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## **Understanding Embedded - Microprocessors**

Embedded microprocessors are specialized computing chips designed to perform specific tasks within an embedded system. Unlike general-purpose microprocessors found in personal computers, embedded microprocessors are tailored for dedicated functions within larger systems, offering optimized performance, efficiency, and reliability. These microprocessors are integral to the operation of countless electronic devices, providing the computational power necessary for controlling processes, handling data, and managing communications.

## **Applications of Embedded - Microprocessors**

Embedded microprocessors are utilized across a broad spectrum of applications, making them indispensable in

Details	
Product Status	Discontinued at Digi-Key
Core Processor	i3-7101TE
Number of Cores/Bus Width	2 Core, 64-Bit
Speed	3.4GHz
Co-Processors/DSP	-
RAM Controllers	DDR3L, DDR4
Graphics Acceleration	Yes
Display & Interface Controllers	-
Ethernet	-
SATA	-
USB	-
Voltage - I/O	-
Operating Temperature	-
Security Features	-
Package / Case	1151-LGA Module
Supplier Device Package	1151-FCLGA (37.5x37.5)
Purchase URL	https://www.e-xfl.com/product-detail/advantech/96mpi3k-3-4-3m11t

Email: info@E-XFL.COM

Address: Room A, 16/F, Full Win Commercial Centre, 573 Nathan Road, Mongkok, Hong Kong



Spec Code SR374

Ordering Code CM8067702867061

## Intel® Xeon® Silver 4116 Processor (16.5M Cache, 2.10 GHz)

Code Name	Kaby Lake			
<u>Essentials</u>				
Vertical Segment	Desktop			
Processor Number	i3-7101TE			
Status	Launched			
Launch Date	Q1'17			
Lithography	14 nm			
Recommended Customer Price	\$117.00			
<u>Performance</u>				
# of Cores	2			
# of Threads	4			
Processor Base Frequency	3.40 GHz			
Cache	3 MB SmartCache			
Bus Speed	8 GT/s DMI3			
TDP	35 W			
Supplemental Information				
Embedded Options Available	Yes			
Datasheet	Link			
Memory Specifications				
Max Memory Size (dependent on memory type)	64 GB			
Memory Types	DDR3L-1600, DDR4-2400			
Max # of Memory Channels	2			
Max Memory Bandwidth	34.1 GB/s			

