Shuttle®

Medical Panel PC
M21AL01-i5
Intel Core i5-1235U

MEDICAL-GRADE PANEL PC WITH 21.5" TOUCH-DISPLAY

This high-value Panel PC comes features a rugged Aluminium chassis with an anti-bacterial and anti-septic coating and IP65-rated front panel for superior hygiene and infection control. The display is Full-HD and sports a projected capacitive 10-point multi-touch function. With its passive cooling the system is virtually noiseless, maintenance-free and approved for 24/7 nonstop operation. Compliant with IEC 60601-1 medical safety standards for electrical devices, this Panel PC is built for reliable operation in a wide range of healthcare environments.

Images for illustration only.

| 21.5"
Touch Display | Anti-Septic
Housing | IEC 60601
EN55011
Medical
Power Supply | M.2
NVMe SSD
Support | 2,5" SSD
Support | Dual
Intel LAN | WLAN-ac | Dual
Serial Port | 100 x 100 mm
VESA mount | Fanless | IP65 (Front) | Supports
24/7 |

ROBUST CHASSIS
■ White Color ■ Robust Aluminium chassis (3 mm thickness) with magnetic cover for the I/O connectors ■ IP65 front panel protection ■ Dimensions (WHD): 543 x 334 x 49.9 mm ■ Net weight: 7.6 kg ■ Fanless cooling system ■ Operating temperature: 0 ~ 40 °C ■ Humidity: 20 ~ 80% RH non-condensing ■ Mounting holes for 100 x 100 mm VESA mount (VESA mount and stand are not included)

MEDICAL-GRADE FEATURES
■ Anti-Septic coating based on an inorganic zinc compound (front panel) and epoxy/polyester resin (rear chassis) ■ Medical power adapter ■ Potential equalization pin (POAG) ■ Medical certificates: cTUVus (ANSI/AAMI ES60601-1:2005/(R)2012), CB (IEC/ EN 60601-1: 2005+A1: 2012), CE (EN 60601-1-2:2015, Class B), FCC Part 18

TOUCH PANEL AND GRAPHICS
■ High quality 21.5" / 54.6cm display with 1920x1080 pixels ■ Brightness: 500 cd/m2 (nits), Contrast ratio 1000:1, Viewing angle: 89° (all directions), Response time: 22 ms ■ Capacitive touch panel with 10-point multi-touch ■ Integrated Intel UHD graphics

OPERATING SYSTEM
■ An operating system is not included.
■ Supports Windows 10, Windows 11 and Linux (64-bit)

PROCESSOR
■ Intel Core i5-1235U, 2x P-Core, 8x E-Core, 12 MB Cache
■ Intel Core Gen. 12, "Alder Lake" ULV Prozessor, 15 W TDP

RAM & SSD SUPPORT (not included)
■ RAM: 2x 262-pin SO-DIMM slot supports up to 2x 32 GB DDR5-4800
■ M.2-SSD card: M.2-2280/2242 M slot supports PCIe/NVMe and SATA
■ Swappable drive tray for 2.5"/7mm SATA SSD storage drive

BACK PANEL CONNECTORS
■ HDMI 2.0b ■ VGA Port ■ 4x USB 3.2 Gen 1 (5 Mbps) ■ 4x USB 2.0 ■ Dual 2.5G LAN (Intel 226) ■ 2x COM Ports (RS232) ■ Mic-in and Line-out ■ DC-input 19V ■ Power Button and Easy Rock Switch ■ Potential Equalization Pin (POAG) including cable

OTHER FEATURES
■ WLAN 802.11ac / BT 4.2 with two internal antennas ■ Hardware TPM v2.0 ■ Full-HD Webcam ■ Two internal speakers (2x 2W, stereo)

