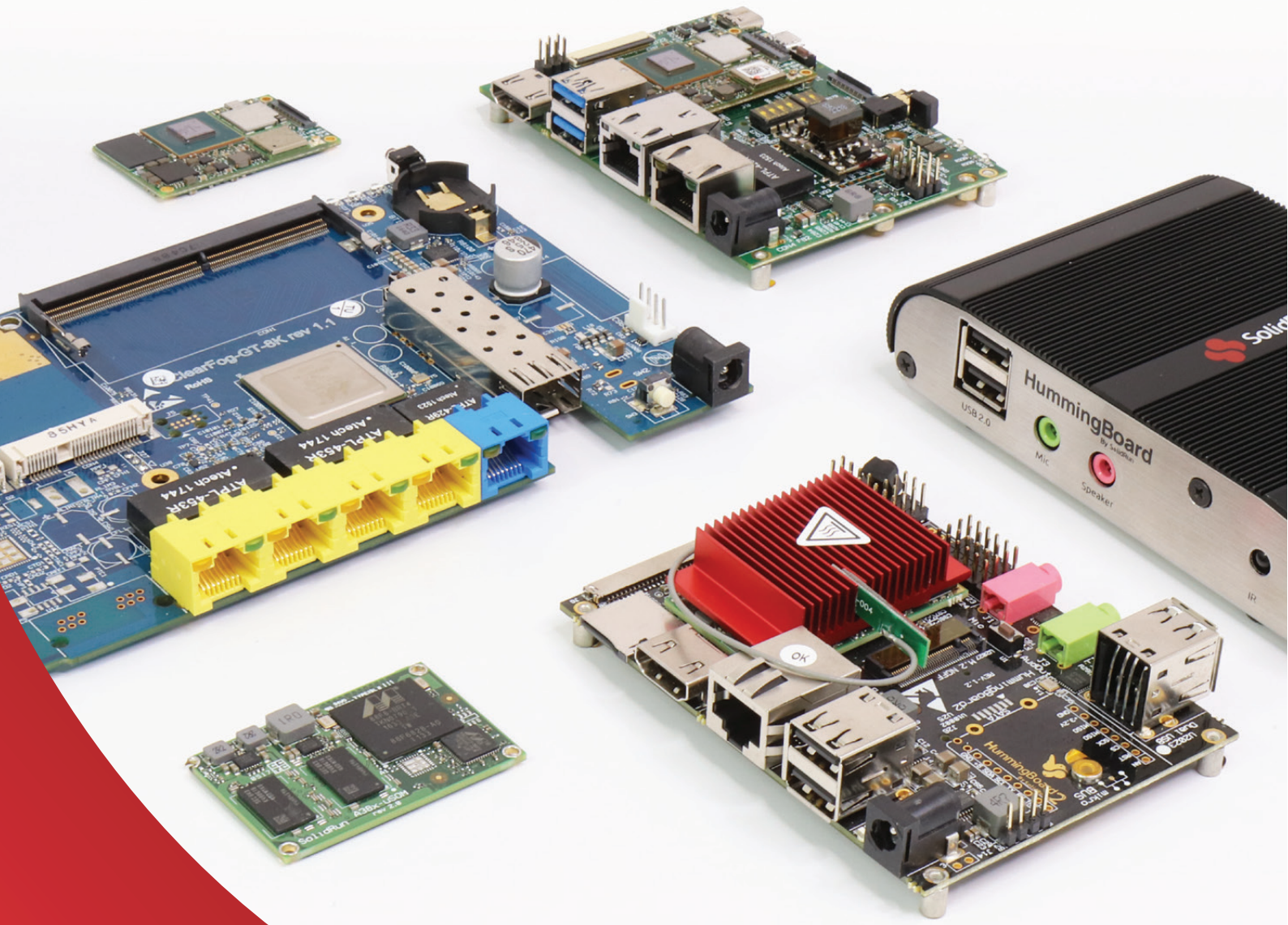
SolidRun




# 2020 Product Guide


SolidRun

# Embedded Edge Computing

SolidRun is a global leading developer of embedded systems and network solutions, focused on a wide range of energy-efficient, powerful and flexible products. We offer a variety of innovative compact embedded solutions including SOMs, COMs, single board computers, industrial switch routers, cutting-edge AI inference devices and state-of-the-art edge gateways.

We offer a one-stop-shop for developers and OEMs, providing a complete service from hardware customization, to software support and ODM design and development. Our mission is to simplify application development while overcoming deployment challenges, and so we can proudly offer our customers faster time-to-market and lower costs.

## Technology Partners

# Business Segments

## Automotive Transport

The automotive industry, together with the latest self-driving innovations, has challenged the electronic systems industry to swiftly bring robust, highly-stable systems quickly to the market. SolidRun's SOMs and SBCs meet the most extreme environmental and performance requirements.

