

VOSM800 System-on-Module



Product Brief

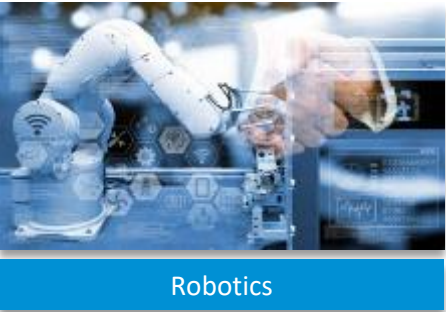
VOSM800 system-on-module is powered by NXP i.MX 8M Mini processor with main frequency up to 1.8GHz. The module integrates a quad-core Arm Cortex-A53 processor and provides up to 4GB LPDDR4 memory and 64GB eMMC storage. It boasts a variety of expansion interfaces, including video output interfaces, on-board Wi-Fi and Bluetooth, USB 2.0, and GPIOs to increase its versatility for diverse scenarios. The module features an LGA packaging that allows for direct welding, eliminating the need for additional connectors. Additionally, it is compliant with Open Standard Modules (OSM) V1.1, which enables seamless integration into various products. Moreover, the module provides an extended service life that meets the rigorous demands of industrial customers.

The module is designed to cater to a vast of application scenarios including but not limited to handheld devices, smart home appliances, industrial IoT devices, and gym instruments.

Features and benefits

VOSM800	
	Flexible option for advanced & compact editions
	Rich interfaces, robust system performance
	On-board Wi-Fi & Bluetooth
	Android operating system
	Compact size, LGA packaging
	Open Standard Modules (OSM) V1.1 compliant
	Extended service life (7+ years)