POWER SUPPLY
■ Medical power adapter 90W/19V (IEC 60601-1 / EN55011)
■ AC input 100~240V 50~60 Hz, 3-pin connector
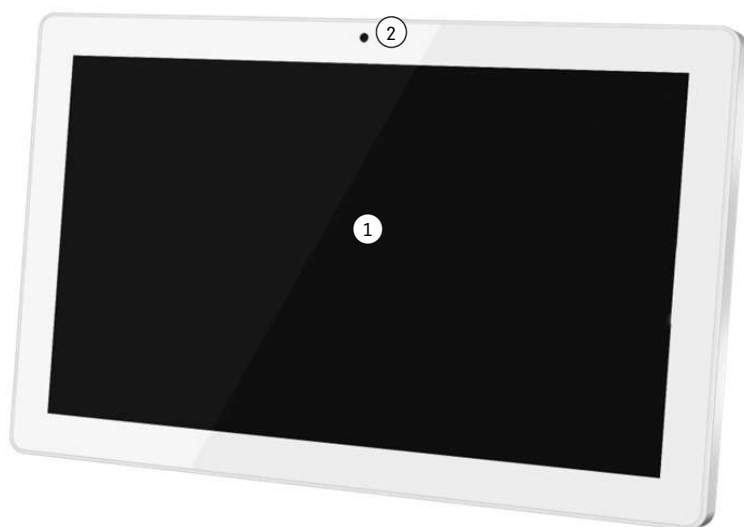■ DC input: 19V (optional 9~36V on request)

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Shuttle Panel-PCs with Intel Core Gen12 Processors "Alder Lake-U"

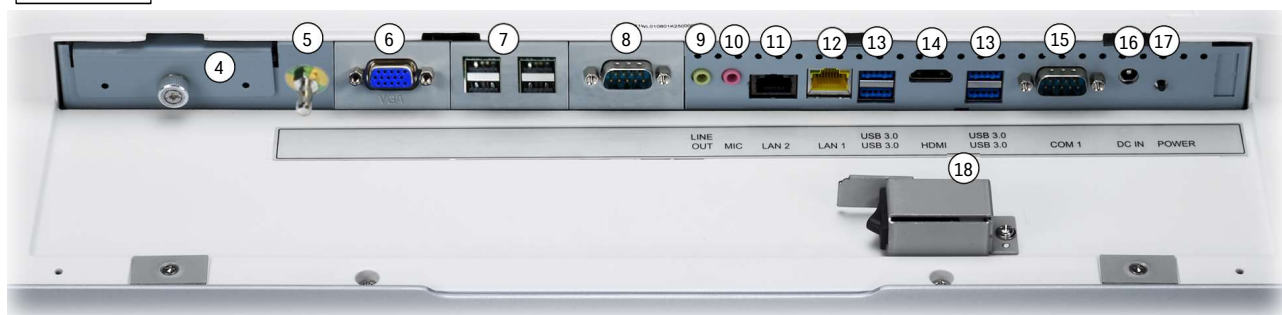| Touch Screen	Application	Panel-PC Model	Intel Processor	UPC Bar Code	Color (front / rear)	WLAN Antennas	DC Input	Medical Features
15.6" Full-HD 350 Nits	Industrial	**P15AL01**-i5	Core i5-1235U	887993007885	Black / Blue	external	9-36 V	—
	Medical	**M15AL01**-i5	Core i5-1235U	887993007526	White / White	internal	19 V	Anti-septic coating, POAG pin, Medical power adapter
21.5" Full-HD 500 Nits	Industrial	**P21AL01**-i3 **P21AL01**-i5	Core i3-1215U Core i5-1235U	887993007366 887993007359	Black / Blue	internal	19 V	—
	Medical	**M21AL01-i5**	Core i5-1235U	887993007588	White / White	internal	19 V	Anti-septic coating, POAG pin, Medical power adapter