## Industrial Automation / Industry 4.0

Industrial automation is a rapidly growing market for IoT-based innovation. With its emphasis on constant availability, processors developed for industrial use must meet exact environmental and reliability demands.

## Multimedia

As high-definition video systems become the norm, multimedia processing requirements have become a greater challenge to system developers. Demanding applications, such as video analytics, have become the new performance baseline.

## Home Automation

IoT technologies are the driving force behind a wave of innovation in the field of home automation. SolidRun's SOMs and SBCs provide an excellent foundation for NAS, routing, and multimedia services, and help you enable consumers to remotely control home security, surveillance, climate control, and water usage.

## Smart City

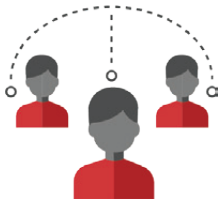
Smart city applications harness a constant flow of data from a growing network of sensors to central analysis and processing systems. SolidRun provides high-performance data aggregation and forwarding in compact solutions with low power footprints.

## Point of Sale / Vending Machines

Opportunities in the POS/ kiosk marketplace are expanding rapidly as they replace brick-and-mortar banking and retail branches. SolidRun's solutions provide both wired and wireless communication solutions that are powerful, reliable and scalable.

## Enterprise & SMB

Small and medium businesses have limited resources and can immensely benefit from simple plug-and-play network solutions, which significantly optimize production and services. SolidRun offers a wide range of gateway and mini PCs that can be easily integrated to fit the enterprise or SMB needs.



## Network

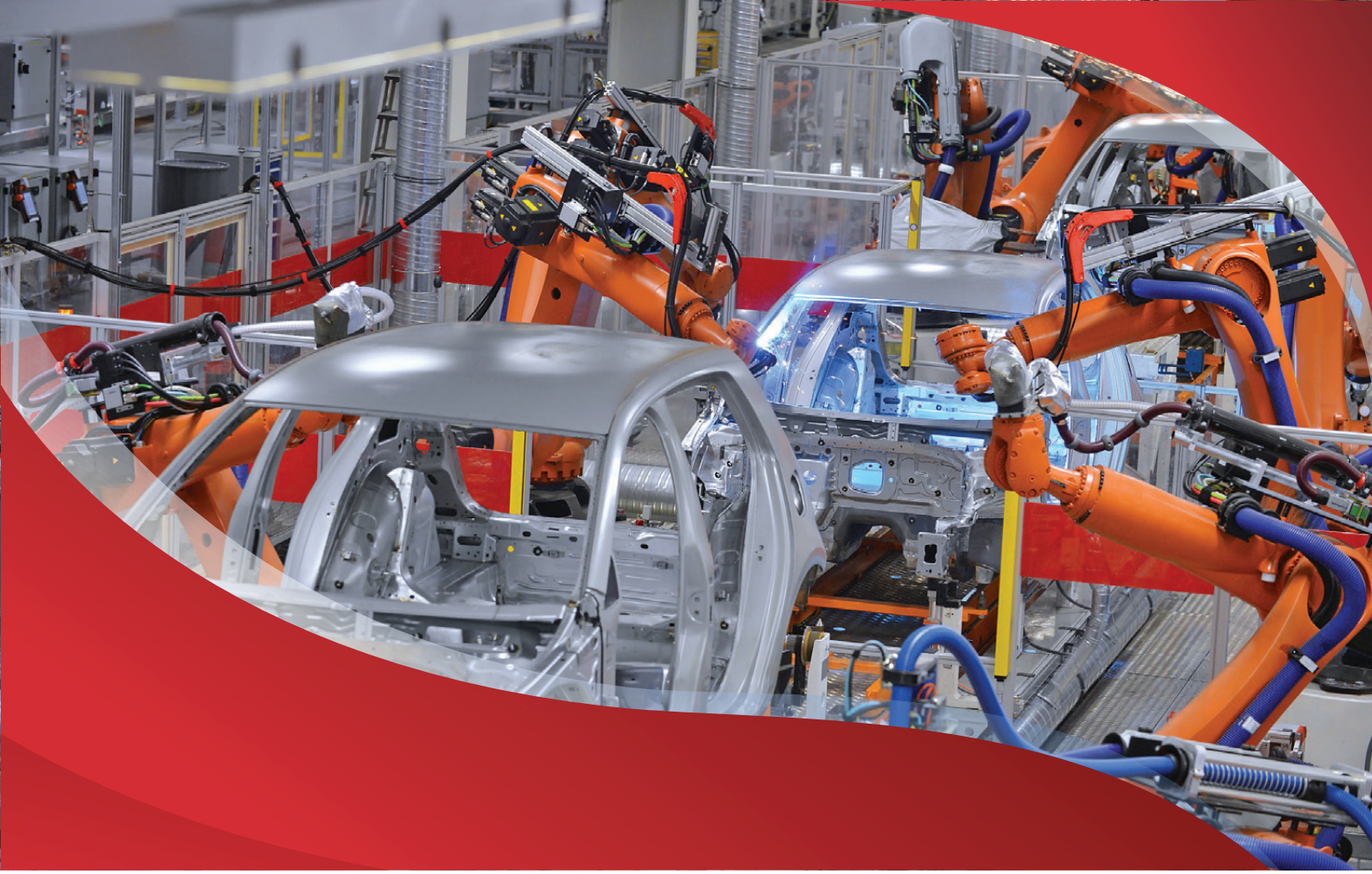
SolidRun has a variety of network solutions tailor made for the efficient networks of tomorrow. From gateways to robust routers and NFVs, our networking solutions are flexible and modular for simple integration to fit the network's needs.