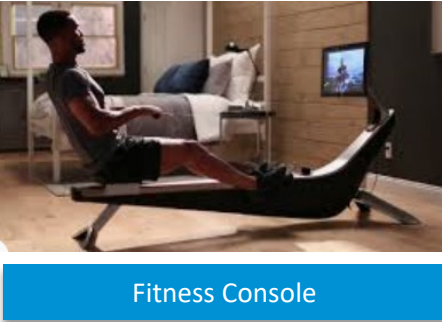
Application Scenarios



Robotics



Security & Surveillance



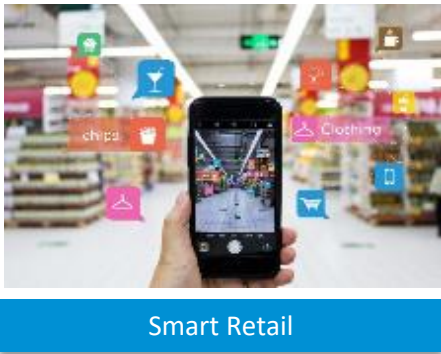
Fitness Console



Home Appliance

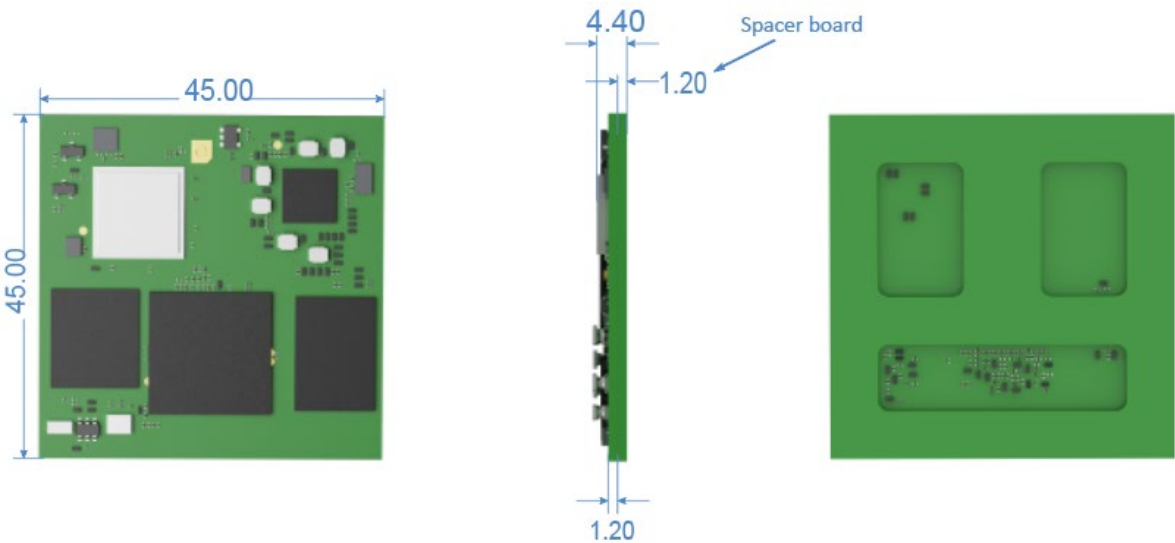


Industrial IoT



Smart Retail

Product Outlines



VOSM800 System-on-Module Datasheet

Specifications			
System	CPU	NXP i.MX 8M Mini, Quad-core ARM Cortex-A53, up to 1.8GHz	
	Memory	2GB LPDDR4 (Optional: 4GB)	
	Storage	16GB eMMC 5.1 (Optional: 64GB)	
	EEPROM	2Kb (for hardware configuration information)	
	PMIC	PCA9450AHN	
Communication	Wi-Fi	Wi-Fi 802.11 a/b/g/n/ac	
	Bluetooth	Bluetooth 5.0	
Media	Video processing	1080p60 H265, VP9 decoder 1080p60 H264, VP8 decoder	1080p60 H.264, VP8 encoder
	Graphics processing	GCNanoUltra for 3D acceleration	GC320 for 2D acceleration
Power	Input	5V/2A DC input	
Software	Operating system	Android 11, Linux (Support by request)	
	Device management	BlueSphere MDM (Optional for Android version)	
Mechanical	Dimensions	45mm x 45mm x 1mm	
Environment Condition	Temperature	Operating: -10°C ~ +60°C (Optional: -40°C ~ +85°C)	Storage: -20°C ~ +70°C
	Humidity	≤95% RH (Non-condensing)	
	Certification	CE, FCC	

I/Os		
MIPI DSI	1 x 4-lane MIPI DSI, up to 1080P @60Hz	
MIPI CSI	1 x 4-lane MIPI CSI	
I ² S	1 x I ² S	
SDIO	1 x 4-bit SDIO V3.0	
RGMII (Ethernet)	1 x RGMII	
SPI	1 x SPI	
UART	1 x Debug UART (1.8V level)	2 x Communication UART (TTL)
USB	1 x USB 2.0 Host	1 x USB 2.0 OTG
I ² C	2 x I ² C	
GPIO	26 x GPIO (Max.)	
JTAG	Supported	
Key	1 x Power key	1 x Reset key
PWM	2 x PWM	

Electrical Characteristics

Absolute Maximum Ratings

Voltage beyond absolute maximum ratings may cause permanent damage to the module. Operation of the module outside of recommended conditions may result in reduced lifetime and/or reliability problems even if the absolute maximum ratings are not exceeded.

Parameter		Min.	Max.	Unit
Voltage of the SOM		-0.5	6	V
Voltage on Wi-Fi/BT chip	VBAT	-0.5	3.9	V
	VDDIO	-0.5	5	V
Voltage of LPDDR4	LPDDR4X VDD1	-0.4	2.1	V
	LPDDR4X VDD2	-0.4	1.5	V
	LPDDR4X VDDQ	-0.4	1.5	V
Storage temperature		-20	70	°C

Recommended Operating Conditions

You are recommended to operate the module in the following conditions to achieve optimized performance of the module.

Parameter		Min.	Typ.	Max.	Unit
Voltage of the SOM		2.7	4.4	5.5	V
Voltage on Wi-Fi/BT chip	VBAT	3	3.3	4.4	V
	VDDIO	1.6	1.8	3.6	V
Voltage of EMCP	eMMC VCC	2.7	3.3	3.6	V
	eMMC VCCQ	1.7	1.8	1.95	V
	LPDDR4X VDD1	1.7	1.8	1.95	V
	LPDDR4X VDD2	1.06	1.1	1.17	V
	LPDDR4X VDDQ	0.57	0.6	0.65	V