Front and Back Panel

Front panel

1. 21.5" Touch Panel
2. Full-HD Webcam

Rear View

3. Screw threads for VESA mount (100x100 mm)
4. Swappable 2.5" drive tray for SSD (7 mm)
5. Potential Equalization Pin (POAG, DIN 42801)
6. VGA-Port (D-Sub)
7. 4x USB 2.0 Type A
8. RS232 Serial COM Port
9. Audio Line Out (Headphones output)
10. Microphone input
11. 2.5G LAN Port (Intel i226V)
12. 2.5G LAN Port (Intel i226V)
13. 4x USB 3.2 Gen 1 Type A port
14. HDMI 2.0b graphics port
15. RS232 Serial COM Port
16. DC-in connector for power adapter
17. Power button
18. Easy Rocker Switch
19. Rear cover with magnet holders

Back Panel

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SPECIAL FEATURES

Reliable nonstop operation
The Shuttle Panel PC M21AL01-i5 is officially approved for 24/7 permanent operation at an ambient temperature of up to 40 °C. Thanks to its low power consumption and completely passive cooling, this PC runs highly reliably and is virtually noiseless.
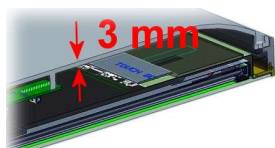
21.5" Full-HD Touch Screen
This Panel PC has a high-grade 21.5" Full-HD display with high brightness (500 nits) and low viewing angle dependence (±89°). The capacitive multitouch screen can also be operated with gloves and allows precise input with two or more fingers at the same time.

Anti-Septic Coating
The housing of this Panel PC comes with an anti-bacterial and anti-septic coating based on an inorganic zinc compound as antimicrobial substance to reduce the possibility of infection or sepsis through microorganisms like bacterias.

Robust Aluminium Chassis
Rear chassis and middle frame are completely made of high-grade Aluminium of 3 mm thickness.

Protection Class IP65
The front panel is dust-protected and protected from splashing of water according to IP protection class 65. Consequently, the touchscreen can be cleaned very easily and effectively. This is particularly welcome in hospitals, doctor's offices, laboratories, aged care centres or other places.

Triple Display Support
In addition to the built-in display two more independent displays can be connected via HDMI 2.0b and VGA.

VESA Mounting
The Shuttle Panel PC M21AL01-i5 has four threaded holes for mounting a 100 x 100 mm VESA mount, which is not included. For example, a suitable stand, VESA arm or wall mount can be used to mount the Panel PC.
Note: VESA mount and stand are not included in the scope of delivery.

Optional Stand „POV21"
A stand is not included in the scope of delivery. With "POV21", Shuttle offers a suitable, robust stand made of high-quality aluminum alloy. Optionally, two devices can also be mounted on this stand (e.g. for a Panel PC and an additional display).

Optimized cable management
The connections on the back panel are facing down and hidden by a cover. The cover snaps in magnetically and is also fixed with screws.

Through a small opening the cables are led away from the PC in an orderly fashion This leads to an effective cable management making for a clean, tidy appearance.

Hidden Power Button
Since the power button is not accessible when the cover is on, there is also a Rock Switch hidden on the back. You can also enable the "Restore on AC Power Loss" option in the BIOS so that it always starts immediately once voltage is applied.

External 2.5" Bay
A 2.5" drive bay for an SSD drive is accessible from the outside for easy swapping of storage for installation and upgrade convenience. Additionally, an SSD card in M.2-2280/2260 format can be installed inside.
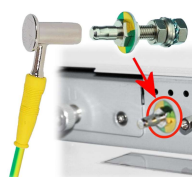
Dual Intel 2.5G Network
The Shuttle Panel PC M21AL01-i5 supports Dual 2.5G LAN with Intel network adapters, which are known for their excellent performance and driver compatibility and therefore are the preferred choice in professional environments.

Versatile connections
The numerous connections also include two serial COM ports (RS232) and eight USB ports (including 4x USB 3.2)

Potential equalization
This PanelPC comes with an Potential Equalization Pin (POAG) according to DIN 42801 in order to connect the Panel PC with a suitable potential equalization terminal, that might be required in medical environments.

Medical Power Adapter
The highly efficient external power adapter is designed for medical applications. It is certified according Medical Safety Standard IEC 60601-1 and also meets EN55011 and FCC Class B.

