

# GET STARTED!

## Development kits for AI and IOT

Bridge the Gap between prototype and field deployment with the UP development kits to reduce your time to market. Get ahead and start with validated hardware, software, framework, sensors and platform.

### AI DEVELOPMENT KITS



UP Squared AI Vision X Developer Kit



UP Squared AI Edge Retail Suite by AIM2



UP Squared PPE monitoring by Cortexica



UP Squared RoboMaker Developer Kit

### LORA IOT DEVELOPMENT KITS



LoRa + 4ZeroBox Industry 4.0 over LoRa on the edge



IoT in a box: LoRa easy deployment



UP LoRa@ Computing + The Things Network starter kit



ResIoT: On-premises private network solution

### OTHER IOT DEVELOPMENT KITS



Eurotech ESF starter kit



UP Squared Grove IoT Development kit



## UP Edge Computes

For AI, IoT, digital signage, automation & more!



	General purpose	General purpose	General purpose	General purpose	IoT	AI
System	UP-GWS	UPC-GWS	UPS-GWS	UP Squared Edge Computing	UP Squared IoT Edge Computing	UP Squared AI Edge Computing
SoC	Intel® Atom™ x5-z8350	Intel® Pentium™ N4200	Intel® Pentium™ N4200	Intel® Atom™ x7-E3950		
Max Clock speed	up to 1.92 GHz		up to 2.5 GHz		up to 2.0GHz	
Cores	Quad Core		Quad Core			
Graphics	Intel® HD 400 Graphics		Intel® HD Graphics 505			
VPU	-	-	-	optional ( via mPCIe)	optional ( via mPCIe)	AI Core X - Movidius™ Myriad™ X2485
FPGA	Intel® FPGA Altera Max V for 40-pin GP-bus	-	Intel® FPGA Altera MAX 10			
MCU	-	-	-	-	-	-
System memory	4GB		8GB			
Storage capacity	32GB		64GB			
Compatible OS	Microsoft Windows 10 full version, Linux (ubuntu, Ubuntu, Yocto), Android					
Pre-installed OS	Optional Ubuntu/ Windows			Optional Ubuntu/ Windows		
Power requirement	5V DC-in @ 4A 5.5/2.1mm jack		5V DC-in @ 6A 5.5/2.1mm jack			
Power consumption	13W		18W			
Dimensions (L X W)	95 x 91 x 37mm	91 x 67 x 55.2mm	95 x 95 x 50mm	100 x 105 x 69.4mm	100 x 105 x 69.4mm	100 x 105 x 69.4mm
Mounting	VESA plate included		VESA & DIN RAIL plate included			
Operating temperature	0°C - 40°C		0°C - 50°C			
Storage temperature	-40°C - 80°C					
Operating humidity	0% - 90% relative humidity, non-condensing					
MTBF (hours)	270,599 Hours	327,838 Hours	173,446 hours	173,446 hours	173,446 hours	173,446 hours
Certification	CE, FCC Class A					

	General purpose	General purpose	General purpose	General purpose	IoT	AI
Display, IO & Connectivity						
HDMI	1 (HDMI 1.4a)		1 (HDMI 1.4b)		1 (HDMI 1.4b)	
DP	-		1 (DP 1.2) 4K @ 60 hz		1 (DP 1.2) 4K @ 60 hz	
Audio	-					
USB port	4 x USB2.0 port Type A 1 x USB 3.0 OTG Micro B	1 x UB3.0 Type A	2 x USB2.0 Type A - 3 x USB3.0 Type A - 1 x USB 3.0 OTG Micro B			
Serial port	-					
HDD interface	1 x SATA 3.0					
Expansion Slot	-	-	1 x mPCIe 1 x M.2 2230 E key	1 x mPCIe 1 x M.2 2230 E key	1 x mPCIe (used if LTE model) 1x M.2 2230 E key ( used if WiFi/BT model)	1 x mPCIe (used if LTE model) 1x M.2 2230 E key ( used if WiFi/BT model)
40-pin GP-Bus	-	-	-	1	1	1
100-pin GP Bus	-	1	-	-	-	-
SMI slot	-	-	-	-	-	-
Others	-	-	-	-	-	-
Ethernet	1 x GbLAN (Realtek RTL8111G-CG)	1x GbLAN (Realtek RTL8111G-CG)	2 x GbLAN (Realtek RTL8111G-CG)	2 x GbLAN (Realtek RTL8111G-CG)	2 x GbLAN (Realtek RTL8111G-CG)	2 x GbLAN (Realtek RTL8111G-CG)
WiFi	optional by WiFi Kit	WiFi 802.11 b/g/n @ 2.4 GHz	optional ( via M.2 2230 )		x1 ( # WiFi/BT model)	
Bluetooth	optional by Bluetooth kit	Bluetooth 4.0 (BLE)	optional ( via M.2 2230 )		x1 ( # WiFi/BT model)	
LTE/4G	-	-	optional ( via mPCIe )		x1 ( # LTE model)	
LoRa	-	-	-	-	-	-
Cooling	fanless					
Longevity	2024	2024	2031	2031	2031	2031
Accessories	-		1x power adapter 1x US/EU power cord	1x power adapter 1x US/EU power cord 2x WiFi antenna ( # WiFi/BT model) 1x LTE antenna ( # LTE model)	1x power adapter 1x US/EU power cord 2x WiFi antenna ( # WiFi/BT model) 1x LTE antenna ( # LTE model)	1x power adapter 1x US/EU power cord



