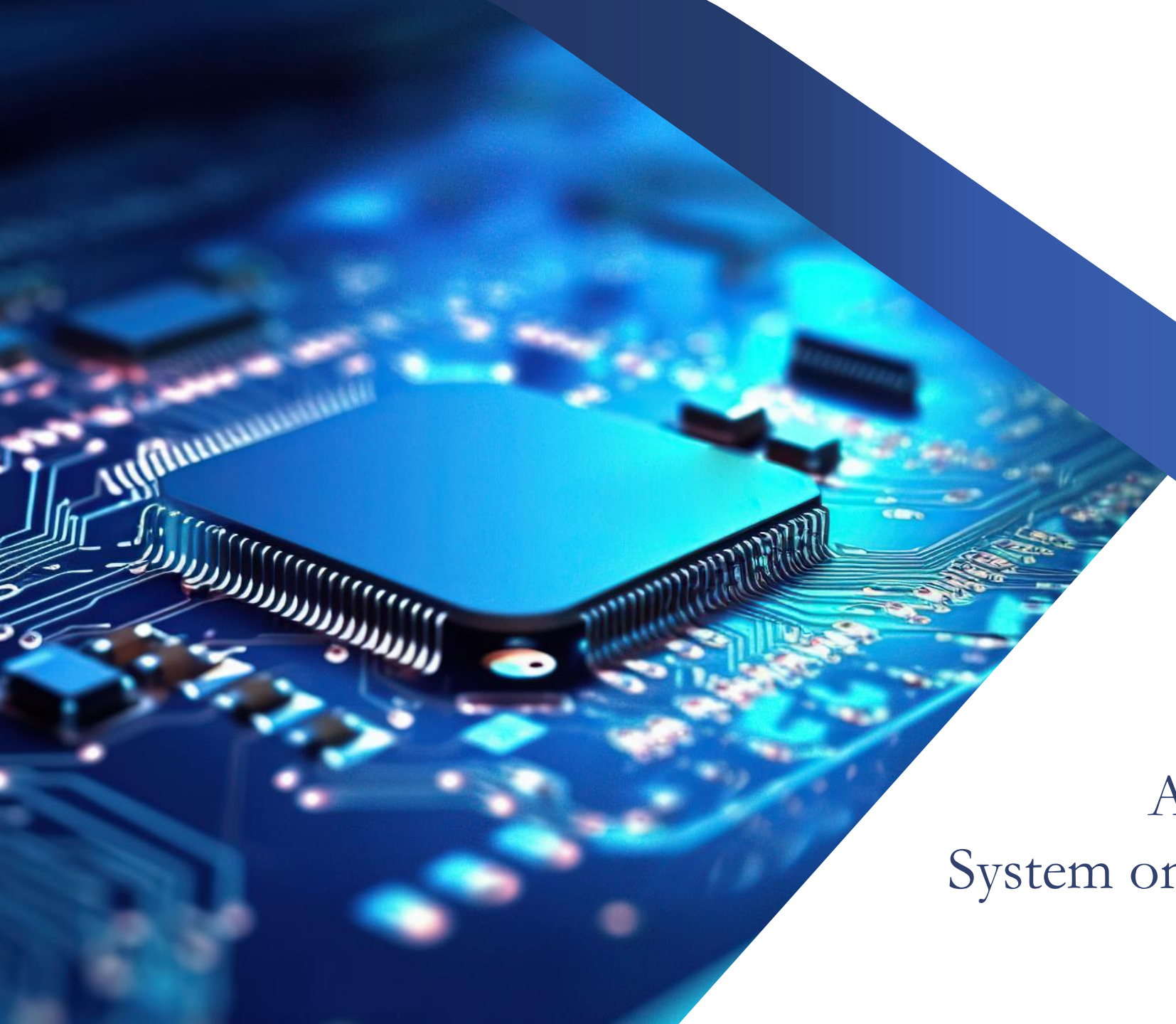


iWave Global

Altera FPGA SoC
System on Module Selection Guide

Why SoC/FPGA System on Modules?

Ready to use

Off-the-Shelf availability

Ample Flexible I/O's

Build interfaces for any sort of non-standard, proprietary requirements or repetition of peripherals

Reduces Costs

Isolates complex, high-layer board and reduce PCB cost

Future Enhancements

Re-use of the functional blocks without any compromises

Quick Time-to-Market

Save 6 to 12 months of the development time

Feature Enriched

Small Power, Feature Enriched, and inherent parallelism

Reduces Risks

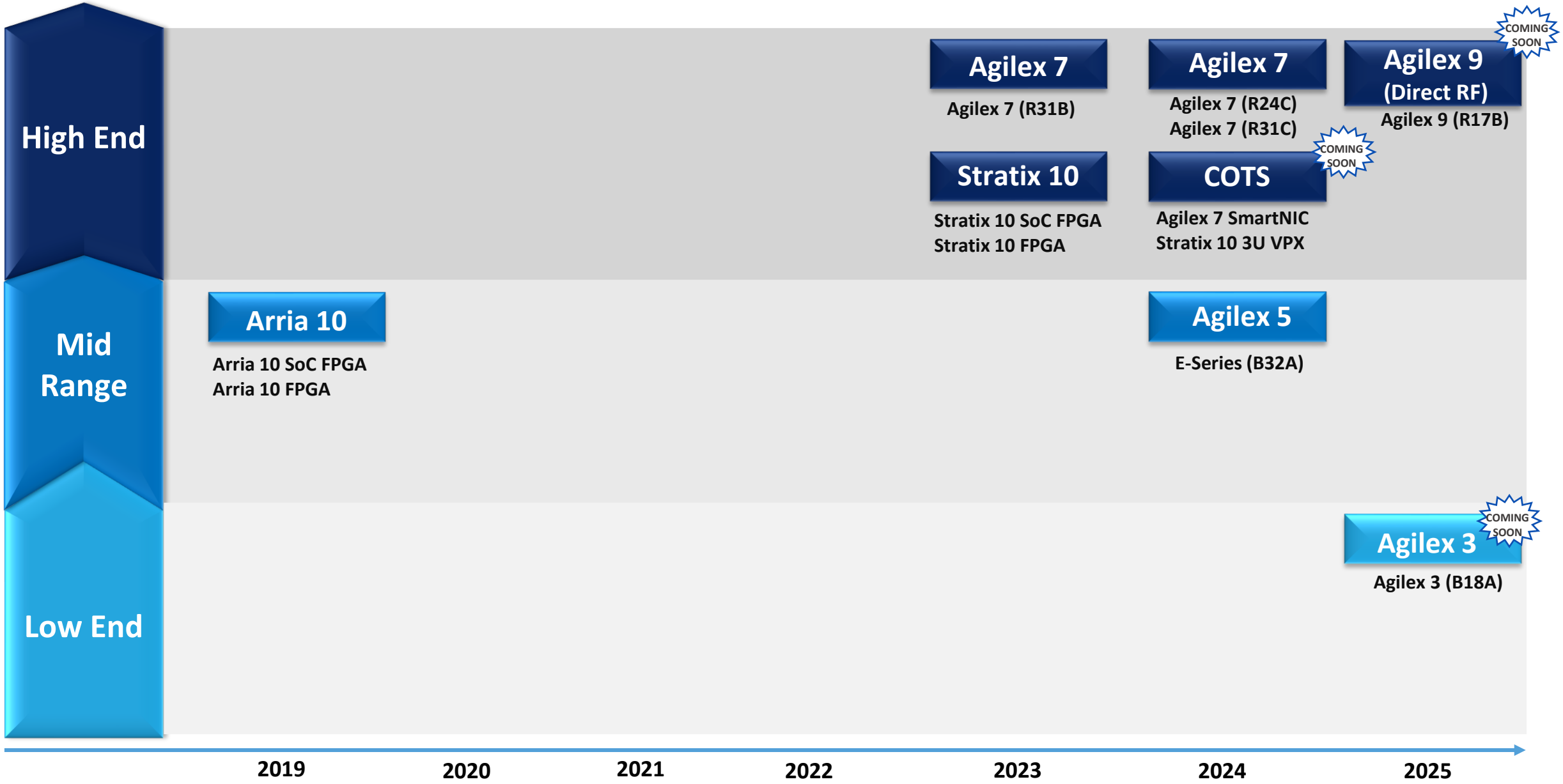
No Design Verification, No Board Bring-Up & No Manufacturing Overhead