# Our Philosophy

## Reduce Time to Market

SolidRun's SOMs and SBCs greatly simplify the development and help reduce time to market (TTM).

- Off the shelf solutions - ready for integration.
- Small form factor and low power consumption provide unprecedented flexibility.
- Efficient reference designs with supported documentation - greatly reduce complexity.
- Innovative Arm® and x86 based embedded architectures are simple, compact and include comprehensive software packages, drivers and support for major operating systems.
- Our unique mix and match concept anables you to select components and features within each product family.



# Services

### NRE Projects

SolidRun performs customization of its products in order to tailor performance as required by its customers.

### Project Support

We assist our customers development teams, from concept to end-product.

### Software Support

SolidRun is an active contributor to the OSS community. Let us assist you with our wide software expertise.

### Production

SolidRun maintains the highest manufacturing standards and uses top-of-the-line facilities to ensure quality and reliability.

# Embedded IoT & Industrial

## Size and performance optimized for innovative IoT solutions

Internet of Things (IoT) and Industrial Automation are ever growing concepts that are witnessing massive growth, and said to be all around us within the next few years. With IoT the world is becoming “smarter” with automation of everything from retail, to industry, vehicles and even our home.

The challenges of IoT and industrial automation require both strong solutions with a creative approach, and a powerful hardware foundation to connect everything smoothly.

# Solutions

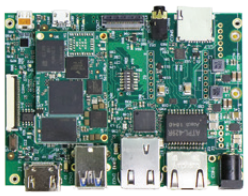
SolidRun designs and develops a wide range of embedded IoT and Industrial automation platforms and solutions. Based on NXP and Intel processors, we offer a variety of modular, energy-efficient, compact and fanless SOMs, SBCs and mini PC with our unique flexible mix-and-match philosophy.

### SolidSense Gateway

Robust indoor, outdoor & industrial IoT gateway

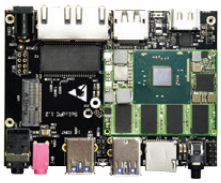
### CuBox Pulse

Multimedia powerhouse fanless mini PC



### HummingBoard

Modular & flexible embedded platform family



### SolidPC Q4

Powerful Intel based embedded platform

# Applications

Smart City

Industry 4.0

POS/ Vending

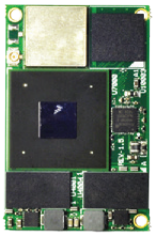
Retail

Smart Factory

Multimedia

# NXP i.MX6 SOMs

We've packed an NXP i.MX6 SoC (System-on-Chip), memory subsystem, power management subsystem, networking and system interconnectivity into a single ultra-compact system on module.