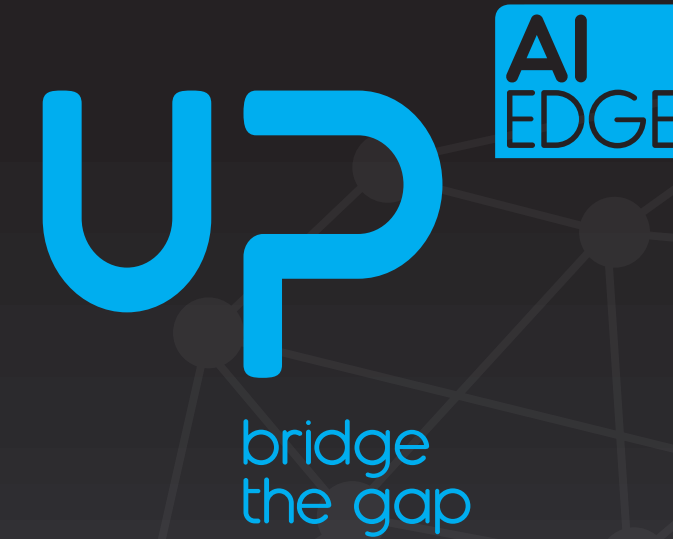
	IoT	IoT	IoT	Automation	General purpose
System	UP Squared LoRa Edge Computing	UP4-LoRa Edge	UP Squared LoRa (IP68)	UP-Automation Edge	UP Xtreme Edge
SoC	Intel® Atom™ x7-E3950	Intel® Atom™ x5-z8350	Intel® Atom™ x5-z8350	Intel® Atom™ x5-z8350	Intel® Core™ i7-6965UE, i5-8365UE, i3-8145UE, Intel® Celeron 4305UE
Max Clock speed	up to 2.0GHz		up to 1.92 GHz		up to 4.4 GHz
Cores	Quad Core				
Graphics	Intel® HD Graphics 505	Intel® HD 400 Graphics	Intel® HD Graphics 500	Intel® HD 400 Graphics	Intel® UHD Graphics 610 (Celeron) / 620 (Core-i)
VPU	optional ( via mPCIe)	-	optional ( via mPCIe)	-	optional ( via M.2 2280, mPCIe, 100-pin)
FPGA	Intel® FPGA Altera MAX 10	Intel® FPGA Altera Max V for 40-pin GP-bus	Intel® FPGA Altera MAX 10	Intel® FPGA Altera Max V for 40-pin GP-bus	Intel® FPGA Altera MAX 5
MCU	-	-	-	-	STM32
System memory	8GB	2GB	2GB/4GB (default)/8GB	2GB	4GB/8GB/16GB
Storage capacity	64GB	32GB (default)	16GB/32GB (default)/64GB/128GB	32GB (default)	64GB
Compatible OS	Microsoft Windows 10 full version, Linux (ubuntu, Ubuntu, Yocto), Android				
Pre-installed OS	Ubuntu/ Windows	optional ubuntu with various IoT platform	optional ubuntu with various IoT platform	optional ubuntu with various IoT platform	Optional Windows 10
Power requirement	5V DC-in @ 6A 5.5/2.1mm jack	5V DC-in @ 6A 5.5/2.1mm jack	5V DC-in @ 6A 5.5/2.1mm jack	5V DC-in @ 4A 5.5/2.1mm jack	12-60V DC-IN (lockable connector)
Power consumption	18W	13W	TBA	13W	26W
Dimensions (L X W)	100 x 105 x 69.4mm	130 x 95 x 44.2mm	239.4 x 159.4 x 69.4mm	130 x 95 x 44.2mm	132 x 190 x 103mm
Mounting	VESA & DIN RAIL plate included	optional VESA or DIN RAIL mounting	wall mount	optional VESA or DIN RAIL mounting	VESA plate included
Operating temperature	0°C - 50°C	0°C - 50°C	-20°C - 70°C (E3940) 0°C - 50°C (N3355)	0°C - 50°C	-20°C - 60°C
Storage temperature	-40°C - 80°C	-20°C - 70°C	-20°C - 70°C	-20°C - 70°C	-40°C - 80°C
Operating humidity	0% - 90% relative humidity, non-condensing				
MTBF (hours)	173,446 hours	TBA	TBA	TBA	TBA
Certification	CE, FCC Class A				