Support

Increased Longevity

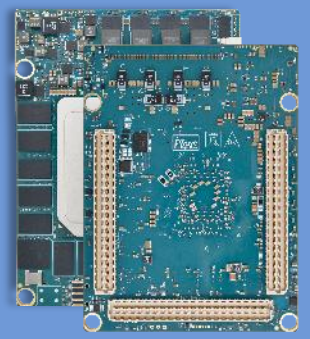
Altera Expertise & Roadmap

altera
An Intel Company



System on Modules Portfolio– Form Factor wise

BRYN / BRYN+



- **Agilex 7 I-Series(R31B)**

AGI - 019 / 022 / 023 / 027

- **Agilex 7 F-Series(R31C)**

AGF - 019 / 022 / 023 / 027

- **Agilex 9 Wide band(R17B)** COMING SOON

AGRW – 014

OREN / OREN+

- **Arria 10 (F34)**

SX - 270 / 320 / 480 / 570 / 660 /

GX - 270 / 320 / 480 / 570 / 660 / 900

1150

- **Stratix 10 (F43)**

SX - 850 / 1110 / 1650 / 2100 / 2500/2800

GX - 850 / 1100 / 1650 / 2100 /2500/2800

- **Agilex 7 (R24C)**

AGF - 006 / 008 / 012 / 014 / 019 / 023

022 / 027

REN / REN+

- **Agilex 5 E Series(B32A)**

Group A– 013A / 028A / 043A / 052A

065A

Group B – 008B / 013B / 028B / 043B

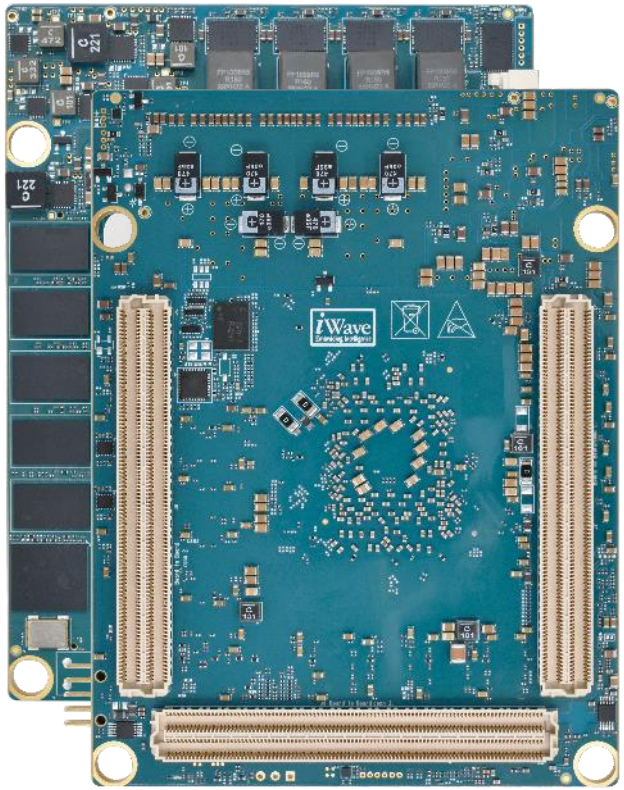
052B / 065B

- **Agilex 3 C Series(B18A)** COMING SOON

A3C - 025 / 050 / 065 / 100 / 135

BRYN+ Form Factor System On Modules

BRYN+



Size – 90mm x 120mm

SOM Board to Board Connectors:

3 x 400 pins @ upto 112Gbps PAM4/56Gbps NRZ

iW-RainboW-G43M – Agilex 7 (R31B) SOM (BRYN+)

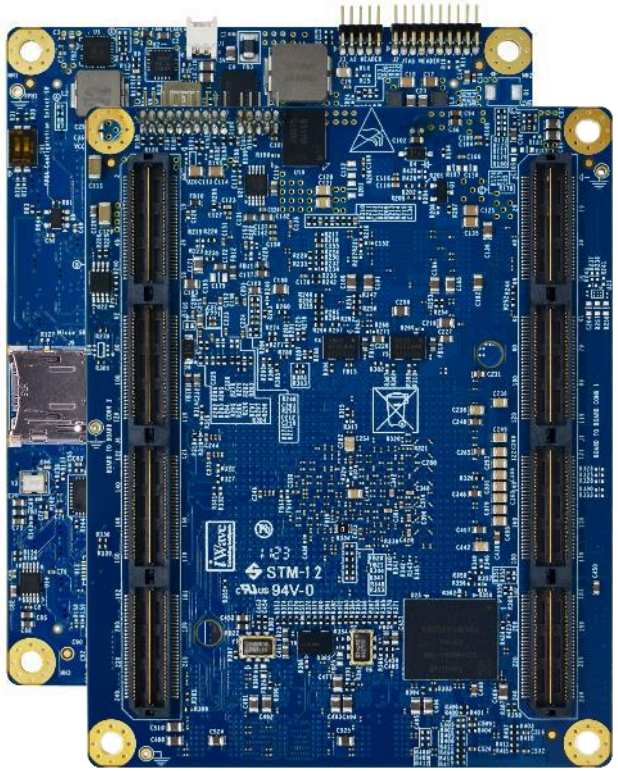
iWave Product Name		iW-RainboW-G43M - Agilex7 I-Series SoC FPGA SOM (BRYN+)															
	FPGA/SoC Name	AGI 019				AGI 023				AGI 022				AGI 027			
On-SOM Features – FPGA	Package	R31B				R31B				R31B				R31B			
	Tile	F-Tile x 4				F-Tile x 4				F-Tile x 4				F-Tile x 4			
	Tile Speed Grade	1	2	3		1	2	3		1	2	3		1	2	3	
	Logic elements (LEs)	19,18,975				23,08,080				22,08,075				26,92,760			
	Adaptive Logic Module (ALMs)	6,50,500				7,82,400				7,48,500				9,12,800			
	DSP Block	1,354				1,640				6,250				8,528			
	eSRAM Count (Size)	1 (18Mb)				1 (18Mb)				-				-			
	M20K Count (Size)	8,500 (166Mb)				10,464 (204Mb)				10,900 (212Mb)				13,272 (259Mb)			
	MLAB Count (Size)	35,525 (20Mb)				39,120 (24Mb)				37,425 (23Mb)				45,640 (28Mb)			
	Crypto Block	2				2				-				-			
	Single-precison / Half-precision TFLOPS	2.0 / 4.0				2.5 / 5.0				9.4 / 18.8				12.8 / 25.6			
	Core Speed Grade	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	RAM Memory1 (GByte)	8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)			
	Number of bits | Speed (Mbps)	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
	RAM Memory2 (GByte)	-				-				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)			
	Number of bits | Speed (Mbps)	-				-				72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
On-SOM Features – HPS	Application Processing Unit	Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53			
		1500 MHz				1500 MHz				1500 MHz				1500 MHz			
	RAM Memory (GByte)	8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)			
	Number of bits | Speed (Mbps)	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
	eMMC Flash Memory (GByte)	32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)			
On-SOM Features – SDM	Configuration QSPI Flash Memory(Gb)	1Gb				1Gb				1Gb				1Gb			
	AS/JTAG Program Connector	1				1				1				1			
Board to Board Connector Interfaces	**Board to Board Connector 1 (400 Pin)**	**< Compatible >**															
	FPGA IOs (LVDS/Single Ended Count)	55/110				55/110				127/254				127/254			
	Variable IO Voltage	1.2|1.5				1.2|1.5				1.2|1.5				1.2|1.5			
	Board to Board Connector 2 (400 Pin)	**< Compatible >**															
	USB 2.0 with PHY	1 x USB 2.0				1 x USB 2.0				1 x USB 2.0				1 x USB 2.0			
	Ethernet with PHY	1 x 1Gbps				1 x 1Gbps				1 x 1Gbps				1 x 1Gbps			
	SDHC interface	1*				1*				1*				1*			
	SPI Interface (H2F)	1				1				1				1			
	Debug UART Interface	1				1				1				1			
	DATA UART/ SPI Interface	1				1				1				1			
	I2C Interface	1				1				1				1			
	I2C Interface (H2F)	1				1				1				1			
	AS/JTAG Interface	1				1				1				1			
	FGT Transceivers counts	28				28				28				28			
	NRZ Mode Speed (Gbps)	1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4	
	PAM4 Mode Speed (Gbps)	20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32	
	Board to Board Connector 3 (400 Pin)	**< Compatible >**															
	FGT Transceivers counts	36				36				36				36			
	NRZ Mode Speed (Gbps)	1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4	
	PAM4 Mode Speed (Gbps)	20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32	
	FHT Transceivers counts	8				8				8				8			
	NRZ Mode Speed (Gbps)	24–29, 48–58	24–29	24–29		24–29, 48–58	24–29	24–29		24–29, 48–58	24–29	24–29		24–29, 48–58	24–29	24–29	
	PAM4 Mode Speed (Gbps)	48–58, 96–112	48–58	48–58		48–58, 96–112	48–58	48–58		48–58, 96–112	48–58	48–58		48–58, 96–112	48–58	48–58	
Spec	Temperature Range (Industrial)	-40°C to +85°C				-40°C to +85°C				-40°C to +85°C				-40°C to +85°C			
	Temperature Range (Extended)	0°C to +85°C				0°C to +85°C				0°C to +85°C				0°C to +85°C			
	SOM Dimension (mm)	90 x 120				90 x 120				90 x 120				90 x 120			
	Supported Operating System	Linux				Linux				Linux				Linux			
	Estimated Product Lifetime	2035+				2035+				2035+				2035+			

iW-RainboW-G43M – Agilex 7 (R31C) SOM (BRYN+)