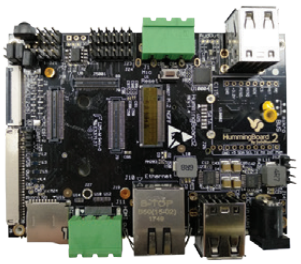
| | SOM i.MX6 Solo | SOM i.MX6 Dual Lite | SOM i.MX6 Dual | SOM i.MX6 Quad |
|---|---|---|---|---|
| **Core** | | | | |
| **Processor Core** | Single core Arm Cortex A9 | Dual core Arm Cortex A9 | Dual core Arm Cortex A9 | Quad core Arm Cortex A9 |
| **Processor Speed** | 1GHz Commercial<br>800MHz Industrial | | | |
| **Graphic Processing Unit** | Vivante GC880 | Vivante GC880 | Vivante GC2000 | Vivante GC2000 |
| **3D GPU Support** | OpenGL E1.1/2.0 | OpenGL E1.1/2.0 | OpenGL\|ES 1.1/2.0, OpenCL 1.1E | OpenGL\|ES 1.1/2.0, OpenCL 1.1E |
| **Memory** | 512MB DDR3, 32bit @ 1600MT/s | 1GB DDR3, 64bit @ 1600MT/s | 1GB DDR3, 64bit @ 2132MT/s | 2GB DDR3, 64bit @ 2132MT/s |
| **Connectivity (PHY on Module)** | | | | |
| **Wired Network*** | 10/100/1000 Mbps | 10/100/1000 Mbps | 10/100/1000 Mbps | 10/100/1000 Mbps |
| **Wireless Network / Bluetooth** | Optional (WL1831) | Optional (WL1831) | Optional (WL1831) | Optional (WL1831) |
| **I/O Expansion (IC/Connector on SBC)** | | | | |
| **Display** | HDMI: 1080p \| LCD:WUXGA (1920x1200) \| LVDS, HDMI 1.4, DSI, Parallel | | | |
| **Supported External Storage** | NOR-Flash, eMMC, SD/microSD, PCIe SSD | | | |
| **Supported Internal Storage** | eMMC, SPI ROM (Optional) | | | |
| **SD/MMC** | 3 | 3 | 3 | 3 |
| **USB 2.0 Host** | 1 | 1 | 1 | 1 |
| **USB 2.0 OTG** | 1 | 1 | 1 | 1 |
| **Serial Port** | 3 | 3 | 3 | 3 |
| **Camera Interface Port** | 2 Lane CSI | 2 Lane CSI | 4 Lane CSI | 4 Lane CSI |
| **CAN Bus** | Yes | Yes | Yes | Yes |
| **SATA** | No | No | Gen II, 3Gbps | Gen II, 3Gbps |
| **PCIe 2.0** | 1 | 1 | 1 | 1 |
| **Second Ethernet** | Via PCIe or USB NIC | Via PCIe or USB NIC | Via PCIe or USB NIC | Via PCIe or USB NIC |
| **I2C** | 3 | 3 | 3 | 3 |
| **SPI** | 3 | 3 | 3 | 3 |
| **PWM** | 4 | 4 | 4 | 4 |
| **GPIO** | 75 | 75 | 75 | 75 |
| **Supported OS** | Linux | Linux | Linux | Linux |
| **Mechanical/Electric** | | | | |
| **Temperature Range**** | Commercial: 0°C to 70°C, Industrial: -40°C to 85°C, Automotive -40°C to 105°C | | | |
| **Voltage** | 5V (3.3V IO Voltage) | | | |
| **Dimensions (WxL)** | 47mm x 30mm | | | |

* Note that due to internal i.MX6 buses, the 1000 Mbps interface speed is limited to 470 Mbps.

**NXP i.MX6 SoC die temperature must be below 115°C

# HummingBoard-i SBC

A powerful and feature-rich embedded platform designed for modularity and flexibility with a wide range of variations - harnessing the robust i.MX6 family of SOMs.



| | HummingBoard Pro | HummingBoard Gate | HummingBoard Edge | HummingBoard CBi |
|---|---|---|---|---|
| **Features** | | | | |
| **SOM Model** | NXP i.MX6 based Single to Quad core Arm Cortex A9 up to 1GHz | NXP i.MX6 based Single to Quad core Arm Cortex A9 up to 1GHz | NXP i.MX6 based Single to Quad core Arm Cortex A9 up to 1GHz | NXP i.MX6 based Single to Quad Core Arm Cortex A9 up to 800MHz |
| **Memory & Storage** | Up to 2GB DDR3*<br>Micro SD<br>mSATA** | Up to 2GB DDR3*<br>Micro SD | Up to 2GB DDR3*<br>Micro SD<br>M.2 (2242)** | Up to 2GB DDR3*<br>MicroSD<br>M.2 (2242)** |
| **Connectivity** | 1 x RJ-45***<br>2 x Host USB 2.0<br>2 x Header USB 2.0<br>mPCIe (half size) | 1 x RJ-45***<br>4 x USB 2.0<br>mPCIe with SIM card holde | 1 x RJ-45***<br>4 x USB 2.0<br>mPCIe with SIM card holder | 1 x CAN bus<br>1 x RS485<br>4 x USB 2.0<br>1 x RJ45<br>mPCIe with SIM card holder |
| **Media** | HDMI-Out<br>LVDS<br>SPDIF<br>Analog Audio<br>MIPI- CSI- 2 Camera | HDMI-Out<br>MIPI- CSI-2 and MIPI-DSI<br>Parallel Camera | HDMI-Out<br>LVDS<br>Analog Audio<br>MIPI-CSI-2 and MIPI-DSI<br>Parallel Camera (on GPIO header) | LVDS<br>MIPI-DSI<br>MIPI-CSI-2 |
| **I/O** | Reset Button<br>26 pins GPIO Header<br>RTC<br>IR | Reset Button<br>36 pins GPIO Header<br>RTC with Battery<br>mikroBUS click interface | Reset Button<br>36 pins GPIO Header<br>RTC with Battery<br>IR | 1 x Reset button<br>RTC<br>IR reciver |
| **OS Support** | Linux | Linux | Linux | Linux |
| **Power** | 5V, Micro USB | 7V-36V, 5.5mmin (twist & lock mechanism) | 7V-36V, 5.5mmin (twist & lock mechanism) | 7V-36V, 5.5mmin (twist & lock mechanism) |
| **Temperature range** | Commercial: 0°C to 70°C<br>Industrial: -40°C to 85° | Commercial: 0°C to 70°C<br>Industrial: -40°C to 85° | Commercial: 0°C to 70°C<br>Industrial: -40°C to 85° | Industrial: -40°C to 85° |
| **Dimensions** | Board: 85mm x 56mm | Board: 102mm x 69mm<br>Enclosed: 120 x 80 x 30mm | Board: 102mm x 69mm<br>Enclosed: 120 x 80 x 30mm | Board: 102mm x 69mm<br>Enclosed: 120 x 80 x 30mm |
| **Environment** | No enclosure | Optional extruded aluminum (IP32) enclosure | Optional extruded aluminum (IP32) enclosure | Optional extruded aluminum (IP32) enclosure |

