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Versal® ACAP AI Core Series Product Selection Guide

Industry's First Adaptive Compute Acceleration Platform (ACAP)

Versal® AI Core Series – Resources

		VC1352	VC1502	VC1702	VC1802	VC1902	VC2602	VC2802
Intelligent Engines	AI Engines Tiles	128	198	304	300	400	0	0
	AI Engine-ML Tiles	0	0	0	0	0	152	304
	AI Engine Data Memory (Mb)	32	50	76	75	100	76	152
	AIE-ML Shared Memory (Mb)	0	0	0	0	0	304	304
	DSP Engines	928	1,032	1,312	1,600	1,968	984	1,312
Adaptable Engines	System Logic Cells (K)	540	815	981	1,586	1,968	820	1,139
	LUTs	246,784	372,352	448,512	725,000	899,840	375,000	520,704
	NoC Master / NoC Slave Ports	10	21	21	28	28	21	21
	Distributed RAM (Mb)	8	11	14	22	27	11	16
Memory	Total Block RAM (Mb)	16	30	34	28	34	17	21
	UltraRAM (Mb)	59	110	130	91	130	63	74
	Accelerator RAM (Mb)	32	0	0	0	0	0	0
	Total PL Memory (Mb)	115	151	178	141	191	91	111
	DDR Memory Controllers	2	3	3	4	4	3	3
	DDR Bus Width	128	192	192	256	256	192	192
Scalar Engines	Application Processing Unit	Dual-core Arm® Cortex®-A72, 48KB/32KB L1 Cache w/ parity & ECC; 1MB L2 Cache w/ ECC						
	Real-time Processing Unit	Dual-core Arm Cortex-R5F, 32KB/32KB L1 Cache, and 256KB TCM w/ECC						
	Memory	256KB On-Chip Memory w/ECC						
	Connectivity	Ethernet (x2); UART (x2); CAN-FD (x2); USB 2.0 (x1); SPI (x2); I2C (x2)						
Serial Transceivers	GTY Transceivers	0	32	44	44	44	0	0
	GTYP Transceivers	8	0	0	0	0	32(1)	32(1)
Integrated Protocol IP	CCIX & PCIe® w/DMA (CPM)	–	1 x Gen4x16, CCIX	1 x Gen4x16, CCIX	1 x Gen4x16, CCIX	1 x Gen4x16, CCIX	2 x Gen5x8, CCIX	2 x Gen5x8, CCIX
	PCI Express®	1 x Gen4x8	4 x Gen4x8	4 x Gen4x8	4 x Gen4x8	4 x Gen4x8	4 x Gen5x4	4 x Gen5x4
	100G Multirate Ethernet MAC	1	3	4	4	4	2	2
	Video Decoder Engines (VDEs)	–	–	–	–	–	2	4
	Platform Management Controller	Boot, Security, Safety, Monitoring, and High-Speed Debug						
Ordering Information	Extended Temp[2]	-1MSE, -1LSE, -2MSE, -2MLE, -2LSE, -2LLE					-1MSE, -1LSE, -2MSE, -2MLE, -2LSE, -2LLE, -3HSE	
	Industrial Temp[2]	-1MSI, -1MLI, -1LSI, -1LLI, -2MSI, -2MLI, -2LLI, -2HSI					-1MSI, -1MLI, -1LSI, -1LLI, -2MSI, -2MLI	

Notes:

1. 16 GTYP transceivers are dedicated to CPM5 for PCI Express use.
2. In extended and industrial temperature grades, some ordering combinations can operate for a limited time with a junction temperature of 110°C. Timing parameters adhere to the same speed file at 110°C as they do below 110°C, regardless of operating voltage. Operation at 110°C Tj is limited to 3% of the device lifetime and can occur sequentially or at regular intervals as long as the total time does not exceed 3% of device lifetime.