iWave Product Name		iW-RainboW-G43M - Agilex7 F-Series SoC FPGA SOM (BRYN+)															
	FPGA/SoC Name	AGF 019				AGF 023				AGF 022				AGF 027			
On-SOM Features – FPGA	Package	R31C				R31C				R31C				R31C			
	Tile	F-Tile x 4				F-Tile x 4				F-Tile x 4				F-Tile x 4			
	Tile Speed Grade	1	2	3		1	2	3		1	2	3		1	2	3	
	Logic elements (LEs)	19,18,975				23,08,080				22,08,075				26,92,760			
	Adaptive Logic Module (ALMs)	6,50,500				7,82,400				7,48,500				9,12,800			
	DSP Block	1,354				1,640				6,250				8,528			
	eSRAM Count (Size)	1 (18Mb)				1 (18Mb)				-				-			
	M20K Count (Size)	8,500 (166Mb)				10,464 (204Mb)				10,900 (212Mb)				13,272 (259Mb)			
	MLAB Count (Size)	35,525 (20Mb)				39,120 (24Mb)				37,425 (23Mb)				45,640 (28Mb)			
	Crypto Block	2				2				-				-			
	Single-precison / Half-precision TFLOPS	2.4 / 4.9				2.4 / 4.9				9.4 / 18.8				12.8 / 25.6			
	Core Speed Grade	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	RAM Memory1 (GByte)	8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)			
	Number of bits | Speed (Mbps)	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
	RAM Memory2 (GByte)	-				-				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)			
	Number of bits | Speed (Mbps)	-				-				72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
On-SOM Features – HPS	Application Processing Unit	Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53			
		1500 MHz				1500 MHz				1500 MHz				1500 MHz			
	RAM Memory (GByte)	-				-				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)			
	Number of bits | Speed (Mbps)	-				-				72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
	eMMC Flash Memory (GByte)	32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)			
On-SOM Features – SDM	Configuration QSPI Flash Memory(Gb)	1Gb				1Gb				1Gb				1Gb			
	AS/JTAG Program Connector	1				1				1				1			
Board to Board Connector Interfaces	**Board to Board Connector 1 (400 Pin)**	**< Compatible >**															
	FPGA IOs (LVDS/Single Ended Count)	55/110				55/110				127/254				127/254			
	Variable IO Voltage	1.2|1.5				1.2|1.5				1.2|1.5				1.2|1.5			
	Board to Board Connector 2 (400 Pin)	**< Compatible >**															
	USB 2.0 with PHY	1 x USB 2.0				1 x USB 2.0				1 x USB 2.0				1 x USB 2.0			
	Ethernet with PHY	1 x 1Gbps				1 x 1Gbps				1 x 1Gbps				1 x 1Gbps			
	SDHC interface	1*				1*				1*				1*			
	SPI Interface (H2F)	1				1				1				1			
	Debug UART Interface	1				1				1				1			
	DATA UART/ SPI Interface	1				1				1				1			
	I2C Interface	1				1				1				1			
	I2C Interface (H2F)	1				1				1				1			
	AS/JTAG Interface	1				1				1				1			
	FGT Transceivers counts	28				28				28				28			
	NRZ Mode Speed (Gbps)	1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4	
	PAM4 Mode Speed (Gbps)	20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32	
	Board to Board Connector 3 (400 Pin)	**< Compatible >**															
	FGT Transceivers counts	36				36				36				36			
	NRZ Mode Speed (Gbps)	1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4	
	PAM4 Mode Speed (Gbps)	20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32	
	FHT Transceivers counts	-				-				-				-			
	NRZ Mode Speed (Gbps)	-				-				-				-			
	PAM4 Mode Speed (Gbps)	-				-				-				-			
Spec	Temperature Range (Industrial)	-40°C to +85°C				-40°C to +85°C				-40°C to +85°C				-40°C to +85°C			
	Temperature Range (Extended)	0°C to +85°C				0°C to +85°C				0°C to +85°C				0°C to +85°C			
	SOM Dimension (mm)	90 x 120				90 x 120				90 x 120				90 x 120			
	Supported Operating System	Linux				Linux				Linux				Linux			
	Estimated Product Lifetime	2035+				2035+				2035+				2035+			

OREN/OREN+ Form Factor System On Modules

OREN

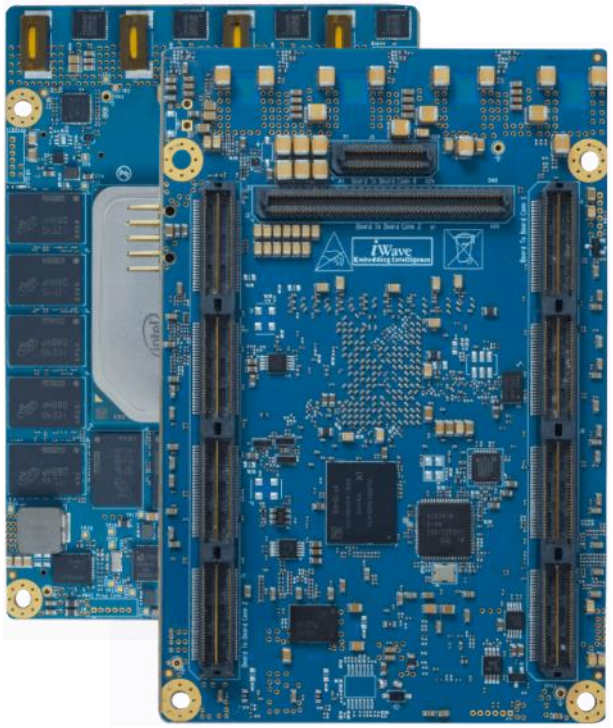


Size – 75mm x 95mm

SOM Board to Board Connectors:

2 x 400 pins @ upto 17Gbps NRZ

OREN+



Size – 75mm x 110mm

SOM Board to Board Connectors:

2 x 240 pins @ upto 17Gbps NRZ

1 x 240 pins @ upto 32Gbps NRZ

1 x 80 pins @ upto 32Gbps NRZ

iW-RainboW-G51M – Agilex 7 (R24C) SOM (OREN+)

iWave Product Name		iW-RainboW-G51M - Agilex7 F-Series SoC FPGA SOM (OREN+)															
	FPGA/SoC Name	AGF 006				AGF 008				AGF 012				AGF 014			
On-SOM Features – FPGA	Package	R24C				R24C				R24C				R24C			
	Tile	F-Tile x 2				F-Tile x 2				F-Tile x 2				F-Tile x 2			
	Tile Speed Grade	1	2	3		1	2	3		1	2	3		1	2	3	
	Logic elements (LEs)	5,73,480				7,64,640				11,78,525				14,37,240			
	Adaptive Logic Module (ALMs)	1,94,400				2,59,200				3,99,500				4,87,200			
	DSP Block	1,640				2,296				3,743				4,510			
	eSRAM Count (Size)	-				-				2 (36Mb)				2 (36Mb)			
	M20K Count (Size)	2,844 (56Mb)				3,792 (74Mb)				5,900 (115Mb)				7,110 (139Mb)			
	MLAB Count (Size)	9,720 (6Mb)				12,960 (8Mb)				19,975(12Mb)				24,360 (15Mb)			
	Crypto Block	-				-				-				-			
	Single-precison / Half-precision TFLOPS	2.5 / 5.0				3.5 / 6.9				6.0 / 12.0				6.8 / 13.6			
	Core Speed Grade	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	RAM Memory1 (GByte) - DDR4	-				-				-				8GB DDR4 (Upgradable upto 16GB)			
	Number of bits | Speed (Mbps)	-				-				-				72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
	RAM Memory2 (GByte) - QDR-IV	144Mb QDR4				144Mb QDR4				144Mb QDR4				144Mb QDR4			
	Number of bits | Speed (Mbps)	18bit |2132	18bit | 2132	18bit | 1,866	18bit |1,600	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
	RAM Memory2 (GByte) - QDR-IV	144Mb QDR4				144Mb QDR4				144Mb QDR4				144Mb QDR4			
	Number of bits | Speed (Mbps)	18bit |2132	18bit | 2132	18bit | 1,866	18bit |1,600	18bit |2132	18bit | 2132	18bit | 1,866	18bit |1,600	18bit |2132	18bit | 2132	18bit | 1,866	18bit |1,600	18bit |2132	18bit | 2132	18bit | 1,866	18bit |1,600
On-SOM Features – HPS	Application Processing Unit	Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53			
		1500 MHz				1500 MHz				1500 MHz				1500 MHz			
	RAM Memory (GByte) - DDR4	8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)			
	Number of bits | Speed (Mbps)	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
	eMMC Flash Memory (GByte)	32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)			
On-SOM Features – SDM	Configuration QSPI Flash Memory(Gb)	1Gb				1Gb				1Gb				1Gb			
	AS/JTAG Program Connector	1				1				1				1			
Board to Board Connector Interfaces	**Board to Board Connector 1 (240 Pin)**	**< Compatible >**															
Board to Board Connector Interfaces – FPGA	FPGA IOs (Single Ended Count)	54				54				54				54			
	Variable IO Voltage	1.2|1.5				1.2|1.5				1.2|1.5				1.2|1.5			
Board to Board Connector Interfaces – HPS	HPS RGMII	1				1				1				1			
Board to Board Connector Interfaces – FPGA	FGT Transceivers counts	12				12				12				12			
	NRZ Mode Speed (Gbps)	1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4	
	PAM4 Mode Speed (Gbps)	20–32	20–32	20–32		20–32	20–32	20–32		20–32	20–32	20–32		20–32	20–32	20–32	
Board to Board Connector Interfaces	**Board to Board Connector 2 (240 Pin)**	**< Compatible >**															
Board to Board Connector Interfaces – HPS	USB 2.0 with PHY	1 x USB 2.0				1 x USB 2.0				1 x USB 2.0				1 x USB 2.0			
	Ethernet with PHY(H2F)	1 x 1Gbps				1 x 1Gbps				1 x 1Gbps				1 x 1Gbps			
	SDHC interface	1*				1*				1*				1*			
	Debug UART Interface	1				1				1				1			
	DATA UART/ SPI Interface	1				1				1				1			
	I2C Interface	1				1				1				1			
	JTAG Interface	1				1				1				1			
Board to Board Connector Interfaces – FPGA	FPGA IOs (Single Ended Count)	56				56				96				96			
	Variable IO Voltage	1.2|1.5				1.2|1.5				1.2|1.5				1.2|1.5			
	FGT Transceivers counts	4				4				4				4			
	NRZ Mode Speed (Gbps)	1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4	
	PAM4 Mode Speed (Gbps)	20–32	20–32	20–32		20–32	20–32	20–32		20–32	20–32	20–32		20–32	20–32	20–32	
Board to Board Connector Interfaces	**Board to Board Connector 3 (240 Pin)**	**< Compatible >**															
Board to Board Connector Interfaces – FPGA	FGT Transceivers counts	16				16				16				16			
	NRZ Mode Speed (Gbps)	1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4	
	PAM4 Mode Speed (Gbps)	20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32	
Spec	Temperature Range (Industrial)	-40°C to +85°C				-40°C to +85°C				-40°C to +85°C				-40°C to +85°C			
	Temperature Range (Extended)	0°C to +85°C				0°C to +85°C				0°C to +85°C				0°C to +85°C			
	SOM Dimension (mm)	75 x 110				75 x 110				75 x 110				75 x 110			
	Supported Operating System	Linux				Linux				Linux				Linux			
	Estimated Product Lifetime	2035+				2035+				2035+				2035+			

iW-RainboW-G51M – Agilex 7 (R24C) SOM (OREN+)