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PRODUCT SPECIFICATIONS

Comparison with the previous model

MODEL	M21AL01-i5 (New)	M21WL01-i5
Processor	**Intel Core i5-1235U** Intel Gen. 12 "Alder Lake-U", TDP= 15W, Intel 7 (10 nm) Technology	**Intel Core i5-8365UE** Intel Gen. 8 "Whiskey Lake-U", TDP= 15W, 14 nm Technology
RAM memory support	2x SO DIMM, 262 pins max. 2x 32 GB DDR5-4800 (or higher)	2x SO DIMM, 260 pins max. 2x 32 GB DDR4-2400 (or higher)
M.2-2280 Slot	M.2-2280M slot for M.2 SSD cards Supports M.2 SSD cards with 80 and 42 mm in length Supports NVMe/PCIe Gen4 X4 and SATA	M.2-2280M slot for M.2 SSD cards Supports M.2 SSD cards with 80 and 60 mm in length Supports NVMe/PCIe Gen3 X4 and SATA
21.5" Display	Resolution 1920 x 1080 Brightness: 500 cd/qm (nits) Viewing angle: 89° all directions	Resolution 1920 x 1080 Brightness: 300 cd/qm (nits) Viewing angle: 89° all directions
Intel vPro/AMT	No	vPro/AMT is supported
TPM	Hardware TPM 2.0 module (Infineon SLB9670VQ2)	Hardware TPM 2.0 module (Infineon SLB9670VQ2)
Dual LAN	2x Intel LAN with 2.5 Gbps (Intel i226V and i226LM)	2x Intel LAN with 1 Gbps (Intel i211 and i219LM)
Grafik Ports	HDMI 2.0b VGA	HDMI 1.4b DVI-I
USB Ports	4x USB 3.2 Gen1 (5 Gbps) 4x USB 2.0	4x USB 3.2 Gen1 (5 Gbps)
COM Ports	2x Serial COM-Port (RS232)	3x Serial COM-Port (2x RS232 and 1x RS232/422/485)
Front View		
I/O Ports		

Shuttle Panel-PCs with Intel Gen12 Prozessor

	15.6" Display		21.5" Display	
Display Size				
Model	P15AL01-i5	M15AL01-i5	P21AL01-i3/i5	M21AL01-i5
Application	**Industrial Panel-PC**	**Medical Panel-PC**	**Industrial Panel-PC**	**Medical Panel-PC**
Chassis Color	Front: black Back: dark blue	Front: white Back: white	Front: black Back: dark blue	Front: white Back: white
Medical Coating	—	Anti-Septic Coating (front and rear)	—	Anti-Septic Coating (front and rear)
Processor Options	Intel Core i5-1235U	Intel Core i5-1235U	Intel Core i3-1215U or Intel Core i5-1235U	Intel Core i5-1235U
Display Features	Resolution: 1920 x 1080 Brightness: 350 nits 10-point capacitive touch	Resolution: 1920 x 1080 Brightness: 350 nits 10-point capacitive touch	Resolution: 1920 x 1080 Brightness: 500 nits 10-point capacitive touch	Resolution: 1920 x 1080 Brightness: 500 nits 10-point capacitive touch
I/O Ports	HDMI 2.0b, VGA 4x USB 3.2, 4x USB 2.0 2x Intel LAN (2.5G), 2x Audio, 1x COM	HDMI 2.0b, VGA 4x USB 3.2, 4x USB 2.0 2x Intel LAN (2.5G), 2x Audio, 1x COM	HDMI 2.0b, VGA 4x USB 3.2, 4x USB 2.0 2x Intel LAN (2.5G), 2x Audio, 2x COM	HDMI 2.0b, VGA 4x USB 3.2, 4x USB 2.0 2x Intel LAN (2.5G), 2x Audio, 2x COM
POAG *)	—	POAG connector with cable	—	POAG connector with cable
M.2-Slot for SSD	Supports M.2-2280 SSD card PCIe Gen4 x4 (NVMe) / SATA	Supports M.2-2280 SSD card PCIe Gen4 x4 (NVMe) / SATA	Supports M.2-2280 SSD card PCIe Gen4 x4 (NVMe) / SATA	Supports M.2-2280 SSD card PCIe Gen4 x4 (NVMe) / SATA
2.5" Bay for SSD	—	—	Supports 2.5" SSD (SATA)	Supports 2.5" SSD (SATA)
WLAN Antenna	External Antennas	Internal Antennas	Internal Antennas	Internal Antennas
Power Adapter	Standard Power Adap. 90W IEC 62368-1 / 60950-1	Medical Power Adapter 90W IEC 60601-1 / EN55011	Standard Power Adap. 90W IEC 62368-1 / 60950-1	Medical Power Adapter 90W IEC 60601-1 / EN55011
DC-Input **)	DC-Input supports 9-36V	DC-Input supports 19V	DC-Input supports 19V	DC-Input supports 19V
Front View				
Rear View				