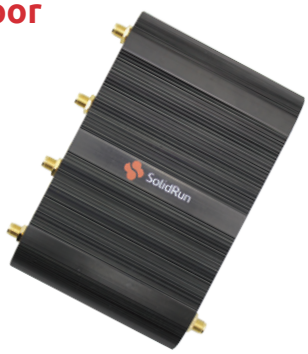
* RAM type and speed dependant on SOM
** Supported with SOM iMX6 Dual and above
*** 1000 Mbps link is limited to 470 Mbps actual bandwidth due to limitation in NXP i.MX6 internal buses

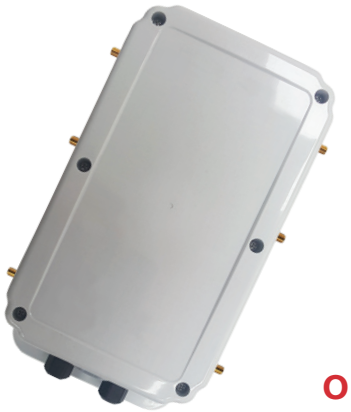
# SolidSense Edge Gateway

SolidSense N6 Edge Gateway is an enterprise Internet of Things gateway designed for servicing a local network of IoT devices with a range of solutions and business applications. SolidSense is the ultimate IoT M2M solution, with high-end connectivity options, on an industrial grade fanless platform in both an indoor and outdoor configuration.

Based on the robust and modular NXP i.MX6 Arm Cortex A9 Single/Dual/Quad core processor, SolidSense is a feature-rich edge platform designed to provide flexibility for developers and OEMs in implementing an almost endless range of IoT solutions.

**Indoor**



**Outdoor**

## Software

- Civil Infrastructure Platform (CIP) Linux kernel for the robustness & long term support
- Containerized platform for extensive flexibility
- Eclipse IoT Kura container for IoT application development and integration
- Device management services including kernel safe update
- Ready to use applications containers
- Micro services architecture to access platform I/O
- Wirepas support

| | SolidSense N6 Indoor | SolidSense N6 Outdoor | SolidSense N6 Industrial |
|---|---|---|---|
| **Features** | | | |
| **Processor** | NXP i.MX6 Arm Cortex A9 Single to Quad core 800MHz | | |
| **Memory & Storage** | Up to 2GB DDR3 \| eMMC (8GB by default) | | |
| **Networking** | 1 x RJ45 Ethernet 10/100/1000 (max 470 Mbps)<br>WiFi and Bluetooth 2.0 (2.4 GHz)<br>Dual BLE 4.2 (SDR based on Nordic Semiconductor)<br>LTE Cut 4 EU/AU/US | 1 x RJ45 Ethernet 10/100/1000 (max 470 Mbps)<br>WiFi and Bluetooth 2.0 (2.4 GHz)<br>BLE 4.2/5.0 (SDR based on Nordic Semiconductor)<br>LTE Cut 4 EU/AU/US | 2 x RJ45 Ethernet 10/100/1000 (max 470 Mbps)<br>WiFi (2.4 GHz)<br>BLE 5.0 (2x nRF52840- SDR based on Nordic Semiconductor)<br>LTE Cut 4 EU/AU/US |
| **Connectivity** | 4 x USB 2.0<br>HDMI<br>MicroSD<br>Physical SIM | Accessible only with case open:<br>1 x USB 2.0 type A<br>MicroSD<br>Physical SIM<br>Ethernet<br>1 x Optional cable gland for external connectivity | 2 x USB 2.0 type A<br>HDMI<br>MicroSD<br>2 x Physical SIM<br>CAN Bus<br>2 x RS485/RS232 + 1 x RS232 (isolated, on terminal blocks)<br>Solid-state relay output,<br>Digital inputs<br>Additional internal headers with I2C available |
| **Development and Debug Interfaces** | Console port (UART) | Console port (UART) | Console port (UART) |
| **Certification** | CE, FCC/CSA | CE, FCC/CSA | CE, FCC/CSA |
| **Power** | 9V to 36V via twist and lock jack | AC 100-240V, integrated power supply with unterminated cable | 7V to 36V with reverse polarity protection (battery backup)<br>PoE source for external |
| **Temperature Range** | -25°C to 65°C | -30°C to 80°C | -25°C to 65°C |
| **Dimensions** | 120 x 80 x 30mm | 223 x 134 x 84mm | 132.5 x 144 x 40.5mm |
| **Enclosure** | Extruded aluminum, IP32, 5 x SMA (2.4GHz x 3, LTE, GPS) | Polycarbonate (UL94V), IP68, 6 x SMA (3 x 2.4GHz, 2 x LTE, GPS) | Extruded aluminum, IP32, 8 x SMA |