iWave Product Name		iW-RainboW-G51M - Agilex7 F-Series SoC FPGA SOM (OREN+)															
On-SOM Features	FPGA/SoC Name	AGF 019				AGF 023				AGF 022				AGF 027			
FPGA	Package	R24C				R24C				R24C				R24C			
FPGA	Tile	F-Tile x 2				F-Tile x 2				F-Tile x 2				F-Tile x 2			
FPGA	Tile Speed Grade	1	2	3		1	2	3		1	2	3		1	2	3	
FPGA	Logic elements (LEs)	19,18,975				23,08,080				22,08,075				26,92,760			
FPGA	Adaptive Logic Module (ALMs)	6,50,500				7,82,400				7,48,500				9,12,800			
FPGA	DSP Block	1,354				1,640				6,250				8,528			
FPGA	eSRAM Count (Size)	1 (18Mb)				1 (18Mb)				-				-			
FPGA	M20K Count (Size)	8,500 (166Mb)				10,464 (204Mb)				10,900 (212Mb)				13,272 (259Mb)			
FPGA	MLAB Count (Size)	35,525 (20Mb)				39,120 (24Mb)				37,425 (23Mb)				45,640 (28Mb)			
FPGA	Crypto Block	2				2				-				-			
FPGA	Single-precison / Half-precision TFLOPS	2.0 / 4.0				2.5 / 5.0				9.4 / 18.8				12.8 / 25.6			
FPGA	*Core Speed Grade*	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
FPGA	RAM Memory1 (GByte) - DDR4	-				-				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)			
FPGA	*Number of bits | Speed (Mbps)*	-				-				72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
FPGA	RAM Memory2 (GByte) - QDR-IV	144Mb QDR4				144Mb QDR4				144Mb QDR4				144Mb QDR4			
FPGA	*Number of bits | Speed (Mbps)*	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
FPGA	RAM Memory2 (GByte) - QDR-IV	144Mb QDR4				144Mb QDR4				144Mb QDR4				144Mb QDR4			
FPGA	*Number of bits | Speed (Mbps)*	18bit |2132	18bit | 2132	18bit | 1,866	18bit |1,600	18bit |2132	18bit | 2132	18bit | 1,866	18bit |1,600	18bit |2132	18bit | 2132	18bit | 1,866	18bit |1,600	18bit |2132	18bit | 2132	18bit | 1,866	18bit |1,600
HPS	Application Processing Unit	Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53				Quad-core Arm® Cortex®-A53			
HPS		1500 MHz				1500 MHz				1500 MHz				1500 MHz			
HPS	RAM Memory (GByte) - DDR4	4GB DDR4 (Upgradable upto 8GB)				4GB DDR4 (Upgradable upto 8GB)				8GB DDR4 (Upgradable upto 16GB)				8GB DDR4 (Upgradable upto 16GB)			
HPS	Number of bits | Speed (Mbps)	32bit | 3200	32bit | 2666	32bit | 2400	72bit |2134	32bit | 3200	32bit | 2666	32bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134	72bit | 3200	72bit | 2666	72bit | 2400	72bit |2134
HPS	eMMC Flash Memory (GByte)	32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)				32GB (Upgradable upto 128GB)			
SDM	Configuration QSPI Flash Memory(Gb)	1Gb				1Gb				1Gb				1Gb			
SDM	AS/JTAG Program Connector	1				1				1				1			
Board to Board Connector Interfaces	**Board to Board Connector 1 (240 Pin)**	**< Compatible >**															
FPGA	FPGA IOs (Single Ended Count)	54				54				54				54			
FPGA	*Variable IO Voltage*	1.2|1.5				1.2|1.5				1.2|1.5				1.2|1.5			
HPS	HPS RGMII	1				1				1				1			
FPGA	FGT Transceivers counts	12				12				12				12			
FPGA	*NRZ Mode Speed (Gbps)*	1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4	
FPGA	*PAM4 Mode Speed (Gbps)*	20–32	20–32	20–32		20–32	20–32	20–32		20–32	20–32	20–32		20–32	20–32	20–32	
Board to Board Connector Interfaces	**Board to Board Connector 2 (240 Pin)**	**< Compatible >**															
HPS	USB 2.0 with PHY	1 x USB 2.0				1 x USB 2.0				1 x USB 2.0				1 x USB 2.0			
HPS	Ethernet with PHY(H2F)	1 x 1Gbps				1 x 1Gbps				1 x 1Gbps				1 x 1Gbps			
HPS	SDHC interface	1*				1*				1*				1*			
HPS	Debug UART Interface	1				1				1				1			
HPS	DATA UART/ SPI Interface	1				1				1				1			
HPS	I2C Interface	1				1				1				1			
HPS	JTAG Interface	1				1				1				1			
FPGA	FPGA IOs (Single Ended Count)	56				56				96				96			
FPGA	*Variable IO Voltage*	1.2|1.5				1.2|1.5				1.2|1.5				1.2|1.5			
FPGA	FGT Transceivers counts	4				4				4				4			
FPGA	*NRZ Mode Speed (Gbps)*	1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4		1–17.4	1–17.4	1–17.4	
FPGA	*PAM4 Mode Speed (Gbps)*	20–32	20–32	20–32		20–32	20–32	20–32		20–32	20–32	20–32		20–32	20–32	20–32	
Board to Board Connector Interfaces	**Board to Board Connector 3 (240 Pin)**	**< Compatible >**															
FPGA	FGT Transceivers counts	16				16				16				16			
FPGA	*NRZ Mode Speed (Gbps)*	1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4		1–32.45	1–32	1–17.4	
FPGA	*PAM4 Mode Speed (Gbps)*	20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32		20–58.125	20–58.125	20–32	
Spec	Temperature Range (Industrial)	-40°C to +85°C				-40°C to +85°C				-40°C to +85°C				-40°C to +85°C			
Spec	Temperature Range (Extended)	0°C to +85°C				0°C to +85°C				0°C to +85°C				0°C to +85°C			
Spec	SOM Dimension (mm)	75 x 110				75 x 110				75 x 110				75 x 110			
Spec	Supported Operating System	Linux				Linux				Linux				Linux			
Spec	Estimated Product Lifetime	2035+				2035+				2035+				2035+			

iW-RainboW-G45M – Stratix 10 (SX) SOM (OREN+)

iWave Product Name		iW-RainboW-G45M- Stratix10 System On Module - (OREN+)																	
	FPGA/SoC Name	SX 850			SX 1100			SX 1650			SX 2100			SX 2500			SX 2800		
On-SOM Features – FPGA	Package	F43 - F1760			F43 - F1760			F43 - F1760			F43 - F1760			F43 - F1760			F43 - F1760		
	Tile	H Tile x 2			H Tile x 2			H Tile x 2			H Tile x 2			H Tile x 2			H Tile x 2		
	Transceiver Speed Grade	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	Logic elements (LEs)	8,41,000			13,25,000			16,24,000			20,05,000			24,22,000			27,53,000		
	Adaptive logic modules (ALMs)	2,84,960			4,49,280			5,50,540			6,79,680			8,21,150			9,33,120		
	ALM registers	11,39,840			17,97,120			22,02,160			27,18,720			32,84,600			37,32,480		
	Digital signal processing (DSP)	2,016			2,592			3,145			3,744			5,011			5,760		
	M20K Count (Size)	3,477 (68Mb)			5,461 (107Mb)			5,851 (114Mb)			6,501 (127Mb)			9,963 (195Mb)			11,721 (229Mb)		
	TFLOPS	3.2			4.1			5			6			8			9.2		
	Core Speed Grade	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	RAM Memory1 (GByte)	8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)		
	Number of bits | Speed (Mbps)	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600
	RAM Memory2 (GByte)	8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)		
	Number of bits | Speed (Mbps)	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600
On-SOM Features – HPS	Application Processing Unit	4 x Arm® Cortex®-A53			4 x Arm® Cortex®-A53			4 x Arm® Cortex®-A53			4 x Arm® Cortex®-A53			4 x Arm® Cortex®-A53			4 x Arm® Cortex®-A53		
		1500 MHz			1500 MHz			1500 MHz			1500 MHz			1500 MHz			1500 MHz		
	RAM Memory (GByte)	8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)		
	Number of bits | Speed (Mbps)	72bit | 2666	72bit |2400	72bit |1866	72bit | 2666	72bit |2400	72bit |1866	72bit | 2666	72bit |2400	72bit |1866	72bit | 2666	72bit |2400	72bit |1866	72bit | 2666	72bit |2400	72bit |1866	72bit | 2666	72bit |2400	72bit |1866
	eMMC Flash Memory (GByte)	32GB (Upgradable upto 256GB)			32GB (Upgradable upto 256GB)			32GB (Upgradable upto 256GB)			32GB (Upgradable upto 256GB)			32GB (Upgradable upto 256GB)			32GB (Upgradable upto 256GB)		
On-SOM Features – SDM	Configuration QSPI Flash Memory(Gb)	1Gb (Upgradable)			1Gb (Upgradable)			1Gb (Upgradable)			1Gb (Upgradable)			1Gb (Upgradable)			1Gb (Upgradable)		
	AS/JTAG Program Connector	Yes			Yes			Yes			Yes			Yes			Yes		
Board to Board Connector Interfaces	**Board to Board Connector 1 & 2 (2 x 240 Pins)**	**< Compatible >**																	
HPS Interfaces	USB 2.0 with PHY	1 x USB 2.0			1 x USB 2.0			1 x USB 2.0			1 x USB 2.0			1 x USB 2.0			1 x USB 2.0		
	Ethernet with PHY	1 x 1Gbps			1 x 1Gbps			1 x 1Gbps			1 x 1Gbps			1 x 1Gbps			1 x 1Gbps		
	SDHC interface	1*			1*			1*			1*			1*			1*		
	DATA UART/ SPI Interface	1			1			1			1			1			1		
	Debug UART Interface	1			1			1			1			1			1		
	I2C Interface	1			1			1			1			1			1		
	AS/JTAG Interface	Yes			Yes			Yes			Yes			Yes			Yes		
FPGA Interfaces	Total GX/GXT Transceivers counts	24			24			24			24			24			24		
	Configurable GX Transceivers counts (up to)	24			24			24			24			24			24		
	Configurable GXT Transceivers counts (up to)	16			16			16			16			16			16		
	GX Speed (Gbps)	17.4			17.4			17.4			17.4			17.4			17.4		
	GXT Speed (Gbps) SoC Supported|Connector supported	28.3 |25	26.6 |25	NA	28.3 |25	26.6 |25	NA	28.3 |25	26.6 |25	NA	28.3 |25	26.6 |25	NA	28.3 |25	26.6 |25	NA	28.3 |25	26.6 |25	NA
	FPGA IOs (Single Ended Count)	189			189			189			189			189			189		
	Variable IO Voltage Support	1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8		
	Board to Board Connector 3 (240 Pin)	**< Compatible >**																	
FPGA	Total GX/GXT Transceivers counts	24			24			24			24			24			24		
	Configurable GX Transceivers counts (up to)	24			24			24			24			24			24		
	Configurable GXT Transceivers counts (up to)	16			16			16			16			16			16		
	GX Speed (Gbps)	17.4			17.4			17.4			17.4			17.4			17.4		
	GXT Speed (Gbps)	28.3	26.6	NA	28.3	26.6	NA	28.3	26.6	NA	28.3	26.6	NA	28.3	26.6	NA	28.3	26.6	NA
	Board to Board Connector 4 (80 Pin)	**< Compatible >**																	
FPGA	FPGA IOs (Single Ended Count)	42			42			42			42			42			42		
	Variable IO Voltage Support	1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8		
Spec	Temperature Range (Industrial)	-40°C to +85°C			-40°C to +85°C			-40°C to +85°C			-40°C to +85°C			-40°C to +85°C			-40°C to +85°C		
	Temperature Range (Extended)	0°C to +85°C			0°C to +85°C			0°C to +85°C			0°C to +85°C			0°C to +85°C			0°C to +85°C		
	SOM Dimension (mm)	75 x 110			75 x 110			75 x 110			75 x 110			75 x 110			75 x 110		
	Supported Operating System	Linux			Linux			Linux			Linux			Linux			Linux		
	Estimated Product Lifetime	2030+			2030+			2030+			2030+			2030+			2030+		