*) POAG: Shuttle Medical Panel-PCs come with an **Potential Equalization Pin** (POAG) in order to connect the PC with a potential equalization terminal.
**) the DC-Input normally supports 19V input voltage only. However, an optional voltage regulator module VOL01 can be added to support an extended voltage range of 9...36V. Among the Panel PCs listed above, only the P15AL01-i5 model is already equipped with VOL01 as standard.

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SHUTTLE Panel PC M21AL01-i5 — SPECIFICATIONS
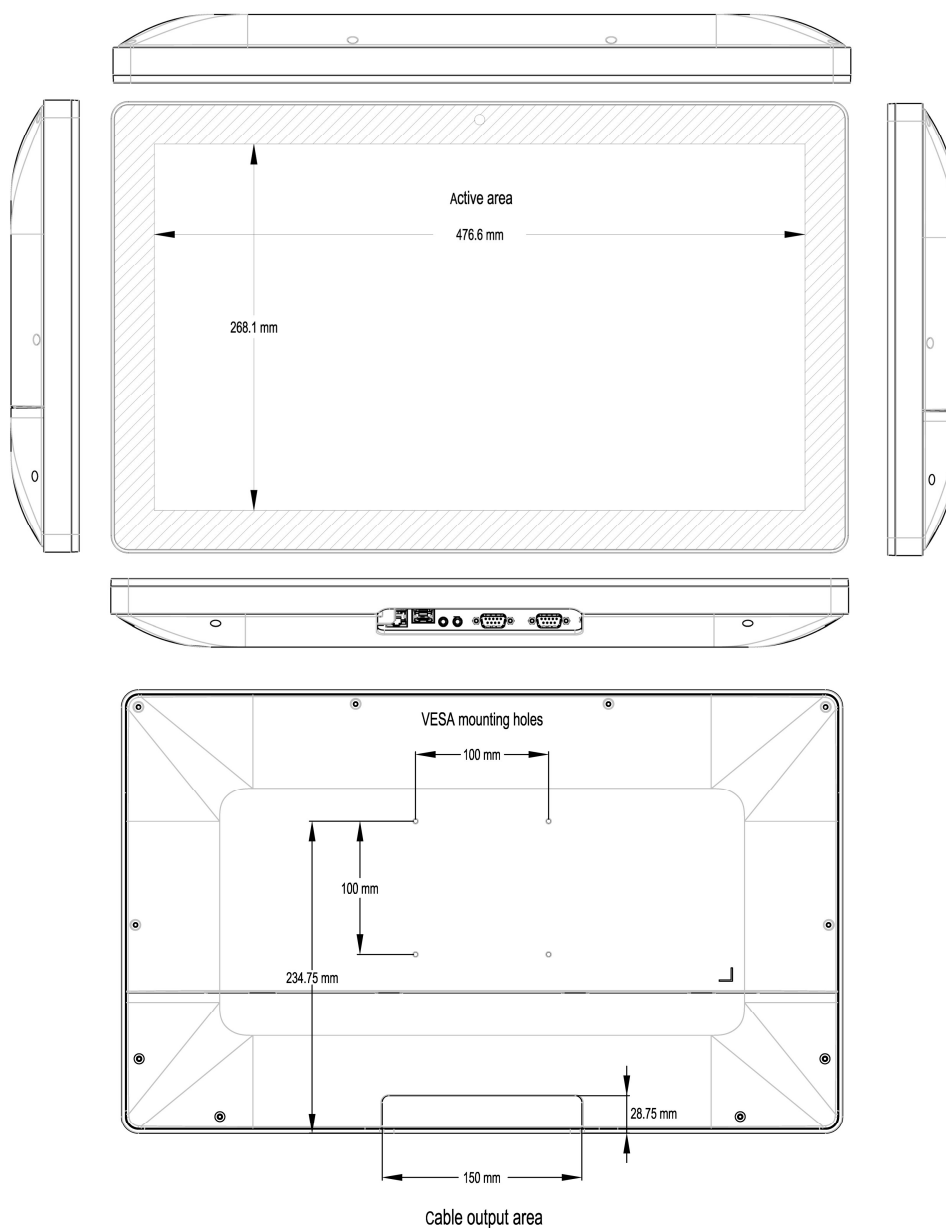
FANLESS AND SILENT	Passive heatpipe cooling, absolutely no fan noise Perfect for noise-sensitive environments Fanless, dust-free and thus virtually maintenance-free
24/7 NONSTOP OPERATION	This device is approved for 24/7 permanent operation. Requirements: - Free circulation of air amongst the PC must be guaranteed. - If a SSD is installed, this must also be approved for permanent operation by its manufacturer.
IP65 PROTECTED	The front panel is protected from dust and jets of water according to protection class IP65.
CHASSIS	Anti-Septic coating based on an inorganic zinc compound (front panel) and epoxy/polyester resin (rear chassis) Robust chassis with cover for the I/O connectors Rear/cable cover and middle frame are all made of Aluminium Rear cover chassis thickness: 3.0 mm Color: White Dimensions: 543 x 334 x 49.9 mm (W x H x D) 100x100 mm VESA mountable, 4x M4x6L screws required) VESA mount and stand are not included in the scope of delivery. Net weight: 7.6 kg
OPERATING SYSTEM	This system comes without operating system. It is compatible with: - Windows 10 (64-bit) - Windows 11 (64-bit) - Linux (64-bit)