Versal® AI Core Series – Packaging

			VC1352	VC1502	VC1702	VC1802	VC1902	VC2602	VC2802
Package	Package Dimensions (mm)	Ball Pitch (mm)	XPIO DDR Only, XPIO DDR+PL HDIO, MIO GTY, GTYP						
NBVA1024	31x31	0.92	168, 210 22, 78 0, 8						
NSVE1369	35x35	0.92	168, 210, 44, 78 0, 8						
NSVG1369	35x35	0.92		132, 246 22, 78 24, 0	132, 246 44, 78 24, 0				
NSVH1369	35x35	0.92						132, 192 44, 78 0, 32	132, 192 44, 78 0, 32
VSVA1596(1)	37.5x37.5	0.92		132, 246 22, 78 32, 0	132, 246 44, 78 32, 0				
VIVA1596(1)	40x40	0.92				132, 246 44, 78 32, 0	132, 246 44, 78 32, 0		
VSVD1760	40x40	0.92				186, 462 0, 78 24, 0	186, 462 0, 78 24, 0		
VFVH1760	40x40	0.92						186, 300 44, 78 0, 32	186, 300 44, 78 0, 32
VSVA2197	45x45	0.92		192, 294 22, 78 32, 0	192, 294 44, 78 44, 0	186, 462 44, 78 44, 0	186, 462 44, 78 44, 0		

Notes:
1. Devices in VIVA1596 and VSVA1596 support peak LPDDR4 data rates in 324 I/O only. The remaining 54 I/O support limited data rates. See the associated data sheet.

Versal® AI Core Series – Figures of Merit

			VC1352	VC1502	VC1702	VC1802	VC1902	VC2602	VC2802
Intelligent Engines	AI Engine Peak Perf – INT8x4	TOPs	43	101	101	100	133	202	405
	AI Engine Peak Perf – INT8	TOPs	43	101	101	100	133	101	202
	AI Engine Peak Perf – INT8x16	TOPs	21	51	51	50	67	51	101
	AI Engine Peak Perf – INT16	TOPs	11	25	25	25	33	25	51
	AI Engine Peak Perf – CINT16	Complex TOPs	3	6	6	6	8	3	6
	AI Engine Peak Perf – FP32	TFLOPs	3	6	6	6	8	8	17
	AI Engine Peak SRAM Bandwidth	Tb/s	170	405	405	399	532	202	405
	DSP Engine Peak Perf – INT8	TOPs	6.4	9.1	9.1	11.0	13.6	6.8	9.1
	DSP Engine Peak Perf – INT24	TOPs	2.1	3.0	3.0	3.7	4.5	2.3	3.0
	DSP Engine Peak Perf – CINT18	Complex TOPs	0.9	1.3	1.3	1.6	1.9	1.0	1.3
	DSP Engine Peak Perf – FP32	TFLOPs	1.5	2.1	2.1	2.6	3.2	1.6	2.1
Adaptable Engines	Adaptable Engine Peak Perf – INT1	TOPs	258	381	469	758	941	392	544
	Adaptable Engine Peak Perf – INT2	TOPs	118	175	215	347	431	180	250
	Adaptable Engine Peak Perf – INT4	TOPs	31	45	56	90	112	47	65
	Adaptable Engine Peak Perf – INT8	TOPs	8	12	14	23	29	12	17
Scalar Engines	Arm® Cortex-A72 Performance	DMIPs	18,942	18,942	18,942	18,942	18,942	19,516	19,516
	Arm Cortex-R5F Performance	DMIPs	2,672	2,672	2,672	2,672	2,672	2,672	2,672
Memory	Total Bandwidth - Block RAM	Tb/s	64	79	137	115	139	69	86
	Total Bandwidth - Ultra RAM	Tb/s	22	23	49	35	49	24	28
	Total Bandwidth - Accelerator RAM	Tb/s	0.4	0.0	0.0	0.0	0.0	0.0	0.0
	Total SRAM Bandwidth	Tb/s	86	102	186	150	188	92	114
I/O	Transceiver Bandwidth	Tb/s	0.51	2.48	2.48	2.48	2.48	2.10	2.10
	Sensor I/O Bandwidth	Gb/s	672	941	941	1,478	1,478	960	960
Platform Engines	DDR4 Memory Bandwidth	GB/s	51.2	51.2	76.8	102.4	102.4	76.8	76.8
	LPDDR4 Memory Bandwidth	GB/s	68.3	68.3	102.4	136.5	136.5	102.4	102.4
	NoC Cross-sectional Bandwidth	Tb/s	1.1	1.2	1.7	2.2	2.2	1.7	1.7