iW-RainboW-G45M – Stratix 10 (GX) SOM (OREN+)

	iWave Product Name	iW-RainboW-G45M- Stratix10 System On Module - (OREN+)																	
	FPGA/SoC Name	GX 850			GX 1100			GX 1650			GX 2100			GX 2500			GX 2800		
On-SOM Features – FPGA	Package	F43 - F1760			F43 - F1760			F43 - F1760			F43 - F1760			F43 - F1760			F43 - F1760		
	Tile	H Tile x 2			H Tile x 2			H Tile x 2			H Tile x 2			H Tile x 2			H Tile x 2		
	Transceiver Speed Grade	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	Logic elements (LEs)	8,41,000			13,25,000			16,24,000			20,05,000			24,22,000			27,53,000		
	Adaptive logic modules (ALMs)	2,84,960			4,49,280			5,50,540			6,79,680			8,21,150			9,33,120		
	ALM registers	11,39,840			17,97,120			22,02,160			27,18,720			32,84,600			37,32,480		
	Digital signal processing (DSP)	2,016			2,592			3,145			3,744			5,011			5,760		
	M20K Count (Size)	3,477 (68Mb)			5,461 (107Mb)			5,851 (114Mb)			6,501 (127Mb)			9,963 (195Mb)			11,721 (229Mb)		
	TFLOPS	3.2			4.1			5			6			8			9.2		
	Core Speed Grade	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	RAM Memory1 (GByte)	8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)		
	Number of bits | Speed (Mbps)	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600
	RAM Memory2 (GByte)	8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)			8GB DDR4 (Upgradable upto 16GB)		
	Number of bits | Speed (Mbps)	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600	64bit | 2400	64bit |2134	64bit |1600
On-SOM Features – HPS	Application Processing Unit	-			-			-			-			-			-		
		-			-			-			-			-			-		
	RAM Memory (GByte)	8GB DDR4 (Upgradable upto 16GB)**			8GB DDR4 (Upgradable upto 16GB)**			8GB DDR4 (Upgradable upto 16GB)**			8GB DDR4 (Upgradable upto 16GB)**			8GB DDR4 (Upgradable upto 16GB)**			8GB DDR4 (Upgradable upto 16GB)**		
	Number of bits | Speed (Mbps)	72bit | 2666	72bit |2400	72bit |1866	72bit | 2666	72bit |2400	72bit |1866	72bit | 2666	72bit |2400	72bit |1866	72bit | 2666	72bit |2400	72bit |1866	72bit | 2666	72bit |2400	72bit |1866	72bit | 2666	72bit |2400	72bit |1866
	eMMC Flash Memory (GByte)	-			-			-			-			-			-		
On-SOM Features – SDM	Configuration QSPI Flash Memory(Gb)	1Gb (Upgradable)			1Gb (Upgradable)			1Gb (Upgradable)			1Gb (Upgradable)			1Gb (Upgradable)			1Gb (Upgradable)		
	AS/JTAG Program Connector	Yes			Yes			Yes			Yes			Yes			Yes		
Board to Board Connector Interfaces	**Board to Board Connector 1 & 2 (2 x 240 Pins)**	**< Compatible >**																	
	USB 2.0 with PHY	-			-			-			-			-			-		
	Ethernet with PHY	-			-			-			-			-			-		
	SDHC interface	-			-			-			-			-			-		
	DATA UART/ SPI Interface	-			-			-			-			-			-		
	Debug UART Interface	-			-			-			-			-			-		
	I2C Interface	-			-			-			-			-			-		
	AS/JTAG Interface	Yes			Yes			Yes			Yes			Yes			Yes		
	Total GX/GXT Transceivers counts	24			24			24			24			24			24		
	Configurable GX Transceivers counts (up to)	24			24			24			24			24			24		
	Configurable GXT Transceivers counts (up to)	16			16			16			16			16			16		
	GX Speed (Gbps)	17.4			17.4			17.4			17.4			17.4			17.4		
	GXT Speed (Gbps) SoC Supported|Connector supported	28.3 |25	26.6 |25	NA	28.3 |25	26.6 |25	NA	28.3 |25	26.6 |25	NA	28.3 |25	26.6 |25	NA	28.3 |25	26.6 |25	NA	28.3 |25	26.6 |25	NA
	FPGA IOs (Single Ended Count)	189			189			189			189			189			189		
	Variable IO Voltage Support	1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8		
	Board to Board Connector 3 (240 Pin)	**< Compatible >**																	
	Total GX/GXT Transceivers counts	24			24			24			24			24			24		
	Configurable GX Transceivers counts (up to)	24			24			24			24			24			24		
	Configurable GXT Transceivers counts (up to)	16			16			16			16			16			16		
	GX Speed (Gbps)	17.4			17.4			17.4			17.4			17.4			17.4		
	GXT Speed (Gbps)	28.3	26.6	NA	28.3	26.6	NA	28.3	26.6	NA	28.3	26.6	NA	28.3	26.6	NA	28.3	26.6	NA
	Board to Board Connector 4 (80 Pin)	**< Compatible >**																	
	FPGA IOs (Single Ended Count)	42			42			42			42			42			42		
	Variable IO Voltage Support	1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8			1.2 | 1.25 | 1.35 | 1.5 | 1.8		
Spec	Temperature Range (Industrial)	-40°C to +85°C			-40°C to +85°C			-40°C to +85°C			-40°C to +85°C			-40°C to +85°C			-40°C to +85°C		
	Temperature Range (Extended)	0°C to +85°C			0°C to +85°C			0°C to +85°C			0°C to +85°C			0°C to +85°C			0°C to +85°C		
	SOM Dimension (mm)	75 x 110			75 x 110			75 x 110			75 x 110			75 x 110			75 x 110		
	Supported Operating System	-			-			-			-			-			-		
	Estimated Product Lifetime	2030+			2030+			2030+			2030+			2030+			2030+		

iW-RainboW-G24M – Arria 10 (SX) SOM (OREN)