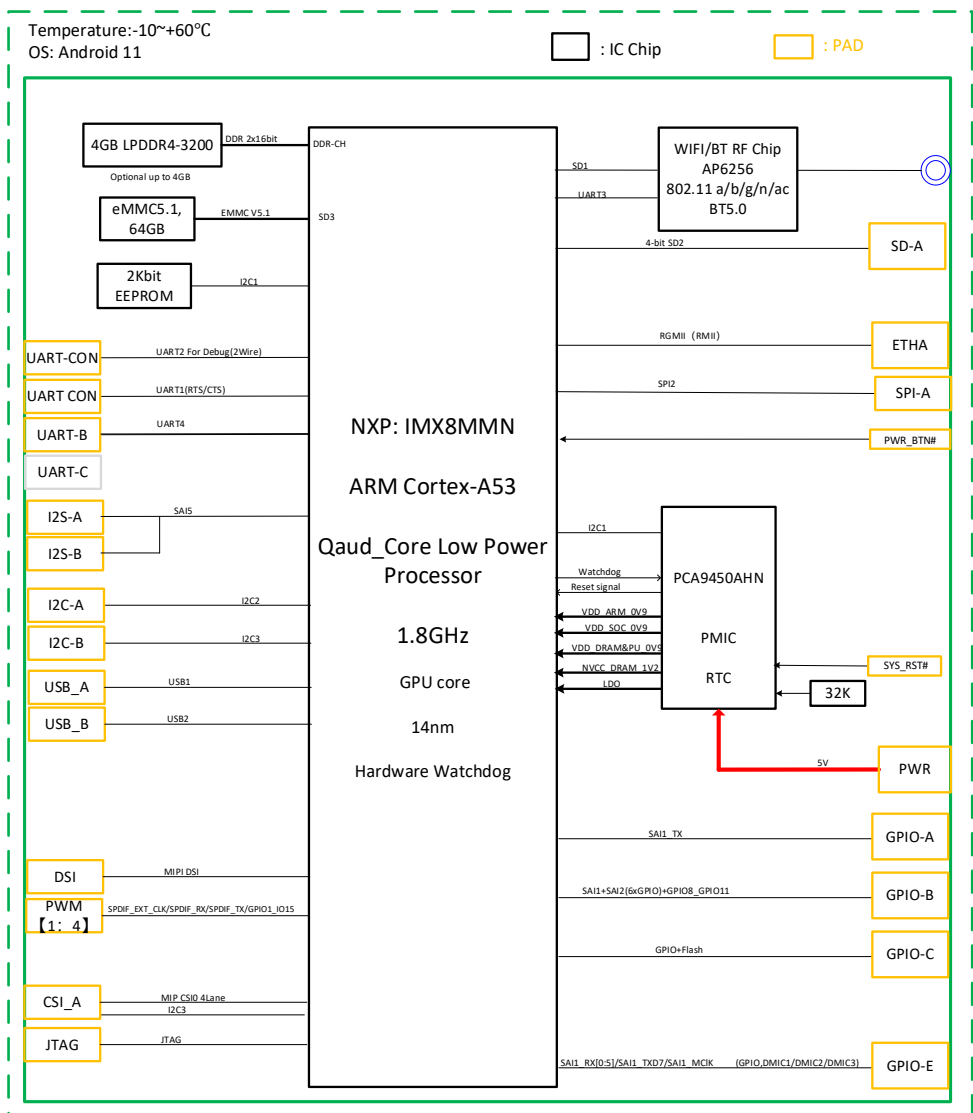
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- Recommended Operating Conditions (Cont'd)