	IoT	IoT	IoT	Automation	General purpose
Display, IO & Connectivity					
HDMI	1 (HDMI 1.4b)		M12 Connector 1 (HDMI 1.4a)	1 (HDMI 1.4a)	1 (HDMI 2.0)
DP	1 (DP 1.2) 4K @ 60 hz		-	-	1 (DP 1.2) 4K @ 60 hz
Audio	Audio Out/Mic In				
USB port	2 x USB2.0 Type A - 3 x USB3.0 Type A - 1 x USB 3.0 OTG Micro B	4 x USB2.0 port Type A - 1 x USB 3.0 OTG Micro B	1 x USB 3.0 type A (M.12)	4 x USB3.0 port Type A - 1 x USB 3.0 OTG Micro B	4x USB3.0 (type A)
Serial port	-		2x 4 pin RS232 + 4 pin GPIO (M.12)	2x RS-232/422/485	2x RS232/422/485
HDD interface	1 x SATA 3.0		-	-	1 x SATA 3.0
Expansion Slot	1x mPCIe (used if LTE model) 1x M.2 2230 E key ( used if WiFi/BT model)	-	-	-	1x M.2 2280 B-M key 1x M.2 2230 E key 1x mPCIe
40-pin GP-Bus	1	-	-	-	1
100-pin GP Bus	-	-	-	-	1
SMI slot	-	-	1	-	1
Others	-	-	PoE IEEE802.3, Max 25W	AIO/DIO 6-pin block connector x 1 (8-bit ADC x 1, GPIO x 3, GND x 2)	Phoenix 1: 3V3, 5V, GND, I2C, GPIO x8, PWM x2 Phoenix 2: 3V3, GND, I2C, GPIO, CAN RS & TX, ADC x7
Ethernet	2 x GbLAN (Realtek RTL8111G-CG)	1 x GbLAN (Realtek RTL8111G-CG)	M 12 Connector 1 x GbLAN (Standard: Realtek® 8111G x 1 Wide temperature: Intel® I211 x 1)	1 x GbLAN (Realtek RTL8111G-CG)	2 x GbLAN ( 1x I210, 1x Intel I219)
WiFi	x1 ( # WiFi/BT model)	-	WiFi 802.11 a/b/g/n 2T2R	-	optional ( via M.2 2230 )
Bluetooth	x1 ( # WiFi/BT model)	-	Bluetooth 4.1	-	optional ( via M.2 2230 )
LTE/4G	x1 ( # LTE model)	-	4G LTE (EMEA)	4G LTE (EMEA)	optional ( via mPCIe )
LoRa	x1 (LoRa@ 868MHz)				
Cooling	fanless				
Longevity	2031	2024	170204100E (IP68 power connector cable)	2024	2034
Accessories	1x LoRa antenna 1x power adapter w 1x US/EU power cord	1x LoRa antenna 1x 5V@4A AC adapter with interchangeable power cable EU, US/AUS and CN	1x WiFi/BT antenna 1x LTE antenna 1x LoRa antenna	1x WiFi BT antennas 1x 4G antennas for 1 pcs each 1x 5V@4A AC adapter with interchangeable power cable EU, US/AUS and CN	1x power adapter 1x US/EU power cord 1x M.2 2280 thermal block