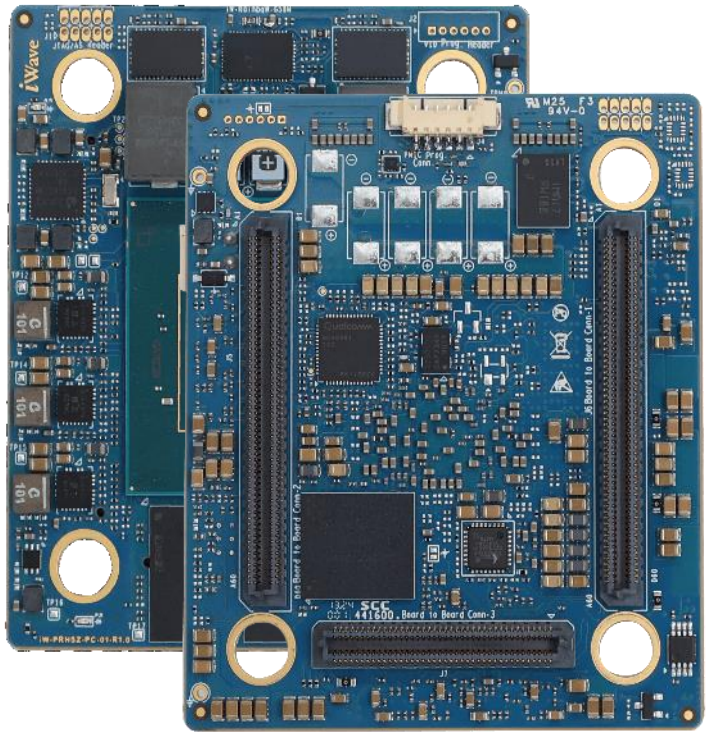
iWave Product Name		iW-RainboW-G24M - Arria10 System On Module (OREN)																			
On-SOM Features	FPGA/SoC Name	SX270				SX320				SX480				SX570				SX660			
FPGA	Package	F34				F34				F34				F34				F34			
FPGA	Transceiver Speed Grade	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
FPGA	Logic elements (LEs)	270K				320K				480K				570K				660K			
FPGA	Adaptive logic modules (ALMs)	1,01,620				1,18,730				1,81,790				2,17,080				2,50,540			
FPGA	ALM registers	4,06,480				4,74,920				7,27,160				8,68,320				10,02,160			
FPGA	M20K memory blocks	750				891				1,438				1,800				2,133			
FPGA	M20K memory (Mb)	15				17				28				35				42			
FPGA	MLAB memory (Mb)	2.4				2.8				4.3				5				5.7			
FPGA	GFLOPS	747				887				1,231				1,371				1,519			
FPGA	*Core Speed Grade*	1	2	3		1	2	3		1	2	3		1	2	3		1	2	3	
FPGA	RAM Memory1 (GByte)	-				-				2GB DDR4 (Upgradable upto 16GB)				2GB DDR4 (Upgradable upto 16GB)				2GB DDR4 (Upgradable upto 16GB)			
FPGA	*Number of bits | Speed (Mbps)*	-				-				64bit | 2400	64bit |2134	64bit |1600		64bit | 2400	64bit |2134	64bit |1600		64bit | 2400	64bit |2134	64bit |1600	
HPS	Application Processing Unit	2 x Arm® Cortex®-A9 MPCore				2 x Arm® Cortex®-A9 MPCore				2 x Arm® Cortex®-A9 MPCore				2 x Arm® Cortex®-A9 MPCore				2 x Arm® Cortex®-A9 MPCore			
HPS		1200 MHz |1500MHz				1200 MHz |1500MHz				1200 MHz |1500MHz				1200 MHz |1500MHz				1200 MHz |1500MHz			
HPS	RAM Memory (GByte)	2GB DDR4 (Upgradable upto 4GB)				2GB DDR4 (Upgradable upto 4GB)				2GB DDR4 (Upgradable upto 4GB)				2GB DDR4 (Upgradable upto 4GB)				2GB DDR4 (Upgradable upto 4GB)			
HPS	*Number of bits | Speed (Mbps)*	40bit | 2400	40bit |2134	40bit |1600		40bit | 2400	40bit |2134	40bit |1600		40bit | 2400	40bit |2134	40bit |1600		40bit | 2400	40bit |2134	40bit |1600		40bit | 2400	40bit |2134	40bit |1600	
HPS	eMMC Flash Memory (GByte)	8GB (Upgradable upto 128GB)*				8GB (Upgradable upto 128GB)*				8GB (Upgradable upto 128GB)*				8GB (Upgradable upto 128GB)*				8GB (Upgradable upto 128GB)*			
Config	Configuration QSPI Flash Memory	256Mb (Upgradable)				256Mb (Upgradable)				256Mb (Upgradable)				256Mb (Upgradable)				256Mb (Upgradable)			
Config	AS/JTAG Program Connector	Yes				Yes				Yes				Yes				Yes			
Board to Board Connector Interfaces	**Board to Board Connector 1 & 2 (2 x 240 Pin)**	**< Compatible >**																			
HPS	USB 2.0 with PHY	1 x USB 2.0				1 x USB 2.0				1 x USB 2.0				1 x USB 2.0				1 x USB 2.0			
HPS	Ethernet with PHY	1 x 1Gbps				1 x 1Gbps				1 x 1Gbps				1 x 1Gbps				1 x 1Gbps			
HPS	SDHC interface	1				1				1				1				1			
HPS	SPI Interface	1				1				1				1				1			
HPS	Debug UART Interface	1				1				1				1				1			
HPS	I2C Interface	1				1				1				1				1			
HPS	GPIOs	4				4				4				4				4			
HPS	AS/JTAG Interface	Yes				Yes				Yes				Yes				Yes			
FPGA	High Transceivers	24				24				24				24				24			
FPGA	*Speed (Gbps)*	17.4	15	14.2	12.5	17.4	15	14.2	12.5	17.4	15	14.2	12.5	17.4	15	14.2	12.5	17.4	15	14.2	12.5
FPGA	FPGA IOs	188				188				188				188				188			
FPGA	Bank IOs | Variable IO Voltage	142 | 1.2V to 1.8V				142 | 1.2V to 1.8V				142 | 1.2V to 1.8V				142 | 1.2V to 1.8V				142 | 1.2V to 1.8V			
Spec	Temperature Range (Industrial)	-40°C to +85°C				–40°C to +85°C				–40°C to +85°C				–40°C to +85°C				–40°C to +85°C			
Spec	Temperature Range (Extended)	0°C to +85°C				0°C to +85°C				0°C to +85°C				0°C to +85°C				0°C to +85°C			
Spec	SOM Dimension (mm)	75 x 95				75 x 95				75 x 95				75 x 95				75 x 95			
Spec	Supported Operating System	Linux				Linux				Linux				Linux				Linux			
Spec	Estimated Product Lifetime	2030+				2030+				2030+				2030+				2030+			

iW-RainboW-G24M – Arria 10 (GX) SOM (OREN)

iWave Product Name		iW-RainboW-G24M - Arria10 System On Module (OREN)																											
On-SOM Features	FPGA/SoC Name	GX270				GX320				GX480				GX570				GX660				GX900				GX1150			
FPGA	Package	F34				F34				F34				F34				F34				F34				F34			
FPGA	Transceiver Speed Grade	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
FPGA	Logic elements (LEs)	270K				320K				480K				570K				660K				900K				1,150K			
FPGA	Adaptive logic modules (ALMs)	1,01,620				1,18,730				1,81,790				2,17,080				2,50,540				3,39,620				4,27,200			
FPGA	ALM registers	4,06,480				4,74,920				7,27,160				8,68,320				10,02,160				13,58,480				17,08,800			
FPGA	M20K memory blocks	750				891				1,438				1,800				2,133				2,423				2,713			
FPGA	M20K memory (Mb)	15				17				28				35				42				47				53			
FPGA	MLAB memory (Mb)	2.4				2.8				4.3				5				5.7				9.2				12.7			
FPGA	GFLOPS	747				887				1,231				1,371				1,519				1,366				1,366			
FPGA	*Core Speed Grade*	1	2	3		1	2	3		1	2	3		1	2	3		1	2	3		1	2	3		1	2	3	
FPGA	RAM Memory1 (GByte)	-				-				2GB DDR4 (Upgradable upto 16GB)				2GB DDR4 (Upgradable upto 16GB)				2GB DDR4 (Upgradable upto 16GB)				2GB DDR4 (Upgradable upto 16GB)				2GB DDR4 (Upgradable upto 16GB)			
FPGA	*Number of bits | Speed (Mbps)*	-				-				64bit | 2400	64bit |2134	64bit |1600		64bit | 2400	64bit |2134	64bit |1600		64bit | 2400	64bit |2134	64bit |1600		64bit | 2400	64bit |2134	64bit |1600		64bit | 2400	64bit |2134	64bit |1600	
HPS	Application Processing Unit	-				-				-				-				-				-				-			
HPS	Application Processing Unit	-				-				-				-				-				-				-			
HPS	RAM Memory (GByte)	2GB DDR4 (Upgradable upto 8GB)**				2GB DDR4 (Upgradable upto 8GB)**				2GB DDR4 (Upgradable upto 8GB)**				2GB DDR4 (Upgradable upto 8GB)**				2GB DDR4 (Upgradable upto 8GB)**				2GB DDR4 (Upgradable upto 8GB)**				2GB DDR4 (Upgradable upto 8GB)**			
HPS	*Number of bits | Speed (Mbps)*	40bit | 2400	40bit |2134	40bit |1600		40bit | 2400	40bit |2134	40bit |1600		40bit | 2400	40bit |2134	40bit |1600		40bit | 2400	40bit |2134	40bit |1600		40bit | 2400	40bit |2134	40bit |1600		40bit | 2400	40bit |2134	40bit |1600		40bit | 2400	40bit |2134	40bit |1600	
HPS	eMMC Flash Memory (GByte)	-				-				-				-				-				-				-			
Config	Configuration QSPI Flash Memory	256Mb (Upgradable)				256Mb (Upgradable)				256Mb (Upgradable)				256Mb (Upgradable)				256Mb (Upgradable)				256Mb (Upgradable)				256Mb (Upgradable)			
Config	AS/JTAG Program Connector	Yes				Yes				Yes				Yes				Yes				Yes				Yes			
Board to Board Connector Interfaces	**Board to Board Connector 1 & 2 (2 x 240 Pin)**	**< Compatible >**																											
HPS	USB 2.0 with PHY	-				-				-				-				-				-				-			
HPS	Ethernet with PHY	-				-				-				-				-				-				-			
HPS	SDHC interface	-				-				-				-				-				-				-			
HPS	SPI Interface	-				-				-				-				-				-				-			
HPS	Debug UART Interface	-				-				-				-				-				-				-			
HPS	I2C Interface	-				-				-				-				-				-				-			
HPS	GPIOs	-				-				-				-				-				-				-			
FPGA	AS/JTAG Interface	Yes				Yes				Yes				Yes				Yes				Yes				Yes			
FPGA	High Transceivers	24				24				24				24				24				24				24			
FPGA	*Speed (Gbps)*	17.4	15	14.2	12.5	17.4	15	14.2	12.5	17.4	15	14.2	12.5	17.4	15	14.2	12.5	17.4	15	14.2	12.5	17.4	15	14.2	13	17.4	15	14.2	12.5
FPGA	FPGA IOs	188				188				188				188				188				208				208			
FPGA	Bank IOs | Variable IO Voltage	142 | 1.2V to 1.8V				142 | 1.2V to 1.8V				142 | 1.2V to 1.8V				142 | 1.2V to 1.8V				142 | 1.2V to 1.8V				142 | 1.2V to 1.8V				142 | 1.2V to 1.8V			
Spec	Temperature Range (Industrial)	-40°C to +85°C				–40°C to +85°C				–40°C to +85°C				–40°C to +85°C				–40°C to +85°C				–40°C to +85°C				–40°C to +85°C			
Spec	Temperature Range (Extended)	0°C to +85°C				0°C to +85°C				0°C to +85°C				0°C to +85°C				0°C to +85°C				0°C to +85°C				0°C to +85°C			
Spec	SOM Dimension (mm)	75 x 95				75 x 95				75 x 95				75 x 95				75 x 95				75 x 95				75 x 95			
Spec	Supported Operating System	Linux				-				-				-				-				-				-			
Spec	Estimated Product Lifetime	2030+				2030+				2030+				2030+				2030+				2030+				2030+			

