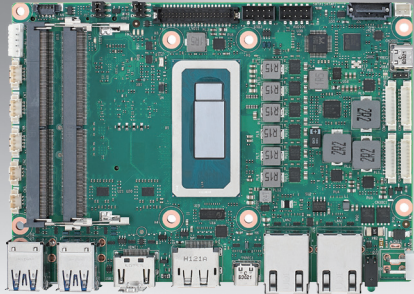


MIO-5377R

13th Gen. Intel® Core™ Processors (Code Name: Raptor Lake-P) 3.5" SBC with USB4 for MXM GPU

NEW



Features

- 13th Gen. Intel® Core™ Processor up to 14 Cores, TDP 28/15W
- Dual Channel DDR5-4800 up to 64GB, IB ECC support by SKU
- 4 simultaneous displays: LVDS/HDMI/DP/USB-C Alt. DP
- 2x LAN, 8x USB (incl. 1x USB4), 4x UART, 2x CANBus, 3x I²C
- 3 Expansions: M.2 E-Key, B-Key, M-Key (support NVMe)
- Supports Windows 10 LTSC & Ubuntu 22.04 LTS, embedded software APIs, DeviceOn

Software APIs:



Utilities:



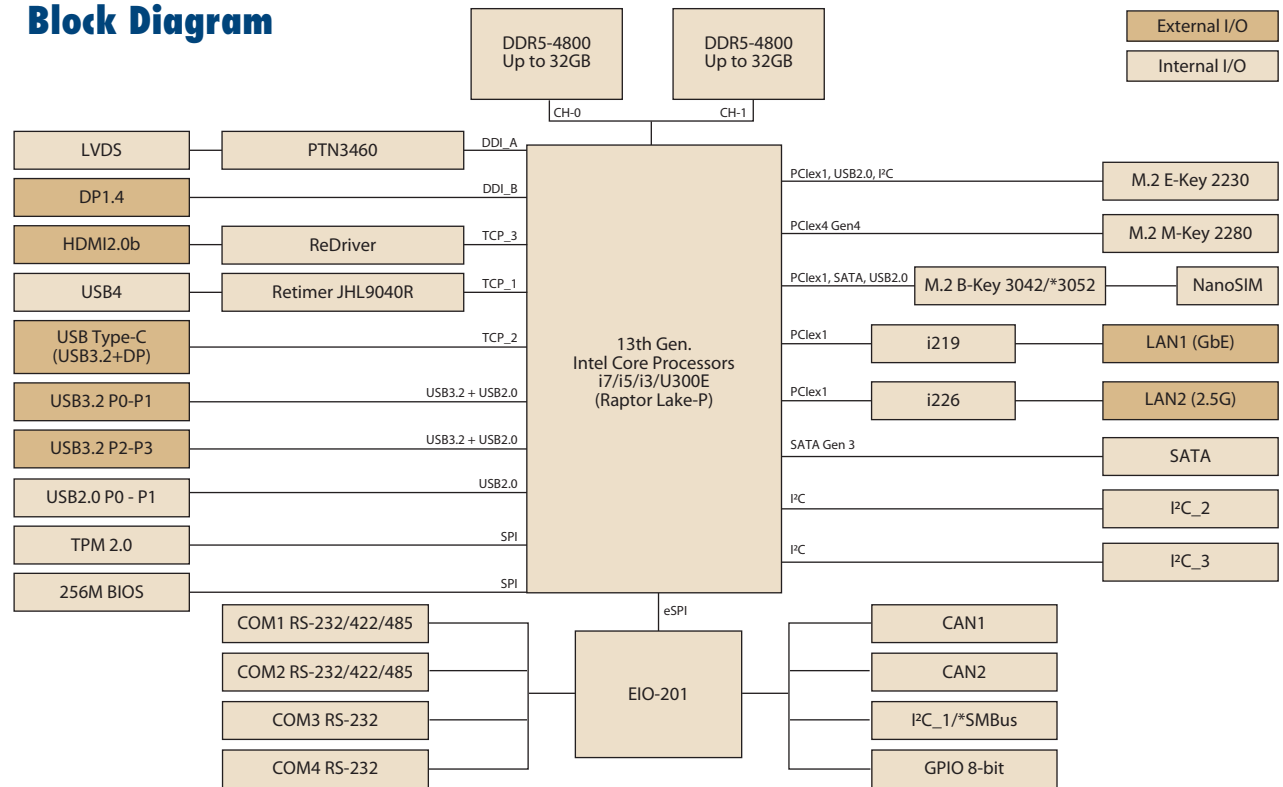
Windows 10 Ubuntu DeviceOn iManager CE FC