All parameters listed are maximum values. Verify all data in this document with the device data sheets or product guides found at: www.xilinx.com.

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Versal® ACAP Migration Table

Package Name	Footprint	Versal AI Edge Series							Versal AI Core Series							Versal Prime Series									Versal Premium Series						
		VE2002	VE2102	VE2202	VE2302	VE1752	VE2602	VE2802	VC1352	VC1502	VC1702	VC1802	VC1902	VC2602	VC2802	VM1102	VM1302	VM1402	VM1502	VM1802	VM2202	VM2302	VM2502	VM2902	VP1102	VP1202	VP1402	VP1502	VP1552	VP1702	VP1802
SBVA484	A484	■	■																												
SBVA625	A625	■	■																												
SFVA784	A784	■	■	■	■											■															
NBVA1024	A1024								■																						
NBVB1024	B1024																■	■													
NFVB1369	B1369																■	■	■												
NSVE1369	E1369								■																						
NSVF1369	F1369																■	■													
NSVG1369	G1369					■				■	■																				
NSVH1369	H1369						■	■						■	■																
VSVA1596(1)	A1596					■				■	■																				
VIVA1596(1)	A1596											■	■																		
VFVC1596	C1596																■	■													
VFVC1760	C1760																		■	■											
VSVD1760	D1760											■	■				■	■	■	■											
VFVF1760	F1760																				■	■			■	■	■				
VFVH1760	H1760						■	■						■	■																
VSVA2197	A2197					■				■	■	■	■						■	■											
VSVC2197	C2197																				■	■	■			■					
VSVA2785	A2785																								■	■	■	■	■		
VSVA3112	A3112																											■			
VSVA3340	A3340																										■	■	■	■	
LSVC4072	C4072																														■

Legend
■ Device
— Migration Path

Note:
1. VSVA1596 package dimensions are 37.5x37.5mm, VIVA1596 package dimensions are 40x40mm with 1.25mm overhang

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Versal® ACAP Ordering Information

Device Name				Device Attributes				Package Definition			
XC	V	C	1902	-1	M	S	E	V	S	V	D1760
Xilinx XC: Commercial XA: Automotive XQ: Defense	**Architecture** Versal	**Series Name** E: AI Edge C: AI Core M: Prime P: Premium H: HBM	**Device Number** Digits 1-3: Value Identifier Digit 4: # of Primary Cores	**Speed Grade** -1: Slowest -2: Mid -3: Highest	**Voltage** L: Low (0.7V) M: Mid (0.80V) H: High (0.88V)	**Static Screen** S: Standard L: Low Static	**Temp Grade** E: 0 to 110°C(1) I: –40 to 110°C(1) Q: –40 to +125°C M: –55 to +125°C	**Ball Pitch** V: 0.92mm, w/LSC N: 0.92mm, no LSC S: 0.8mm L: 1.0mm	**Lid** S: Lidless, w/Stiffener Ring F: Lidded B: Lidless, no Stiffener Ring H: Lidded Overhang I: Lidless, w/Stiffener Ring & Overhang	**RoHS6 Code** (2) V: Pb-free Ball Q: Eutectic Ball R: Ruggedized, Eutectic Ball	**Footprint**

Note:
1. Operation at 110°C Tj is limited to 3% of the device lifetime and can occur sequentially or at regular intervals as long as the total time does not exceed 3% of device lifetime—except -1E and -3E (standard 0–100°C).
2. All packages have Pb-free bumps.