Intel® HD Graphics 630	ECC Memory Supported ‡	Yes			
Graphics Base Frequency         350 MHz           Graphics Max Dynamic Frequency         1.10 GHz           Graphics Video Max Memory         64 GB           Graphics Output         eDP/DP/HDMI/DVI           4K Support         Yes, at 60Hz           Max Resolution (HDMI 1.4)‡         4096x2304@30Hz           Max Resolution (eDP - Integrated Flat Panel)‡         4096x2304@60Hz           Max Resolution (VGA)‡         N/A           DirectX* Support         12           OpenGL* Support         4.4           Intel® Quick Sync Video         Yes           Intel® InTru™ 3D Technology         Yes           # of Displays Supported ‡         3           Device ID         0x5902           Expansion Options         3           Scalability         1S Only           PCI Express Revision         3           PCI Express Configurations ‡         1x16,2x8,1x8+2x4           Max # of PCI Express Lanes         16           Package Specifications         FCLGA1151           Max CPU Configuration         1           T         T           Sub-JUNCTION         88°C           Package Size         37.5mm x 37.5mm           Low Halogen Options Available         See MDDS <td>Processor Graphics</td> <td></td>	Processor Graphics				
Graphics Max Dynamic Frequency Graphics Video Max Memory G4 GB Graphics Output GP/DP/HDMI/DVI 4K Support Yes, at 60Hz Max Resolution (HDMI 1.4)‡ 4096x2304@304B Max Resolution (DP)‡ 4096x2304@60Hz Max Resolution (eDP - Integrated Flat Panel)‡ Max Resolution (VGA)‡ Mi/A DirectX* Support 12 OpenGL* Support 4.4 Intel® Quick Sync Video Yes Intel® InTru™ 3D Technology Yes Intel® Clear Video HD Technology Yes # of Displays Supported ‡ 3 Device ID 0x5902 Expansion Options Scalability PCI Express Revision 3 PCI Express Revision 3 PCI Express Configurations ‡ 1x16,2x8,1x8+2x4 Max # of PCI Express Lanes 16 Package Specifications Sockets Supported FCLGA1151 Max CPU Configuration 1 T <sub-yjunction< bul=""> Package Size 37.5mm x 37.5mm See MDDS Advanced Technologies Intel® Optane™ Memory Supported ‡ Yes</sub-yjunction<>	Processor Graphics	Intel® HD Graphics 630			
Graphics Video Max Memory  Graphics Output  4K Support  Max Resolution (HDMI 1.4)‡  Max Resolution (DP)‡  Max Resolution (EDP - Integrated Flat Panel)‡  Max Resolution (VGA)‡  Max Bofect Support  Max DirectX* Support  Max Pes  Max Was DirectNote  Max DirectNote  Max Was DirectNote  Max W	Graphics Base Frequency	350 MHz			
Graphics Output	Graphics Max Dynamic Frequency	1.10 GHz			
Max Resolution (HDMI 1.4)‡  Max Resolution (DP)‡  Max Resolution (eDP - Integrated Flat Panel)‡  Max Resolution (VGA)‡  N/A  DirectX* Support  12  OpenGL* Support  4.4  Intel® Quick Sync Video  Yes  Intel® Intru™ 3D Technology  Yes  # of Displays Supported ‡  3  Device ID  0x5902  Expansion Options  Scalability  PCI Express Revision  3  PCI Express Revision  3  PCI Express Configurations ‡  1x16,2x8,1x8+2x4  Max # of PCI Express Lanes  16  Package Specifications  Sockets Supported  Max CPU Configuration  1  T <sub>JUNCTION</sub> 88°C  Package Size  37.5mm x 37.5mm  See MDDS  Advanced Technologies  Intel® Optane™ Memory Supported ‡  Yes	Graphics Video Max Memory	64 GB			
Max Resolution (HDMI 1.4)‡       4096x2304@30Hz         Max Resolution (DP)‡       4096x2304@60Hz         Max Resolution (VGA)‡       N/A         Max Resolution (VGA)‡       N/A         DirectX* Support       12         OpenGL* Support       4.4         Intel® Quick Sync Video       Yes         Intel® InTru™ 3D Technology       Yes         Intel® Clear Video HD Technology       Yes         # of Displays Supported ‡       3         Device ID       0x5902         Expansion Options       3         Scalability       1S Only         PCI Express Revision       3         PCI Express Configurations ‡       1x16,2x8,1x8+2x4         Max # of PCI Express Lanes       16         Package Specifications       FCLGA1151         Max CPU Configuration       1         T <sub>JUNCTION       88°C         Package Size       37.5mm x 37.5mm         Low Halogen Options Available       See MDDS         Advanced Technologies       Yes</sub>	Graphics Output	eDP/DP/HDMI/DVI			