Specifications

| | Processor | i7-1370PE | i7-1370PRE | i7-1365UE | i7-1365URE | i5-1345UE | i3-1315UE | U300E | |
|---------------|---|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|
| Platform | Max. Frequency (P-Core) | 4.80 GHz | 4.80 GHz | 4.90 GHz | 4.90 GHz | 4.60 GHz | 4.50 GHz | 4.30 GHz | |
| | Base Frequency (P-Core) | 1.90 GHz | 1.90 GHz | 1.70 GHz | 1.70 GHz | 1.40 GHz | 1.20 GHz | 1.10 GHz | |
| | Core/Thread | 6P+8E / 20T | 6P+8E / 20T | 2P+8E / 12T | 2P+8E / 12T | 2P+8E / 12T | 2P+4E / 8T | 1P+4E / 6T | |
| | Intel® Smart Cache (L3) | 24MB | 24MB | 12MB | 12MB | 12MB | 10MB | 8MB | |
| | CPU TDP | 28W | 28W | 15W | 15W | 15W | 15W | 15W | |
| | Chipset | On-package Intel 600 Series Chipset | | | | | | | |
| Memory | Technology | DDR5-4800 | | | | | | | |
| | Max. Capacity | Up to 64GB | | | | | | | |
| | IB ECC | No | Yes | No | Yes | No | No | No | |
| Graphics | Channel/Socket | Dual Channels / 2 sockets | | | | | | | |
| | Controller | Intel® Iris® Xe Graphics | | | | | | Intel® UHD Graphics | |
| | Max. Frequency | 1.40 GHz | 1.40 GHz | 1.30 GHz | 1.30 GHz | 1.25 GHz | 1.20 GHz | 1.10 GHz | |
| | Execution Units | 96 | 96 | 96 | 96 | 80 | 64 | 48 | |
| Display I/F | 3D/HW Acceleration | DX12.1, OGL4.6, OCL3.0, HW Encode: H.265/HEVC, H.264, MPEG2, HW Decode: H.265 | | | | | | | |
| | LCD | 1 x LVDS: Dual Channel 18/24-bit, up to 1920 x 1200 | | | | | | | |
| | HDMI/DP | 1 x HDMI 2.0b, up to 4096 x 2160 x 24bpp@60Hz 1 x DP1.4, up to 4096 x 2304 x 36bpp@60Hz | | | | | | | |
| Ethernet | Multiple Display | 4 simultaneous displays via LVDS + HDMI + DP + USB Type-C Alt. Mode | | | | | | | |
| | Controller | LAN1: Intel i219 ; LAN2: Intel i226 | | | | | | | |
| | Speed | LAN1: GbE ; LAN2: 2.5GbE | | | | | | | |
| | TSN support | No | Yes (LAN2 only) | No | Yes (LAN2 only) | No | No | No | |
| External I/O | Ethernet | 2 x RJ-45 | | | | | | | |
| | HDMI/DP | 1 x HDMI, 1 x DP | | | | | | | |
| | USB Type-C | 1 x USB3.2 Gen2x1 10Gbps, support DisplayPort1.4 Alt. Mode | | | | | | | |
| | USB Type-A | 4 x USB3.2 Gen2x1 10Gbps | | | | | | | |
| | LED | Power status, SATA R/W | | | | | | | |
| | Power DC-Jack | Optional | | | | | | | |
| | Internal I/O | SATA | 1 x SATA GenIII 6.0Gbps | | | | | | |
| USB4 | | 1 USB4 with USB Type-C, Bandwidth min. 20Gbps, max. 40Gbps, with USB3.2, Display & PCIe | | | | | | | |
| USB2.0 | | 2 | | | | | | | |
| COM Port | | 2 x RS-232/422/485, 2 x RS-232 (4-wire), max. 1Mbps | | | | | | | |
| CAN Bus | | 2 x CAN2.0 | | | | | | | |
| Serial Bus | | 3 x I ² C (CN6 is BOM option to 1 x SMBus by request; First priority is to use CN6; On Windows, CN7 & CN8 are supported by custom BIOS) | | | | | | | |
| Audio | | Realtek ALC888s, Line-in/Line-out/MIC | | | | | | | |
| GPIO | | 8-bit general purpose input output I/O | | | | | | | |
| Inverter | | 12V/5V/3.3V selectable | | | | | | | |
| Fan | | 12V, 1A (4-wire) | | | | | | | |
| Board Feature | Front Panel Control | Power-on, Reset, Buzzer, SATA LED, CaseOpen | | | | | | | |
| | Watchdog Timer | 65536 level, 0-65535 sec | | | | | | | |
| | TPM | Discrete TPM2.0 IC (*iTPM support by request) | | | | | | | |
| | iManager 3.0 | SW API for Hardware Monitor, Smart Fan Control, Brightness Control, I ² C, GPIO, WDT | | | | | | | |
| Expansion | M.2 E-Key | 1 x E-Key 2230 (PCIex1, USB2.0) for WiFi/BT module | | | | | | | |
| | M.2 B-Key | 1 x B-Key 3042 (PCIex1, SATA, USB2.0) for storage and 4G/LTE module w/ Nano SIM (Default with 3042. *Support 3052 for 5G module by request.) | | | | | | | |
| | M.2 M-Key | 1 x M-Key 2280 (PCIe Gen4 x4) for NVMe SSD | | | | | | | |
| Power | Supply Voltage | Vin: DC 12V-24V ± 10%; RTC Battery: Lithium 3V/220mAh (*200mAh for Extend Temp. SKU) | | | | | | | |
| | Connector | ATX 2x2 pin 90D, optional DC-Jack, or ATX 2x2 pin 180D | | | | | | | |
| | Power Management | AT, ATX | | | | | | | |
| | Max. Consumption (*Ref. data with Burn-In Test. Please contact FAE for adapter selection.) | 12V: 46.7W 24V: 48.5W | 12V: 46.7W 24V: 48.5W | 12V: 29.5W 24V: 29.7W | 12V: 29.5W 24V: 29.7W | 12V: 25.6W 24V: 27.5W | 12V: 24.5W 24V: 25.1W | 12V: 24.0W 24V: 26.3W | |
| | Idle Consumption | 12V: 23.4W 24V: 24.3W | 12V: 23.4W 24V: 24.3W | 12V: 18.8W 24V: 19.8W | 12V: 18.8W 24V: 19.8W | 12V: 17.6W 24V: 19.3W | 12V: 15.8W 24V: 17.0W | 12V: 15.7W 24V: 19.7W | |
| Environment | Temperature | Operating: Standard: 0 - 60 °C (32 - 140 °F); *Extend: -40 - 85 °C (-40 - 185 °F), support with selected SKU Storage: -40 - 85 °C (-40 - 185 °F) | | | | | | | |
| | Humidity | Operating: 40 °C @ 95% relative humidity, non-condensing Storage: 60 °C @ 95% relative humidity, non-condensing | | | | | | | |
| | Vibration Resistance | 3.5 Grms | | | | | | | |
| Certification | EMC, FCC Class B | | | | | | | | |
| Mechanical | Dimensions 146 x 102 mm (5.7" x 4") | | | | | | | | |