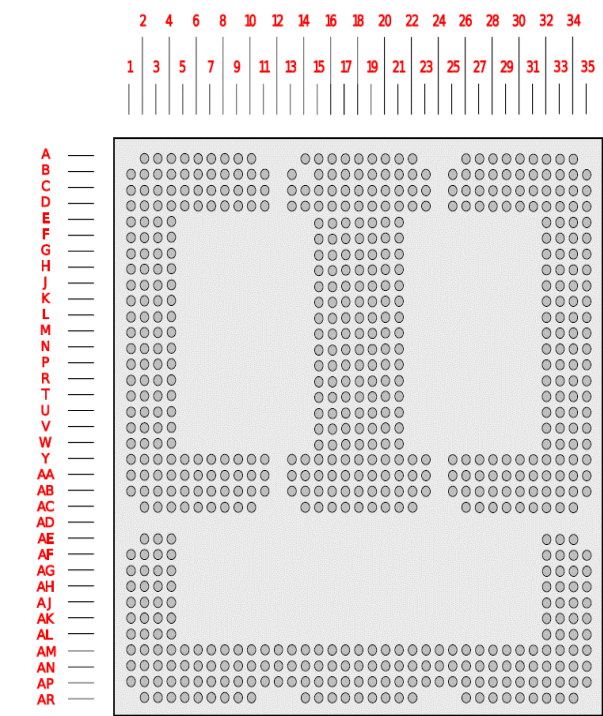
Parameter	Min.	Typ.	Max.	Unit
NVCC_SNV5_1P8	1.62	1.8	1.98	V
VDD_SNV5_0P8	0.8	0.9	1.1	V
VDD_24M_XTAL_1P8	1.62	1.8	1.98	V
VDD_ARM	0.805	0.85	0.95	V
VDD_SOC	0.78	0.82	0.9	V
VDD_VPU	0.805	0.85	1	V
VDD_GPU	0.805	0.85	1	V
VDD_DRAM	0.805	0.85	1	V
VDD_DRAM_PLL_0P8	0.805	0.85	1	V
NVCC_DRAM	1.06	1.1	1.17	V
VDD_DRAM_PLL_1P8	1.62	1.8	1.98	V
NVCC_JTAG	1.62	1.8	1.98	V
NVCC_NAND	1.62	1.8	1.98	V
NVCC_SAI1	1.62	1.8	1.98	V
NVCC_SAI2	1.62	1.8	1.98	V
NVCC_SAI3	1.62	1.8	1.98	V
NVCC_SAI5	1.62	1.8	1.98	V
NVCC_GPIO1	1.62	1.8	1.98	V
NVCC_I2C	1.62	1.8	1.98	V
NVCC_UART	1.62	1.8	1.98	
NVCC_ECSPi	1.62	1.8	1.98	V
NVCC_ENET	1.62	1.8	1.98	V
NVCC_SD1	1.62	1.8	1.98	V
NVCC_SD2	1.62	1.8	1.98	V
NVCC_CLK	1.62	1.8	1.98	V
VDD_USB_3P3	3.069	3.3	3.6	V
PVCC0_1P8	1.62	1.8	1.98	V
VDD_ARM_PLL_1P8	1.62	1.8	1.98	V
VDD_ANA0_1P8	1.62	1.8	1.98	V
VDD_USB_1P8	1.62	1.8	1.98	V

Parameter	Min.	Typ.	Max.	Unit
VDD_PCI_1P8	1.62	1.8	1.98	V
VDD_MIPI_1P8	1.62	1.8	1.98	V
VDD_ARM_PLL_0P8	0.78	0.82	0.9	V
VDD_ANA_0P8	0.78	0.82	0.9	V
VDD_USB_0P8	0.78	0.82	0.9	V
VDD_PCI_0P8	0.78	0.82	0.9	V
VDD_MIPI_1P2	1.14	1.2	1.26	V
VDD_MIPI_0P9	0.855	0.9	1	V

— Block Diagram



Pinout



(View from top, through the module)

Pin	Name	Type	Description
U19	NC		No connection
R18	NC		No connection
V17	EXT_EN	Passive	OSM module control signal
T17	BOOT_MODE1	Passive	System config Pin
AA9	ON/OFF	Passive	Power on/off
W17	NC		No connection
U17	NRST	Passive	System reset input, active low
AB18	VCC_BAT	Power	Power input, battery voltage
AA18	VCC_BAT	Power	Power input, battery voltage
Y25	VCC_IN_5V	Power	5V Power in
Y26	VCC_IN_5V	Power	5V Power in
Y27	VCC_IN_5V	Power	5V Power in
Y28	VCC_IN_5V	Power	5V Power in
C2	MIPI_CSI_MCLK/GPIO	Passive	Camera clock output/GPIO
G3	MIPI_CSI_PWDN/GPIO	Passive	Camera power down/GPIO
G4	MIPI_CSI_RST/GPIO	Passive	Camera interrupt signal input/GPIO
B3	CSI0A_L2N	Passive	Channel input CSI0A lane 2 N
B4	CSI0A_L2P	Passive	Channel input CSI0A lane 2 P
C1	CSI0A_L1N	Passive	Channel input CSI0A lane 1 N
B1	CSI0A_L1P	Passive	Channel input CSI0A lane 1 P
A2	CSI0B_L0N	Passive	Channel input CSI0B lane 0 N
A3	CSI0B_L0P	Passive	Channel input CSI0B lane 0 P
A5	CSI0A_L0N	Passive	Channel input CSI0A lane 0 N
A6	CSI0A_L0P	Passive	Channel input CSI0A lane 0 P