# The UP AI & IoT Landscape

# Validated Software Resources



**Empowering Edge Computing**  
The UP AI & IoT Landscape

Silicon	Connectivity	Operator	Cloud	IoT Software	AI Software	Sensors	Other
intel REALSENSE	Wi-Fi	telenor	Microsoft Azure	Microsoft Azure IoT Platform	FOGHORN	BASLER	ubuntu
intel Movidius	Bluetooth	stream	aws	ARDUINO	neurala	intel REALSENSE	Microsoft
intel FPGA	4G LTE	ARKESSA	Google Cloud	THE THINGS INDUSTRIES	CORTEXICA	seeed	EUROTECH
	LoRa		IBM Bluemix	IoT in a Box	deepomatic		MENDER
	enOcean			balena	sightcorp		EDGE X FOUNDRY
				logimic	PROPHESSEE		HMS
				relayr	MAXERIENCE		Actility
					A.I. Tech		Giga-concept
					GRAZPER		emutex
					SAIMOS		talkpol
					WAHTARI		ZERYNTH

## Deep Learning Deployment

**OpenVINO™**  
Open Visual Inference & Neural Network Optimization toolkit for inference deployment on CPU, processor graphics, FPGA & VPU using TF, Caffe & MXNet

**Intel® Movidius™ SDK**  
Optimized inference deployment for all Intel® Movidius™ VPUs using Tensorflow & Caffe

## Machine Learning Library

**Python**

- Scikit-learn
- Pandas
- NumPy

**R**

- Cart
- Random forest
- e1071

**Distributed**

- MLlib (on Spark)
- Mahout

**Deep learning framework optimized for**

## Analytics, Machine & Deep learning Primitives

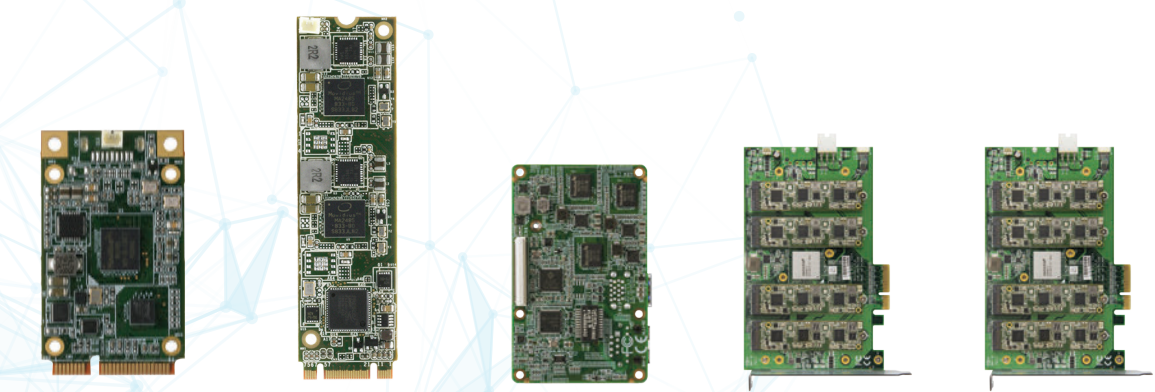
**Python**  
Intel distribution optimized for machine learning

**DAAL**  
Intel Data Analytics Acceleration Library (for machine learning)

**MKL-DNN / CIDNN**  
Open-source deep neural network functions for CPU, Processor graphics

**Intel® Ngraph™ Compiler (Alpha)**  
Open-sourced compiler for deep learning model computations optimized for multiple devices (CPU, GPU, NNP) using multiple frameworks (TF, MXNet, ONNX)

## VISION ACCELERATORS



	AI Core X	AI Core XM 2280	AI Vision Plus X	AI Core XP4	AI Core XP8
Form factor	Full-Size mPCIe	M.2 2280 B+M key	Custom 90x56.5mm	Half-Length PCIe Card	Half-Length PCIe Card
SoC	Movidius™ Myriad™ X 2485	Movidius™ Myriad™ X 2485	Movidius™ Myriad™ X 2485	Movidius™ Myriad™ X 2485	Movidius™ Myriad™ X 2485
Numbers of SoC	1	2	3	4	8
Dimension	51x30mm	22x80mm	90x56.5mm	111 x 170 mm	111 x 170 mm
GPIO reset (F75114)	Yes	Yes	Yes	Yes	Yes
Thermal	fanless heatsink / heatsink with active fan (Optional)	heatsink with active fan / fanless heatsink (Optional)	heatsink with active fan	heatsink with active fan	heatsink with active fan
OpenVINO Compliance	Yes	Yes	Yes	Yes	Yes

**CPU & integrated GPU**

**FPGA**

**VPU**