*Note: Support by request

Block Diagram



*Note: Support by request

Ordering Information

| Part No. | CPU | Core | Max. Frequency | TDP | Memory IB ECC | GPU | GPU Max. Frequency | Execution Units | LAN2 with TSN support | Thermal Solution | Operating Temperature |
|--------------------|------------|-------|----------------|-----|---------------|--------------|--------------------|-----------------|-----------------------|------------------|-----------------------|
| MIO-5377RC7P-Q8A1 | i7-1370PE | 6P+8E | 4.80 GHz | 28W | No | Xe Graphics | 1.40 GHz | 96 EUs | No | Active Cooler | 0 ~ 60 °C |
| MIO-5377RC7PX-Q8A1 | i7-1370PRE | 6P+8E | 4.80 GHz | 28W | Yes | Xe Graphics | 1.40 GHz | 96 EUs | Yes | Active Cooler | -40 ~ 85 °C |
| MIO-5377RC7-Q9A1 | i7-1365UE | 2P+8E | 4.90 GHz | 15W | No | Xe Graphics | 1.30 GHz | 96 EUs | No | Passive Heatsink | 0 ~ 60 °C |
| MIO-5377RC7X-Q9A1 | i7-1365URE | 2P+8E | 4.90 GHz | 15W | Yes | Xe Graphics | 1.30 GHz | 96 EUs | Yes | Passive Heatsink | -40 ~ 85 °C |
| MIO-5377RC5-Q6A1 | i5-1345UE | 2P+8E | 4.60 GHz | 15W | No | Xe Graphics | 1.25 GHz | 80 EUs | No | Passive Heatsink | 0 ~ 60 °C |
| MIO-5377RC3-Q5A1 | i3-1315UE | 2P+4E | 4.50 GHz | 15W | No | UHD Graphics | 1.20 GHz | 64 EUs | No | Passive Heatsink | 0 ~ 60 °C |
| MIO-5377RU-Q3A1 | U300E | 1P+4E | 4.30 GHz | 15W | No | UHD Graphics | 1.10 GHz | 48 EUs | No | Passive Heatsink | 0 ~ 60 °C |