TOUCHSCREEN	Touchscreen function supports fingertip input Projected capacitive touch panel with 10-point multi-touch and antibacterial coating Supports input with gloves (PVC, cotton, cotton/linen) Stylus pen not supported
DISPLAY (54.6 см / 21.5")	54.6 cm / 21.5" LC display Type: a-Si TFT-LCD, VA mode Ratio: 16:9 wide-screen panel Native resolution: 1920 x 1080 = 2 Megapixel (Full HD / 1080p) Viewing angle (left/right/up/down): 89° Brightness: 500 cd/sqm or nits (typ.) Contrast: 1000:1 (typ.) Viewing Angle: 89°/89°/89°/89° (typ.) Response time: 22 ms (typ.)
PROCESSOR	Model: Intel Core i5-1235U (ULV) 12th Generation Intel Core, code name "Alder Lake-U" System-on-a-chip architecture (SoC) with integrated memory and graphics controller FCBGA1744 package - directly soldered onto the mainboard Processor cores: total 10 - Performance Cores: 2 P-Cores (4 Threads) at 1.3 / 4.4 GHz basis/turbo clock - Efficient Cores: 8 E-Cores at 0.9 / 3.3 GHz basis/turbo clock Smart Cache: 12 MB TDP wattage: 15 W maximum Manufacturing process: Intel 7 (10 nm) Maximum Tjunction Temperature: 100 °C
INTEGRATED GRAPHICS	Intel® Iris® Xe Graphics with 80 Execution Units (EU) Graphics Max Dynamic Frequency: 1.20 GHz Supports up to three independent screens: 1) Built-in Full-HD display (supports 1080p/60) 2) HDMI 2.0b port (supports 1080p/60 and 2160p/60) 3) VGA port (supports 1080p/60)
UEFI BIOS	Supports resume after power failure Supports Wake on LAN (WOL) Supports Power on by RTC Alarm Supports boot from M.2 SSD cards and USB devices AMI BIOS in EEPROM with SPI interface Supports hardware monitoring and Watchdog function Supports Unified Extensible Firmware Interface (UEFI)