Pin	Name	Type	Description
B6	CSI0B_L1N	Passive	Channel input CSI0B lane 1 N
B7	CSI0B_L1P	Passive	Channel input CSI0B lane 1 P
C4	I2C3_SCL	Passive	I2C3 clock signal
C3	I2C3_SDA	Passive	I2C3 data signal
F4	MIPI_DSI_BL_EN /GPIO	Passive	MIPI_DSI 1V8 backlight enable signal output/GPIO
F3	MIPI_DSI_VDD_EN/ GPIO	Passive	MIPI_DSI 3V3 power enable signal output/GPIO
E18	MIPI_DSI_PWM	Passive	MIPI_DSI backlight PWM signal output
AB8	MIPI_TX_CLKN	Passive	MIPI_DSI differential clock lane -
AB7	MIPI_TX_CLKP	Passive	MIPI_DSI differential clock lane +
AB11	MIPI_TX_D0N	Passive	MIPI_DSI differential lane 0 -
AB10	MIPI_TX_D0P	Passive	MIPI_DSI differential lane 0 +
AC9	MIPI_TX_D1N	Passive	MIPI_DSI differential lane 1 -
AC8	MIPI_TX_D1P	Passive	MIPI_DSI differential lane 1 +
AC6	MIPI_TX_D2N	Passive	MIPI_DSI differential lane 2 -
AC5	MIPI_TX_D2P	Passive	MIPI_DSI differential lane 2 +
AB5	MIPI_TX_D3N	Passive	MIPI_DSI differential lane 3 -
AB4	MIPI_TX_D3P	Passive	MIPI_DSI differential lane 3 +
AA3	LCD_ID	Passive	LCD_ID
V21	SAI5_RXD0	Passive	not used
W21	SAI5_TXD0	Passive	HDMI audio signal output
V19	SAI5_RXD1	Passive	Audio signal input
W19	SAI5_TXD1	Passive	Audio signal output
W20	SAI5_BCLK	Passive	Audio/HDMI I2S bit clock
W18	SAI5_LRCLK	Passive	Audio/HDMI I2S left-right channel synchronization clock
V18	SAI5_MCLK	Passive	Audio/HDMI I2S master clock
AA15	I2C2_SCL	Passive	I2C2_SCL
AA16	I2C2_SDA	Passive	I2C2_SDA
AA20	I2C3_SCL	Passive	I2C3_SCL
AA21	I2C3_SDA	Passive	I2C3_SDA
AB13	OTG1_DN	Passive	USB2.0 OTG1 data -
AC14	OTG1_DP	Passive	USB2.0 OTG1 data +
AC16	USB_A_EN	Passive	OTG pulled high, no input detected at VBUS
AB14	OTG1_ID	Passive	USB2.0 OTG1 ID, high for device, low for host

(To be continued...)

Pin	Name	Type	Description
AC15	OTG1_OC	Passive	not used
AB16	USB1_VBUS	Passive	USB1_VBUS
AB23	USB2_DN	Passive	USB2.0 HOST data -
AC22	USB2_DP	Passive	USB2.0 HOST data +
AC20	OTG1_DRV	Passive	HOST2 OC IC enable
AB22	USB2_ID	Passive	USB2.0 HOST ID, always low
J21	SD2_NCD	Passive	SD card detection
F21	SD2_CLK	Passive	SDIO clock
E20	SD2_CMD	Passive	SDIO command/response
G20	SD2_DATA0	Passive	SDIO data line
G21	SD2_DATA1	Passive	SDIO data line
H20	SD2_DATA2	Passive	SDIO data line
H21	SD2_DATA3	Passive	SDIO data line
C20	NVCC_SD2	Passive	not used
D20	SD2_WP	Passive	not used
D21	SD2_NRST	Passive	not used
Y15	CPU_SPI2_SS0	Passive	FLASH_CS0
U16	CPU_SPI2_SCLK	Passive	FLASH_SCLK
U15	CPU_SPI2_MISO	Passive	FLASH_MISO
V15	CPU_SPI2_MOSI	Passive	FLASH_MOSI
AB2	PCIE_RXN	Passive	PCle data receive -
AB1	PCIE_RXP	Passive	PCle data receive +
AC3	PCIE_TXN	Passive	PCle data transmit -
AC2	PCIE_TXP	Passive	PCle data transmit +
V2	PCIE20_PERST	Passive	PCle20_PERST
W2	PCIE20_CLKREQ	Passive	PCle CLK

