supporting computer systems, and other information technology to create integrated circuit designs.
Extreme Integration	The incorporation of functional systems (e.g., logic, memory, input/output, etc.) on an integrated circuit (IC) die or in combination with the integration of multiple IC die (such as memory, standard processors, and field programmable gate arrays) to form a single operational component.
Foundry	For the purpose of this survey a foundry is considered to be a facility that manufactures integrated circuit products for outside organizations as a business. Foundries are: 1) businesses dedicated solely to manufacturing integrated circuit products for fabless integrated circuit companies and other businesses; and/or 2) organizations that chiefly design and manufacture their own integrated circuit products, but that also operate a business of manufacturing IC products for other entities for a fee.
Integrated Circuit (IC)	Analog or digital devices that incorporate transistors, diodes, capacitors, resistors, and other circuit elements that are integrated on a single substrate (chip), typically silicon.
Manufacturing	The production of a working integrated circuit product at a fabrication facility.
Manufacturing Facility	A facility that transforms integrated circuit designs into integrated circuit devices using an array of fabrication equipment including photolithography, deposition, etch, wafer dicing, and testing tools. These facilities produce functioning die as an end-product, devices that may be built with electronics-grade silicon or compound semiconductor materials, including gallium arsenide, gallium nitride, indium phosphide, and others.
Non-U.S. Company	For the purpose of this survey, a non-U.S. company is an organization (publicly traded, privately held, for profit, not-for-profit, or non-profit) that is domiciled at a location outside of the United States. Companies that are a business unit of a parent organization with legal domicile located outside of the United States are non-U.S. companies.
Organization	A company, firm, laboratory, or other entity that owns or controls one or more U.S. establishment(s) capable of designing and/or manufacturing integrated circuit products. A company may be an individual proprietorship, partnership, joint venture, or corporation including any subsidiary corporation in which more than 50 percent of the outstanding voting stock is owned by a business trust, cooperative, trustee(s) in bankruptcy, or receiver(s) under decree of any court owning or controlling one or more establishment.
Outsource	To obtain goods and/or services by contract from a supplier (domestic or foreign) outside the organization.
Product/Process Development	Conceptualization and development of a product prior to the production of the product for customers.
Semiconductor	Elemental materials such as silicon and germanium (or compounds like gallium arsenide) that possess levels of electrical conductivity that are less than a conductor but greater than an insulator. The properties of these materials and similar ones can be manipulated to affect conductivity through temperature and/or the use of dopants.
Service	An intangible product (contrasted to a good, which is a tangible product). Services typically cannot be stored or transported, are instantly perishable, or come into existence at the time they are bought and consumed.
Single Source	An organization that is designated as the only accepted source for the supply of parts, components, materials, or services, even though other sources with equivalent technical know-how and production capability may exist.
Sole Source	An organization that is the only source for the supply of parts, components, materials, or services. No alternative U.S. or non-U.S. based suppliers exist other than the current supplier.
Supplier	An entity from which your organization obtains inputs, which may be goods or services. A supplier may be another firm with which you have a contractual relationship, or it may be another facility owned by the same parent organization.
United States	The "United States" or "U.S." includes the 50 states, Puerto Rico, the District of Columbia, Guam, the Trust Territories, and the U.S. Virgin Islands.
Wafer Starts Per Week	The number of semiconductor wafers that can be processed by an integrated circuit production line in a 7- day period.