TPM MODULE	Hardware Trusted Platform Module (Infineon SLB9670VQ2 TPM 2.0)
POWER ADAPTER	External 90 W power adapter (fanless) Model FSP090-RBBM1 Medical Safety IEC 60601-1, Meet EN55011 and FCC Class B Input: 90~264 V AC, 50/60 Hz Output: 19 V DC, 4.74 A, max. 90 W DC Connector: 5.5/2.5 mm (outer/inner diameter) AC mains cable: 3 pins, with C5/C6 coupler (called "Mickey Mouse" or "Clover-leaf") for the power adapter and CEE-7/7 plug with earth-contact (type E+F) for the power outlet DOE Energy Efficiency Level VI No Load Power Consumption ≤ 0.21W Dimensions: 140 x 71 x 22 mm
DC INPUT CONNECTOR	DC Input Connector: 5.5 / 2.5 mm (outer/inner diameter) The DC-input of the computer supports an external power source with 19V ± 5%.
WIDE DC-ɪɴ RANGE (Oᴘᴛɪoɴᴀʟ)	The DC input voltage range can optionally be extended to support 9-36 V. For this purpose, an accessory item must be purchased separately.
MEMORY SUPPORT	2x SO-DIMM slot with 262 pins Supports DDR5-4800 (PC5-38400) SDRAM at 1.1 V Supports Dual Channel mode Supports a maximum of 32 GB per DIMM, maximum total size: 64 GB
2.5" BAY SUPPORTS SSDs	Supports one SATA SSD drive in 6.35 cm / 2.5" format and up to 7 mm in height The SATA 3.0 interface supports up to 600 MB/s of data transfer speed (6 Gbit/s) The drive can quickly be installed via the swappable drive tray. No Hot-Swap capability (exchanging during a running operation)
M.2 SLOT FOR SSDs	The M.2 2280 M slot provides the following interfaces: - PCI-Express Gen. 4.0 X4 - SATA v3.0 (max. 6 Gbps) It supports M.2 SSD cards with a width of 22 mm and a length of 80 or 42 mm (type 2280 or 2242). Supports M.2 SATA SSDs (with B+M key) and M.2 PCIe NVMe SSDs (with M key) with auto interface detect
WEBCAM	Integrated Full-HD 2.0 Megapixel (1920 x 1080) camera
AUDIO & SPEAKERS	Audio Realtek® ALC888S High-Definition Audio Two analog audio connectors (3.5 mm) on the back panel: 1) 2 channel line out (headphones) 2) microphone input Digital multi-channel audio output: via HDMI Two built-in speakers (2x 2W Stereo)
DUAL 2.5G LAN	Dual network with RJ45 ports and Intel i226V network chips Supports 10 / 100 / 1000 / 2500 MBit/s operation Supports WAKE ON LAN (WOL) Supports network boot by Preboot eXecution Environment (PXE)
WIRELESS NETWORK (WLAN)	Built-in M.2-2230-E WLAN card with two internal antennas (external antennas available on request) WLAN Controller Realtek RTL8821CE Supports WiFi IEEE 802.11b/g/n/ac in the 2.4 / 5 GHz band, 1T1R Supports 20 / 40 / 80 MHz channel bandwidth Security: supports WPA(-PSK), WPA2(-PSK), WEP 64/128 bit, IEEE 802.11x, IEEE 802.11i Supports Bluetooth 4.2 in the 2.4 GHz band
BACK PANEL CONNECTORS	Power Button and Easy Rocker Switch HDMI 2.0b (digital video+audio) VGA (analog video, D-Sub) 4x USB 3.2 Gen 1 Type A (max. 5 Gbps) 4x USB 2.0 Type A 2x Intel 2.5G LAN (RJ45, Intel i226V) 2x Serial Port DB9/D-sub (RS232) Microphone input (3.5 mm) Audio Line-out / Headphones (3.5 mm) DC-input connector for external power adapter (19V / 90W) Potential Equalization Pin (POAG) according to DIN 42801 - the POAG cable is included