REN+ Form Factor System On Modules

REN+



Size – 50mm x 70mm

SOM Board to Board Connectors:
2 x 240 pins @ upto 28Gbps NRZ
1 x 160 pins @ upto 28Gbps NRZ

iW-RainboW-G58M – Agilex 5 E-Series (Group B) SOM (REN+)

iWave Product Name		iW-RainboW-G58M - Agilex 5 E-Series SoC FPGA SOM (REN+)																	
	FPGA/SoC Name	008B			013B			028B			043B			052B			065B		
On-SOM Features	Package	B32A			B32A			B32A			B32A			B32A			B32A		
	Logic elements (LEs)	85,196			1,38,060			2,82,256			4,34,240			5,23,920			6,56,080		
	Adaptive Logic Module (ALMs)	28,880			46,800			95,680			1,47,200			1,77,600			2,22,400		
	DSP Block	116			188			376			564			676			846		
	M20K Count (Size)	229 (4.47Mb)			358 (6.99Mb)			716 (13.98Mb)			1,050 (20.51Mb)			1,288 (25.16Mb)			1,611 (31.46Mb)		
	MLAB Count (Size)	1,780 (1.09Mb)			2,340 (1.43Mb)			4,784 (2.92Mb)			6,720 (4.10Mb)			8,440 (5.13Mb)			11,120 (6.79Mb)		
FPGA	*Core Speed Grade*	-4	-5	-6	-4	-5	-6	-4	-5	-6	-4	-5	-6	-4	-5	-6	-4	-5	-6
	RAM Memory1 (GByte)	-			-			-			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)		
	Number of bits | Speed (Mbps)	-			-			-			32bit | 2666	32bit | -	32bit | -	32bit | 2666	32bit | -	32bit | -	32bit | 2666	32bit | -	32bit | -
	RAM Memory2 (GByte)	-			-			-			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)		
	Number of bits | Speed (Mbps)	-			-			-			32bit | 2666	32bit | -	32bit | -	32bit | 2666	32bit | -	32bit | -	32bit | 2666	32bit | -	32bit | -
HPS	Application Processing Unit	Dual-core Arm® Cortex®-A76| Dual-core Arm® Cortex®-A62			Dual-core Arm® Cortex®-A76| Dual-core Arm® Cortex®-A63			Dual-core Arm® Cortex®-A76| Dual-core Arm® Cortex®-A64			Dual-core Arm® Cortex®-A76| Dual-core Arm® Cortex®-A65			Dual-core Arm® Cortex®-A76| Dual-core Arm® Cortex®-A66			Dual-core Arm® Cortex®-A76| Dual-core Arm® Cortex®-A67		
		1800 MHz | 1500 MHz			1800 MHz | 1500 MHz			1800 MHz | 1500 MHz			1800 MHz | 1500 MHz			1800 MHz | 1500 MHz			1800 MHz | 1500 MHz		
	RAM Memory (GByte)	2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)		
	Number of bits | Speed (Mbps)	32bit | 2666	32bit | -	32bit | -	32bit | 2666	32bit | -	32bit | -	32bit | 2666	32bit | -	32bit | -	32bit | 2666	32bit | -	32bit | -	32bit | 2666	32bit | -	32bit | -	32bit | 2666	32bit | -	32bit | -
	eMMC Flash Memory (GByte)	32GB (Upgradable upto 128GB)			32GB (Upgradable upto 128GB)			32GB (Upgradable upto 128GB)			32GB (Upgradable upto 128GB)			32GB (Upgradable upto 128GB)			32GB (Upgradable upto 128GB)		
SDM	Configuration QSPI Flash Memory(Gb)	1Gb			1Gb			1Gb			1Gb			1Gb			1Gb		
	AS/JTAG Program Connector	1			1			1			1			1			1		
Board to Board Connector Interfaces	**Board to Board Connector 1 (240 Pin)**	**< Compatible >**																	
FPGA	FPGA IOs (HSIO Single Ended Count)	96			96			96			96			96			96		
	Variable HSIO Voltage	1.0|1.05|1.1|1.2|1.3			1.0|1.05|1.1|1.2|1.3			1.0|1.05|1.1|1.2|1.3			1.0|1.05|1.1|1.2|1.3			1.0|1.05|1.1|1.2|1.3			1.0|1.05|1.1|1.2|1.3		
	FPGA IOs (HVIO Single Ended Count)	52			52			52			52			52			52		
	Variable HVIO Voltage	1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3		
	USB 3.1	1*			1*			1*			1*			1*			1*		
	Transceivers counts	4			4			4			4			4			4		
	NRZ Mode Speed (Gbps)	1 – 17.16			1 – 17.16			1 – 17.16			1 – 17.16			1 – 17.16			1 – 17.16		
	Board to Board Connector 2 (240 Pin)	**< Compatible >**																	
HPS	HPS RGMII	1			1			1			1			1			1		
	USB 2.0 with PHY	1 x USB 2.0			1 x USB 2.0			1 x USB 2.0			1 x USB 2.0			1 x USB 2.0			1 x USB 2.0		
	Ethernet with PHY(H2F)	1 x 2.5Gbps			1 x 2.5Gbps			1 x 2.5Gbps			1 x 2.5Gbps			1 x 2.5Gbps			1 x 2.5Gbps		
	SD interface	1*			1*			1*			1*			1*			1*		
	Debug UART Interface	1			1			1			1			1			1		
	DATA UART Interface	1			1			1			1			1			1		
	I2C Interface	1			1			1			1			1			1		
	I2C Interface (H2F)	1			1			1			1			1			1		
	SPI Interface (H2F)	1			1			1			1			1			1		
	AS/JTAG Interface	1*			1*			1*			1*			1*			1*		
FPGA	Transceivers counts	-			-			8			12			12			12		
	NRZ Mode Speed (Gbps)	1 – 17.16			1 – 17.16			1 – 17.16			1 – 17.16			1 – 17.16			1 – 17.16		
	Board to Board Connector 2 (160 Pin)	**< Compatible >**																	
FPGA	FPGA IOs (HVIO Single Ended Count)	37			37			37			37			37			37		
	Variable HVIO IO Voltage	1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3		
	Transceivers counts	-			-			-			-			8			8		
	NRZ Mode Speed (Gbps)	1 – 17.16			1 – 17.16			1 – 17.16			1 – 17.16			1 – 17.16			1 – 17.16		
Spec	Temperature Range (Industrial)	-40°C to +85°C			-40°C to +85°C			-40°C to +85°C			-40°C to +85°C			-40°C to +85°C			-40°C to +85°C		
	Temperature Range (Extended)	0°C to +85°C			0°C to +85°C			0°C to +85°C			0°C to +85°C			0°C to +85°C			0°C to +85°C		
	SOM Dimension (mm)	60 x 70			60 x 70			60 x 70			60 x 70			60 x 70			60 x 70		
	Supported Operating System	Linux			Linux			Linux			Linux			Linux			Linux		
	Estimated Product Lifetime	2035+			2035+			2035+			2035+			2035+			2035+		

iW-RainboW-G58M – Agilex 5 E-Series (Group A) SOM (REN+)