Packing List

| Part No. | Description | Quantity |
|----------------|---|----------|
| | MIO-5377 SBC | 1 |
| 2046537701 | Startup Manual | 1 |
| 1700006291 | SATA Cable, 30cm | 1 |
| 1700031583-01 | SATA Power Cable, 35cm | 1 |
| 1700030406-01 | USB 2.0 Cable, 20cm | 1 |
| 1700030404-01 | COM Port Cable: COM1/COM2, 20cm | 2 |
| 1700031582-01 | COM Port Cable: COM3/COM4, 20cm | 2 |
| 1700019584-01 | Audio Cable, 20cm | 1 |
| 1970005548T001 | MIO-5377 Heatsink (Passive for TDP 15W CPU) | 1 |
| 1970005512T001 | MIO-5377 QFCS (Active for TDP 28W CPU) | 1 |

Rear I/O View



Optional Accessories

| Part No. | Description |
|----------------|---|
| 1970005615T001 | MIO-5377 Heatspreader |
| MIOe-UMXM-FVA1 | USB4 to MXM carrier card, ATX conn., 12V |
| MIOe-UMXM-WVA1 | USB4 to MXM carrier card, Phoenix conn., 12-24V |
| 1700034699-01 | Thunderbolt3 cable (compatible to USB4), 20cm |

Embedded OS/API

| OS | Part No. | Description |
|--------------------------------------|------------------------|---|
| Windows 10 LTSC | 20706WX1HS0057 | Win10 IoT Ent. 2021 LTSC 64bit, High End: Core i7 |
| | 20706WX1VS0057 | Win10 IoT Ent. 2021 LTSC 64bit, Value: Core i5/i3 |
| | 20706WX1ES0057 | Win10 IoT Ent. 2021 LTSC 64bit, Entry: U300E |
| Ubuntu 22.04 LTS | 20706U22DS0022 | Ubuntu Desktop 22.04 LTS 64-bit |
| Advantech Robotic Suite Software API | Download from ESS-WIKI | Advantech Robotic Suite v1.3.0 |
| Yocto BSP | Website Download | SUSI v4.0 |
| | Support by Request | Yocto BSP and Test Image |

Compatible Expansion Boards

MIOe-UMXM



Specifications

| | | | |
|---------------|-----------------------|---|--|
| Product | MXM carrier card | MIOe-UMXM-WVA1 | MIOe-UMXM-FVA1 |
| Expansion | Supported MXM Modules | Type A | Type A, B, B+ |
| Power | Supply DC-in | 12-24V | 12V |
| | Connector | 2-pin phoenix connector | ATX 2x2pin 180D, optional to 90D |
| | MXM Power Requirement | Supply up to 60W TGP MXM | Supply up to 115W TGP MXM |
| Internal I/O | USB4 | 2, support alternate mode: DP1.4, up to 40Gbps bandwidth; 1 port upstream to Host, 1 port downstream to Device | |
| | SMBus | 1 | |
| | Fan | 12V, 4-wire smart fan | |
| External I/O | DP | 4 x DP1.4a, up to 3840x2160 (4K UHD) resolution @120Hz, or 7680x4320 (8K) @60Hz. max. 4 simultaneous outputs | |
| Environment | Temperature | Operating: 0~55°C | Operating: 0~50°C |
| | Humidity | Operating: 40 @95% relative humidity, non-condensing | |
| | Vibration Resistance | 3.5 Grms | |
| Certification | EMC | CE, FCC Class B | |
| Mechanical | Dimensions | 140 x 100mm | |
| Compatible | USB4 Host | MIO-5377, MIO-5377R series | MIO-5377, MIO-5377R series |
| | MXM GPUs | SKY-MXM-A1000-4SDA | SKY-MXM-A1000-4SDA SKY-MXM-A4500-6SDA |

Ordering Information

| Part No. | MXM support Type | USB4 (Type-C) | DP | Power DC-in | Power Connector | Operating Temperature |
|----------------|------------------|---------------|----|-------------|-----------------|-----------------------|
| MIOe-UMXM-WVA1 | Type A | 2 | 4 | 12~24V | Phoenix | 0 ~ 55 °C |
| MIOe-UMXM-FVA1 | Type A, B, B+ | 2 | 4 | 12V | ATX | 0 ~ 50 °C |