Max Resolution (DP)‡       4096x2304@60Hz         Max Resolution (vGA)‡       4096x2304@60Hz         Max Resolution (VGA)‡       N/A         DirectX* Support       12         OpenGL* Support       4.4         Intel® Quick Sync Video       Yes         Intel® InTru™ 3D Technology       Yes         Intel® Clear Video HD Technology       Yes         # of Displays Supported ‡       3         Device ID       0x5902         Expansion Options       3         Scalability       1S Only         PCI Express Revision       3         PCI Express Configurations ‡       1x16,2x8,1x8+2x4         Max # of PCI Express Lanes       16         Package Specifications         Sockets Supported       FCLGA1151         Max CPU Configuration       1         T <sub>JUNCTION       88°C         Package Size       37.5mm x 37.5mm         Low Halogen Options Available       See MDDS         Advanced Technologies       Intel® Optane™ Memory Supported ‡       Yes</sub>	4K Support	Yes, at 60Hz			
Max Resolution (eDP - Integrated Flat Panel)‡  Max Resolution (VGA)‡  DirectX* Support  OpenGL* Support  12  OpenGL* Support  4.4  Intel® Quick Sync Video  Intel® InTru™ 3D Technology  Yes  Intel® Clear Video HD Technology  # of Displays Supported ‡  Device ID  Expansion Options  Scalability  PCI Express Revision  PCI Express Configurations ‡  Max # of PCI Express Lanes  Package Specifications  Sockets Supported  FCLGA1151  Max CPU Configuration  1  T <sub>JUNCTION FCLGA1151  Max CPU Configuration  1  T<sub>JUNCTION See MDDS  Advanced Technologies  Intel® Optane™ Memory Supported ‡  Yes</sub></sub>	Max Resolution (HDMI 1.4)‡	4096x2304@30Hz			
Max Resolution (VGA)‡  DirectX* Support  12  OpenGL* Support  4.4  Intel® Quick Sync Video  Intel® InTru™ 3D Technology  Yes  Intel® Clear Video HD Technology  # of Displays Supported ‡  3  Device ID  0x5902  Expansion Options  Scalability  PCI Express Revision  PCI Express Configurations ‡  1x16,2x8,1x8+2x4  Max # of PCI Express Lanes  16  Package Specifications  Sockets Supported  FCLGA1151  Max CPU Configuration  1  T <sub>JUNCTION</sub> 88°C  Package Size  37.5mm x 37.5mm  Low Halogen Options Available  Advanced Technologies  Intel® Optane™ Memory Supported ‡  Yes	Max Resolution (DP)‡	4096x2304@60Hz			
DirectX* Support         12           OpenGL* Support         4.4           Intel® Quick Sync Video         Yes           Intel® InTru™ 3D Technology         Yes           Intel® Clear Video HD Technology         Yes           # of Displays Supported ‡         3           Device ID         0x5902           Expansion Options         1S Only           Scalability         1S Only           PCI Express Revision         3           PCI Express Configurations ‡         1x16,2x8,1x8+2x4           Max # of PCI Express Lanes         16           Package Specifications         FCLGA1151           Max CPU Configuration         1           T <sub>JUNCTION         88°C           Package Size         37.5mm x 37.5mm           Low Halogen Options Available         See MDDS           Advanced Technologies         Intel® Optane™ Memory Supported ‡         Yes</sub>	Max Resolution (eDP - Integrated Flat Panel)‡	4096x2304@60Hz			
OpenGL* Support  Intel® Quick Sync Video  Intel® InTru™ 3D Technology  Yes  Intel® Clear Video HD Technology  # of Displays Supported ‡  Device ID  Ox5902  Expansion Options  Scalability  PCI Express Revision  PCI Express Configurations ‡  Max # of PCI Express Lanes  16  Package Specifications  Sockets Supported  FCLGA1151  Max CPU Configuration  1 T <sub>JUNCTION</sub> 88°C  Package Size  37.5mm x 37.5mm  Low Halogen Options Available  Advanced Technologies  Intel® Optane™ Memory Supported ‡  Yes	Max Resolution (VGA)‡	N/A			