# NXP i.MX8M SOMs

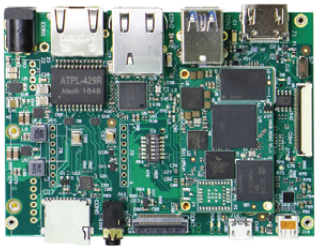
SolidRun's i.MX8 based family of System on Modules (SOMs) harnesses NXP's powerful i.MX8M in a flexible & compact SOM, allowing developers and OEMs to simplify the production cycle and reduce time-to-market drastically.

| | SOM i.MX8M | SOM i.MX8M Mini |
|---|---|---|
| **Core** | | |
| **Processor Core** | Dual/Quad core Arm A53 (with Arm M4 Gpp) | Single to Quad core Arm A53 (with Arm M4 Gpp) |
| **Processor Speed** | Up to 1.5GHz | Up to 1.8GHz |
| **Graphic Processing Unit** | Vivante GC7000 Lite | GC NanoUltra 3D + GC320 2D |
| **3D GPU Support** | OpenGL E1.1/2.0/3.0/3.1, OpenCL 1.2 Vulkan | OpenGL ES 2.0 |
| **RAM** | 32 bit, up to 4GB LPDDR4-3200MT/s | 32 bit, up to 4GB LPDDR4-3000MT/s |
| **Connectivity (PHY on Module)** | | |
| **Wired Network** | 10/100/1000 Mbps | 10/100/1000 Mbps |
| **Wireless Network** | 802.11 ac/a/b/g/n Optional (M.2 1216) | 802.11 ac/a/b/g/n Optional |
| **Bluetooth** | BT 5.0 Optional | BT 5.0 Optional |
| **I/O Expansion (IC/Connector on SBC)** | | |
| **Display** | 4K @60<br>HDMI 2.0, MIPI-DSI | 1080p @60<br>MIPI-DSI |
| **Encoder/Decoder** | Decoder: 4K @60 HAVC H-265, VP9, H-264 | Encoder: 1080p @60 H-264, VP8<br>Decoder: 1080p @60 H-265, VP9, H-264, VP8 |
| **Supported External Storage** | NOR-Flash, SD/microSD, PCIe SSD | NOR-Flash, SD/microSD, PCIe SSD |
| **Supported Internal Storage** | eMMC, QSPI-NOR (Optional) | eMMC, QSPI-NOR (Optional) |
| **SD/MMC** | 2 | 1 |
| **USB** | 2 x USB 3.0 | 2 x USB 2.0 |
| **Serial Port** | 2 (RTS/CTS/RX/TX)and 1 x (TX/RX) | 2 (RTS/CTS/RX/TX) and 1 x (TX/RX) |
| **Camera Interface Port** | 2 x MIPI-CSI2 (4 lane) | 1 x MIPI-CSI2 (4 lane) |
| **Digital audio serial interface** | 20 channels 32bits @384khz DSD512, SPDIF TX&RX, HDMI ARC, Dolby | 20 channels 32bits @384khz DSD512, SPDIF TX&RX, 8 x PDM DMIC channel |
| **PCIe** | up to 2 x PCIe 2.0 | 1 x PCIe 2.0 |
| **I2C** | 2 | 2 |
| **SPI** | 1 | 1 |
| **Supported OS** | Linux | Linux |
| **Mechanical/Electric** | | |
| **Temperature Range*** | Commercial: 0°C to 70°C<br>Industrial: -40°C to 85°C | Commercial: 0°C to 70°C<br>Industrial: -40°C to 85°C |
| **Voltage** | 5V (3.3 IO Voltage) | 5V (3.3 IO Voltage) |
| **Dimensions** | 47mm x 30mm | 47mm x 30mm |

*NXP i.MX8 SoC die temperature must be below 115°C

# HummingBoard-M

The HummingBoard-M range of carrier platforms offer developers a small footprint & energy-efficient range of solutions for easily harnessing the powerful i.MX8M & i.MX8M Mini SOMs.