OTHER CONNECTION OPTIONS	The backpanel has three sections, which can be assigned with other connections. This requires a modification of the metallic back panel shield. Available ports: HDMI, DisplayPort, DVI-I, VGA, Quad USB 2.0, COM.
ENVIRONMENTAL SPECIFICATIONS	Operating temperature: 0 ~ 40 ℃ Storage temperature: -20 ~ 60 ℃ Permitted relative humidity: 20 ~ 80 % (non-condensing)
CONFORMITY AND CERTIFICATIONS	EMI: CE Class B, FCC Class B Safety: CB, cTUVus RF: RED (EU) Medical certificates: cTUVus (ANSI/AAMI ES60601-1:2005/(R)2012), CB (IEC/ EN 60601-1: 2005+A1: 2012), CE (EN 60601-1-2:2015, Class B), IEC 60601-1-2: 2015, FCC Part 18 (CISPR 11, Class B) This device is classed as a technical information equipment (ITE) in class B. The CE-mark approves the conformity by the EU directives: (1) 2014/30/EU relating to electromagnetic compatibility (EMC), (2) 2014/35/EU relating to Electrical Equipment designed for use within certain voltage limits (LVD), (3) 2009/125/EC relating to eco design requirements for energy-related products (ErP) (4) 2014/53/EU Radio Equipment Directive (RED)

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SHUTTLE Panel PC M21AL01-i5 — TECHNICAL DRAWING

Overall dimensions: 543 x 334 x 49.9 mm (WHD)

Active area

476.6 mm

268.1 mm

VESA mounting holes

100 mm

100 mm

234.75 mm

28.75 mm

150 mm

Cable output area

VESA mount and stand are not included in the scope of delivery.

MODIFICATION ON REQUEST

Upon request on a project-related basis, the Shuttle Panel PC M21AL01-i5 can be ordered with external WLAN antennas or other connections (e.g. DisplayPort, additional USB ports or a second HDMI port).
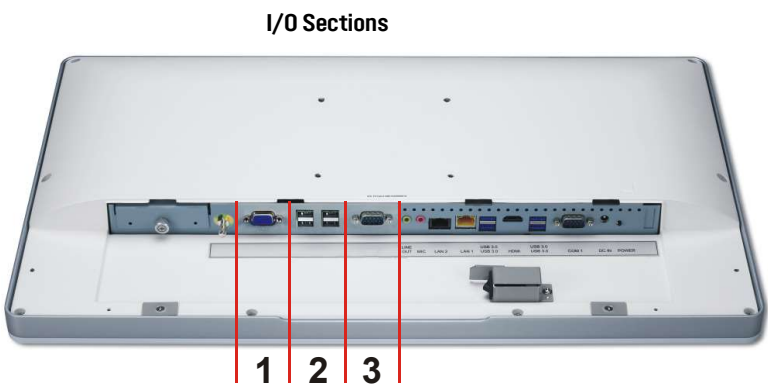
Shuttle can also offer project customers a product version with other processors, e.g. Core i3 or Core i7.

External WLAN antennas upon reqest

Other connection options

The backpanel has three sections, which can be assigned with other connections.

I/O Sections

PORT	IMAGE	OCCUPIED SECTIONS	MAXIMUM KITS
HDMI 2.0	HDMI	1	2
DVI-I	DVI	1	2
D-Sub/VGA	VGA	1	2
4x USB 2.0	USB 2.0 USB 2.0	1	2
Single COM (RS232 only)	COM	1	1
Dual COM (RS232/RS422/RS485)	COM COM	2	1

Please contact us for further details and options.