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Device ID 0x5902  Expansion Options  Scalability 1S Only  PCI Express Revision 3  PCI Express Configurations ‡ 1x16,2x8,1x8+2x4  Max # of PCI Express Lanes 16  Package Specifications  Sockets Supported FCLGA1151  Max CPU Configuration 1  T <sub>JUNCTION</sub> 88°C  Package Size 37.5mm x 37.5mm  Low Halogen Options Available See MDDS  Advanced Technologies  Intel® Optane™ Memory Supported ‡ Yes	Intel® Clear Video HD Technology	Yes			
Scalability  PCI Express Revision  PCI Express Configurations ‡  1x16,2x8,1x8+2x4  Max # of PCI Express Lanes  16  Package Specifications  Sockets Supported  FCLGA1151  Max CPU Configuration  1  T <sub>JUNCTION</sub> 88°C  Package Size  37.5mm x 37.5mm  Low Halogen Options Available  Advanced Technologies  Intel® Optane™ Memory Supported ‡  Yes	# of Displays Supported ‡	3			
Scalability  PCI Express Revision  PCI Express Configurations ‡  1x16,2x8,1x8+2x4  Max # of PCI Express Lanes  16  Package Specifications  Sockets Supported  FCLGA1151  Max CPU Configuration  1  T <sub>JUNCTION</sub> 88°C  Package Size  37.5mm x 37.5mm  Low Halogen Options Available  Advanced Technologies  Intel® Optane™ Memory Supported ‡  Yes	Device ID	0x5902			
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PCI Express Configurations ‡  Max # of PCI Express Lanes  Package Specifications  Sockets Supported  FCLGA1151  Max CPU Configuration  1  T <sub>JUNCTION</sub> Package Size  John Max 37.5mm  Low Halogen Options Available  Advanced Technologies  Intel® Optane™ Memory Supported ‡  Yes	Scalability	1S Only			
Max # of PCI Express Lanes  Package Specifications  Sockets Supported FCLGA1151  Max CPU Configuration 1  T <sub>JUNCTION</sub> Package Size 37.5mm x 37.5mm  Low Halogen Options Available  Advanced Technologies  Intel® Optane™ Memory Supported ‡  Yes	PCI Express Revision	3			
Package Specifications  Sockets Supported FCLGA1151  Max CPU Configuration 1  T <sub>JUNCTION</sub> 88°C  Package Size 37.5mm x 37.5mm  Low Halogen Options Available See MDDS  Advanced Technologies  Intel® Optane™ Memory Supported ‡ Yes	PCI Express Configurations ‡	1x16,2x8,1x8+2x4			
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T <sub>JUNCTION</sub> 88°C  Package Size  37.5mm x 37.5mm  Low Halogen Options Available  See MDDS  Advanced Technologies  Intel® Optane™ Memory Supported ‡  Yes	Sockets Supported	FCLGA1151			
Package Size 37.5mm x 37.5mm  Low Halogen Options Available See MDDS  Advanced Technologies  Intel® Optane™ Memory Supported ‡ Yes	Max CPU Configuration	1			
Low Halogen Options Available  Advanced Technologies  Intel® Optane™ Memory Supported ‡  Yes	T <sub>JUNCTION</sub>	88°C			
Advanced Technologies  Intel® Optane™ Memory Supported ‡  Yes	Package Size	37.5mm x 37.5mm			
Intel® Optane™ Memory Supported ‡ Yes	Low Halogen Options Available	See MDDS			
	Advanced Technologies				
Intel® Turbo Boost Technology No	Intel® Optane™ Memory Supported ‡	Yes			
	Intel® Turbo Boost Technology	No			

Intel® vPro™ Technology ‡	No			
Intel® Hyper-Threading Technology ‡	Yes			
Intel® Virtualization Technology (VT-x) ‡	Yes			
Intel® Virtualization Technology for Directed I/O (VT-d) ‡	Yes			
Intel® VT-x with Extended Page Tables (EPT) ‡	Yes			
Intel® TSX-NI	No			
Intel® 64 ‡	Yes			
Instruction Set	64-bit			
Instruction Set Extensions	SSE4.1/4.2, AVX2			
Idle States	Yes			
Enhanced Intel SpeedStep® Technology	Yes			
Thermal Monitoring Technologies	Yes			
Intel® Identity Protection Technology ‡	Yes			
Security & Reliability				
Intel® AES New Instructions	Yes			
Intel® Software Guard Extensions (Intel® SGX)	Yes			
Intel® Memory Protection Extensions (Intel® MPX)	Yes			
Intel® OS Guard	Yes			
Intel® Trusted Execution Technology ‡	No			
Execute Disable Bit ‡	Yes			
Intel® Boot Guard	Yes			