| Features | HummingBoard Pulse | HummingBoard Ripple |
|---|---|---|
| **SOM Model** | NXP i.MX8M Dual / Quad core Arm Cortex A53 up to 1.5GHz (with Arm M4 GPP)<br>NXP i.MX8M Mini Single to Quad core Arm Cortex A53 up to 1.8GHz (with Arm M4 GPP) | NXP i.MX8M Dual / Quad core Arm Cortex A53 up to 1.5GHz (with Arm M4 GPP)<br>NXP i.MX8M Mini Single to Quad core Arm Cortex A53 up to 1.8GHz (with Arm M4 GPP) |
| **Memory & Storage** | Up to 4GB LPDDR4<br>eMMC (8GB by default)<br>MicroSD | Up to 4GB LPDDR4<br>eMMC (8GB by default)<br>MicroSD |
| **Connectivity** | 2 x USB 3.0*<br>mPCIe**<br>2 x RJ45<br>M.2<br>SIM card slot | 2 x USB 3.0*<br>1 x RJ45**<br>SIM card slot |
| **Media** | HDMI 2.0 out**<br>Micro HDMI<br>MIPI-DSI<br>2 x MIPI-CSI***<br>Digital audio (Riser interface FPC connector)<br>Onboard audio codec | Micro HDMI<br>MIPI-CSI |
| **I/O** | 1 x Reset button<br>1 x Configurable push button<br>mikroBUS click interface<br>3 x LED indicators<br>RTC | 1 x Reset button<br>1 x Configurable push button<br>mikroBUS click interface<br>3 x LED indicators<br>RTC |
| **OS Support** | Linux | Linux |
| **Power** | 7V – 36V wide range<br>PoE sink support 802.3af Class 0 | 7V – 36V wide range |
| **Temperature Range** | Commercial: 0°C to 70°C<br>Industrial: 40°C to 85°C | Commercial: 0°C to 70°C<br>Industrial: -40°C to 85°C |
| **Dimensions** | Board: 102mm x 69mm<br>Enclosed: 141.5 x 78 x 30mm | Board: 102mm x 69mm<br>Enclosed: 141.5 x 78 x 30mm |
| **Environment** | Optional extruded aluminum (IP32) enclosure | Optional extruded aluminum (IP32) enclosure |

Both boards are compatible with i.MX8M & i.MX8M Mini SOMs, some features are not supported with i.MX8M Mini SoC.
*Only USB 2.0 supported with the i.MX8M Mini SoC.
**Only supported with the i.MX8M SoC.
***Only 1 x MIPI-CSI supported with the i.MX8M Mini SoC.

# CuBox Pulse

We've packed so many features into the CuBox Pulse. This tiny multimedia powerhouse is also the perfect device for digital signage and a wide variety of audio and visually rich IoT solutions.

| Features | |
|---|---|
| **SOM Model** | i.MX8M Dual/Quad core Arm Cortex A53 up to 1.5Ghz (With ARM M4 GPP) |
| **Memory & Storage** | Up to 4GB LPDDR4<br>eMMC (8GB by default)<br>MicroSD |
| **Connectivity** | 2 x USB 3.0<br>1 x HDMI 2.0<br>1 x RJ45 |
| **I/O** | Power on button<br>Indication LEDs<br>RTC<br>IR Receiver |
| **OS Support** | Linux |
| **Power** | 12V input DC jack<br>PoE sink support |
| **Temperature Range** | Commercial: 0°C to 40°C |
| **Dimensions** | 5 X 5 X 5cm |
| **Environment** | Plastic enclosure |

- Based on NXP's i.MX8M Dual / Quad Core
- Arm Cortex A53 processor (up to 1.5Ghz)
- Arm M4 General Purpose Processor
- 2"x2"x2" fanless cube enclosure
- Up to 4GB LPDDR4
- 4K UltraHD full HDR support (HDMI 2.0)

Home Entertainment

Digital Signage

Smart City

Internet of Things


# AI Inference Gateway

The HummingBoard Ripple AI Inference Gateway is ready to fuel the next generation of Artificial Intelligence applications by harnessing the energy efficient i.MX8M Mini processor and Gyrfalcon's Lightspeeur 2803S AI accelerator. This gateway platform offers flexibility on a highly cost-effective and robust SOM and carrier combo developed around the popular HummingBoard design.

## Lightspeeur® 2803S Neural Accelerator

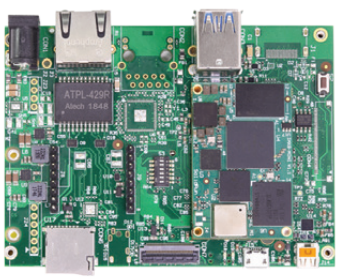
At the heart of the AI inference gateway, the 2803S chip is a powerful deep learning CNN AI acceleration microprocessor. The 9 x 9mm accelerator, based on Matrix Processing Engine architecture, offers multi-dimensional processing for extremely high speeds at very low power (24 TOPs/Watt).


## SOM i.MX8M Mini

SolidRun's i.MX8M Mini SOMs harnesses NXP's Arm Cortex A53 single/dual/quad core 1.8GHz, built with advanced 14LPC FinFET process technology. This cutting-edge building block features up to 4GB LPDDR4, 2 x USB 2.0, powerful network connectivity options including BT and optional WiFi, PCIe 2.0 and robust multimedia features including 20 audio channels (32bits), MIPI-DSI, and 1080p encoder and decoder.