iWave Product Name		iW-RainboW-G58M - Agilex 5 E-Series SoC FPGA SOM (REN+)														
	FPGA/SoC Name	013A			028A			043A			052A			065A		
On-SOM Features – FPGA	Package	B32A			B32A			B32A			B32A			B32A		
	Logic elements (LEs)	1,38,060			2,82,256			4,34,240			5,23,920			6,56,080		
	Adaptive Logic Module (ALMs)	46,800			95,680			1,47,200			1,77,600			2,22,400		
	DSP Block	188			376			564			676			846		
	M20K Count (Size)	358 (6.99Mb)			716 (13.98Mb)			1,050 (20.51Mb)			1,288 (25.16Mb)			1,611 (31.46Mb)		
	MLAB Count (Size)	2,340 (1.43Mb)			4,784 (2.92Mb)			6,720(4.10Mb)			8,440 (5.15Mb)			11,120 (6.79Mb)		
	Core Speed Grade	-1	-2	-3	-1	-2	-3	-1	-2	-3	-1	-2	-3	-1	-2	-3
	RAM Memory1 (GByte)	-			-			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)		
	Number of bits | Speed (Mbps)	-			-			32bit | 3732	32bit | -	32bit | -	32bit | 3732	32bit | -	32bit | -	32bit | 3732	32bit | -	32bit | -
	RAM Memory2 (GByte)	-			-			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)		
	Number of bits | Speed (Mbps)	-			-			32bit | 3732	32bit | -	32bit | -	32bit | 3732	32bit | -	32bit | -	32bit | 3732	32bit | -	32bit | -
On-SOM Features – HPS	Application Processing Unit	Dual-core Arm® Cortex®-A76| Dual-core Arm® Cortex®-A55			Dual-core Arm® Cortex®-A76| Dual-core Arm® Cortex®-A56			Dual-core Arm® Cortex®-A76| Dual-core Arm® Cortex®-A57			Dual-core Arm® Cortex®-A76| Dual-core Arm® Cortex®-A58			Dual-core Arm® Cortex®-A76| Dual-core Arm® Cortex®-A59		
		1800 MHz | 1500 MHz			1800 MHz | 1500 MHz			1800 MHz | 1500 MHz			1800 MHz | 1500 MHz			1800 MHz | 1500 MHz		
	RAM Memory (GByte)	2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)			2GB DDR4 (Upgradable upto 8GB)		
	Number of bits | Speed (Mbps)	32bit | 3732	32bit | -	32bit | -	32bit | 3732	32bit | -	32bit | -	32bit | 3732	32bit | -	32bit | -	32bit | 3732	32bit | -	32bit | -	32bit | 3732	32bit | -	32bit | -
	eMMC Flash Memory (GByte)	32GB (Upgradable upto 128GB)			32GB (Upgradable upto 128GB)			32GB (Upgradable upto 128GB)			32GB (Upgradable upto 128GB)			32GB (Upgradable upto 128GB)		
On-SOM Features – SDM	Configuration QSPI Flash Memory(Gb)	1Gb			1Gb			1Gb			1Gb			1Gb		
	AS/JTAG Program Connector	1			1			1			1			1		
Board to Board Connector Interfaces	**Board to Board Connector 1 (240 Pin)**	**< Compatible >**														
	FPGA IOs (HSIO Single Ended Count)	96			96			96			96			96		
	Variable HSIO Voltage	1.0|1.05|1.1|1.2|1.3			1.0|1.05|1.1|1.2|1.3			1.0|1.05|1.1|1.2|1.3			1.0|1.05|1.1|1.2|1.3			1.0|1.05|1.1|1.2|1.3		
	FPGA IOs (HVIO Single Ended Count)	52			52			52			52			52		
	Variable HVIO Voltage	1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3		
	USB 3.1	1*			1*			1*			1*			1*		
	Transceivers counts	4			4			4			4			4		
	NRZ Mode Speed (Gbps)	1 – 28.1			1 – 28.1			1 – 28.1			1 – 28.1			1 – 28.1		
	Board to Board Connector 2 (240 Pin)	**< Compatible >**														
	HPS RGMII	1			1			1			1			1		
	USB 2.0 with PHY	1 x USB 2.0			1 x USB 2.0			1 x USB 2.0			1 x USB 2.0			1 x USB 2.0		
	Ethernet with PHY(H2F)	1 x 2.5Gbps			1 x 2.5Gbps			1 x 2.5Gbps			1 x 2.5Gbps			1 x 2.5Gbps		
	SD interface	1*			1*			1*			1*			1*		
	Debug UART Interface	1			1			1			1			1		
	DATA UART Interface	1			1			1			1			1		
	I2C Interface	1			1			1			1			1		
	I2C Interface (H2F)	1			1			1			1			1		
	SPI Interface (H2F)	1			1			1			1			1		
	AS/JTAG Interface	1*			1*			1*			1*			1*		
	Transceivers counts	-			8			12			12			12		
	NRZ Mode Speed (Gbps)	1 – 28.1			1 – 28.1			1 – 28.1			1 – 28.1			1 – 28.1		
	Board to Board Connector 2 (160 Pin)	**< Compatible >**														
	FPGA IOs (HVIO Single Ended Count)	37			37			37			37			37		
	Variable HVIO IO Voltage	1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3			1.8|2.5|3.3		
	Transceivers counts	-			-			-			8			8		
	NRZ Mode Speed (Gbps)	1 – 28.1			1 – 28.1			1 – 28.1			1 – 28.1			1 – 28.1		
Spec	Temperature Range (Industrial)	-40°C to +85°C			-40°C to +85°C			-40°C to +85°C			-40°C to +85°C			-40°C to +85°C		
	Temperature Range (Extended)	0°C to +85°C			0°C to +85°C			0°C to +85°C			0°C to +85°C			0°C to +85°C		
	SOM Dimension (mm)	60 x 70			60 x 70			60 x 70			60 x 70			60 x 70		
	Supported Operating System	Linux			Linux			Linux			Linux			Linux		
	Estimated Product Lifetime	2035+			2035+			2035+			2035+			2035+		

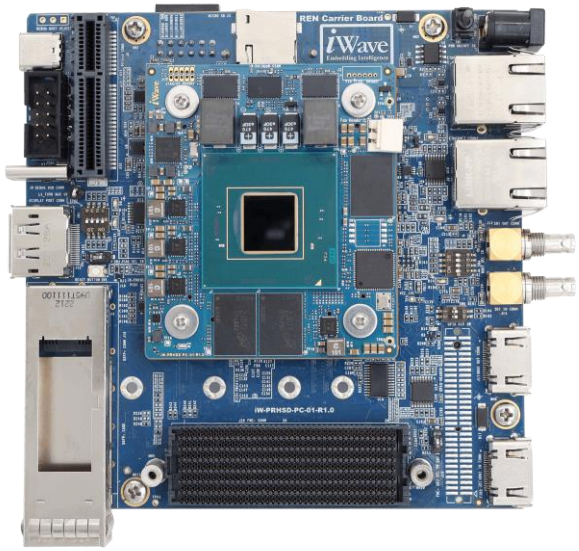
Getting started with Agilex 7 & Agilex 5 Series

Agilex 7 (R31B/R31C)

Development Kit

Agilex 7 (R24C)

Development Kit



Agilex 5 E-Series(B32A)

Development Kit

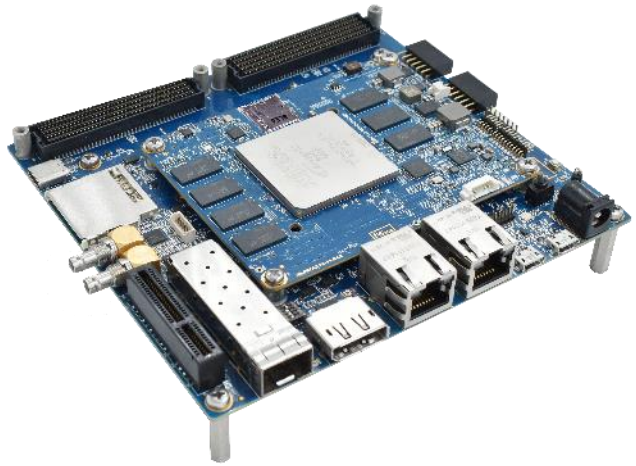
MOUSER ELECTRONICS.

DigiKey

Getting started with Stratix 10 & Arria 10 Series

Stratix 10 (F43)

Development Kit



Arria 10 (F34)

Development Kit

MOUSER ELECTRONICS

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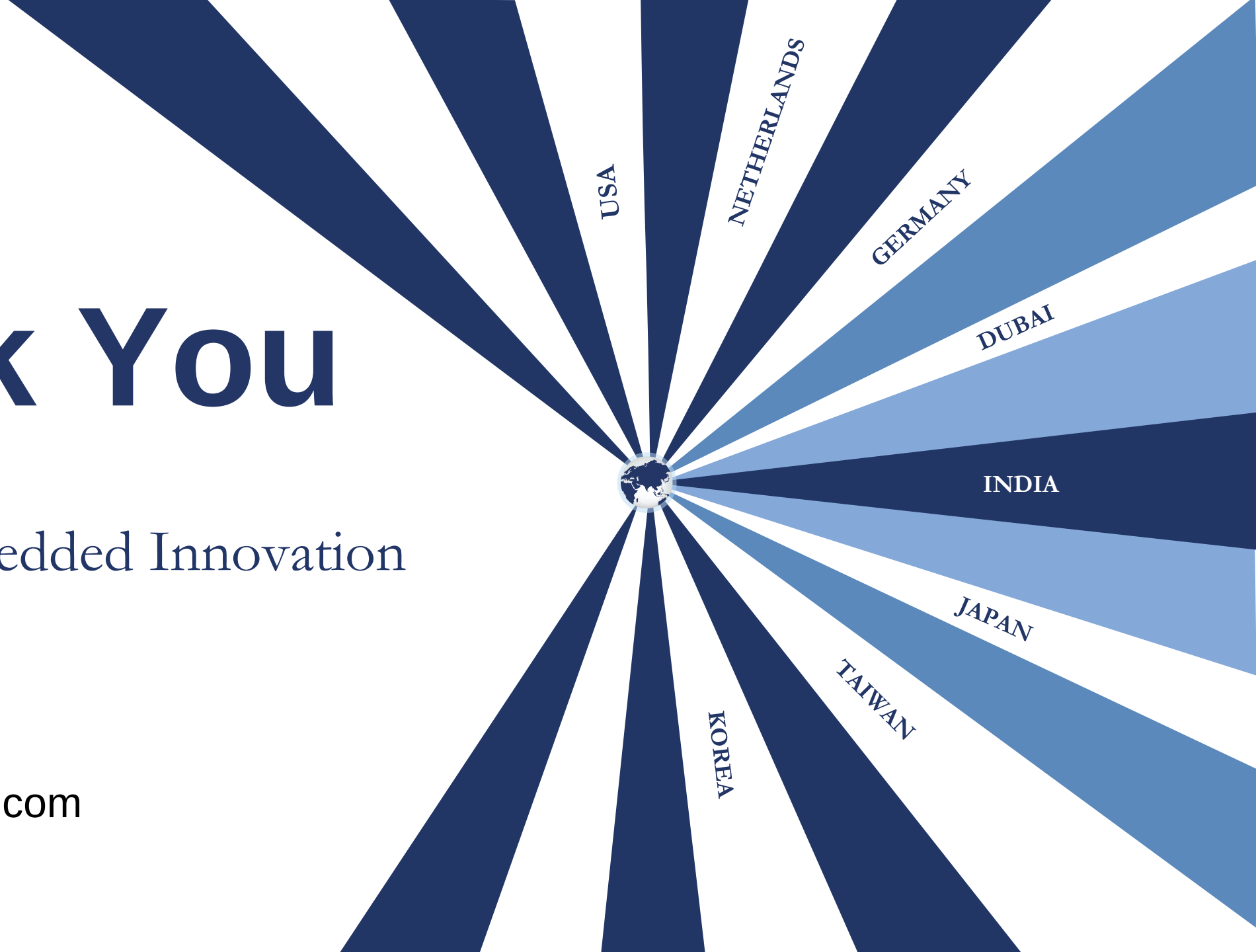
Thank You

We are here to
Accelerate Embedded Innovation



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