Pin	Name	Type	Description
Y1	PCIE_CLKN	Passive	PCle clock transmit -
D19	CPU_EXTPP_/NRST	Passive	CSI Power enable
E19	CPU_HUB_PRTTPWR1	Passive	MIPI DSI/HDMI; active low for HDMI (default); active high for MIPI DSI
F19	CPU_HUB_PRTTPWR2	Passive	
G19	ENET_/NRST	Passive	Interrupt request output (default)
H19	ENET_NINT	Passive	High level, LED solid red
J19	RS232_485_SW	Passive	TP reset
K19	TOUCH_/NRST	Passive	High level, LED solid green
L19	TOUCH_INT	Passive	LCD reset control; high level required
D3	LCD_IO_EN	Passive	High level, LED solid red
D4	CPU_EXT_3V3_EN	Passive	High level, LED solid green
E3	EXT_BL5V_EN	Passive	Flash SPI WP signal
AF32	LCD_RESET	Passive	High level, LED solid red
AF33	SYS_STATUS	Passive	System status
AG32	CPU_EXT_TP_EN	Passive	High level, LED solid red
AG33	EXT_BL12V_EN	Passive	High level, LED solid green
AH32	PCIE_PWR_EN	Passive	High level, LED solid red
AH33	USIM_DET2	Passive	High level, LED solid green
AJ32	ASIX_INT0	Passive	High level, LED solid red
AJ33	ASIX_INT1	Passive	High level, LED solid green
C14	UART3_CTS	Passive	UART RXD
C13	UART3_RTS	Passive	UART3_RTS
A14	UART3_RXD	Passive	UART3_RXD
B13	UART3_TXD	Passive	UART3_TXD
D14	UART4_RXD	Passive	UART4_RXD
D13	UART4_TXD	Passive	UART4_TXD
D22	UART2_RXD	Passive	UART2_RXD
D23	UART2_TXD	Passive	UART2_TXD

(To be continued...)

Pin	Name	Type	Description
A15	GND	GND	Ground
A17	GND	GND	Ground
A18	GND	GND	Ground
A19	GND	GND	Ground
A21	GND	GND	Ground
B15	GND	GND	Ground

Pin	Name	Type	Description
B16	GND	GND	Ground
B17	GND	GND	Ground
B18	GND	GND	Ground
B19	GND	GND	Ground
B20	GND	GND	Ground
B21	GND	GND	Ground

* Apart from those specified here, any pins not included in these sheets are not connected.

Ordering Information

Ordering No.	Chipset	Memory	Storage	Description
VOSM800-L	NXP i.MX 8M Mini	2GB LPDDR4	16GB eMMC	MIPI DSI, UART, USB, I ² C
VOSM800-H	NXP i.MX 8M Mini	4GB LPDDR4	64GB eMMC	
VT-SBC-VOSM800-EVB-L	NXP i.MX 8M Mini	2GB LPDDR4	16GB eMMC	VOSM800-L + carrier board, MIPI DSI/HDMI, UART, USB, I ² C
VT-SBC-VOSM800-EVB-H	NXP i.MX 8M Mini	4GB LPDDR4	64GB eMMC	VOSM800-H + carrier board, MIPI DSI/HDMI, UART, USB, I ² C

Packing list	
VOSM800 system-on-module	1

Optional accessories	
Adapter and power cord	1 kit
Wi-Fi and BT antenna	1

Company Profile

Since its establishment in 2002 by two Silicon Valley entrepreneurs, Vantron Technology has been at the forefront of the connected IoT devices and IoT platform solutions. Today, Vantron boasts a global customer base that includes several Fortune 500 companies. Its product lines cover edge intelligent hardware, IoT communication devices, industrial displays and BlueSphere cloud device management platforms.

With over 20 years of experience in R&D of embedded edge intelligent hardware, Vantron has provided users with diverse embedded solutions featuring ARM and X86 architectures. Its offerings range from Linux to Windows, from embedded to desktop level, and from gateway to server. In addition, it provides users with system clipping, driver transplantation and other related services.