## HummingBoard Ripple

Based on the popular HummingBoard form factor, Ripple provides flexible storage options including eMMC and MicroSD slot, offering a range of connectivity options, including 2 x USB ports, mPCIe, and even a SIM card slot. All on a compact energy efficient platform measuring only 102mm X 69mm.



# Intel Braswell SOMs

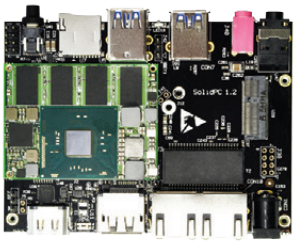
Simplify the development process and move your product quickly to market with SolidRun's Intel based SOM family. Embedded developers and OEMs can easily leverage the advanced capabilities of Intel's Atom® (Codename Braswell) line of 14 nm CPUs.

| | |
|---|---|
| **Core** | |
| **Processor Core** | Quad core Atom E8000 |
| **Processor Speed** | 1.04GHz (Burst 2.0GHz) |
| **Memory** | Up to 4GB |
| **Graphic Processinf Unit** | Intel Gen8 LP - 12EU |
| **GPU HFM Clock (MHz)** | 320, Turbo Clock 600 |
| **Max Resolution (DP 1.1a, HDMI 1.4b)** | 3840x2160 @30 Hz, 2560x1600 @60L; bpp. eDP Max 2560x1600 @60; 24 bpp |
| **Main Features** | |
| **DDR-3L** | Onboard one channel (1GB version) and dual channel (all other) DDR3 1600Mbps, up to 8GB total |
| **Network** | Onboard 10/100/1000 Mbps (RTL8111G) |
| **SPI flash (for BIOS)** | Onboard 64 Mbit- externally programmable via 8 pin header |
| **eMMC** | Optional (8GB by default) |
| **Power** | |
| **PMIC** | Onboard - battery powred optimized |
| **Vin (Vsys)** | Single 7v to 21v |
| **High Speed Connectivity** | |
| **Display** | 4K30 DisplayPort / HDMI CEC and 4K30 DisplayPort / embedded DisplayPort |
| **Camera** | Via Flex cable- One 4 lane MIPI CSI-2 and one 2 lane MIPI CSI-2 |
| **USB 3.0** | 4 (one of them OTG) |
| **PCIe Gen 2.0 1 lane** | 3 |
| **SATA 6 Gbps geb iii** | 2 |
| **Low Speed Connectivity** | |
| **Full UART** | 2 |
| **I2C** | 1 |
| **MCU: STM32F042K4/u6** | On board - 5 generic input/output, 1 x HDMI CEC, and 1 x IR input connected by internal USB to main processor. Reset and boot signals of MCU are processor-controlled to eade development |
| **GPIOs** | Multiplexed with functions, including: UART, I2C, SATA DevSlp, PCIe CLKREQ,SDI |
| **Supported OS** | Windows, Android, Linux |
| **Mechanical** | |
| **Temperature Range*** | Commercial: 0°C to 90°C |
| **Dimensions** | 52mm x 40 mm |
| **Max. hight from SBC** | 6.1mm to 8.6mm (depending on DF40 1.5-4.0 mm mating height on SBC board) |

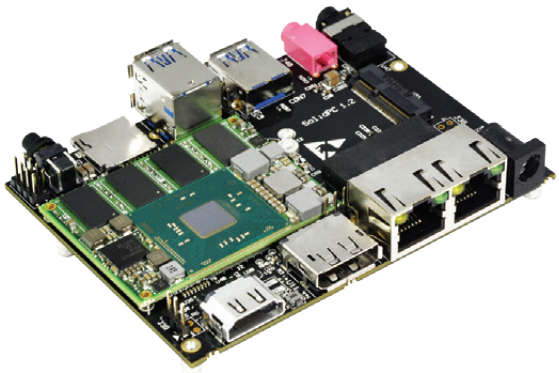
*Intel Atom E8000 SoC die temperature must be below 115°C

# SolidPC Q4 SBC

With its powerful Intel Atom® processor, integral real-time clock, and support for 4K video, SolidRun's SolidPC Q4 supports a wide variety of powerful IoT systems. Leverage the power of Windows 10, and Embedded Linux to complete your application – in record time.



| Features | |
|---|---|
| **SOM Model** | Quad Core Intel Atom E8000 |
| **Memory and Storage** | Up to 4GB DDR3<br>microSD UHS-1 Support<br>8GB eMMC<br>M.2 (2242) SSD Connector |
| **Connectivity** | Display port<br>HDMI CEC 1.4b (up to 4k 30fps)<br>2 x RJ45 with PoE option<br>3 x USB 3.0 Host<br>M.2 2230 Connectors for WiFi/BT<br>Mic-In<br>Streo Out / Toslink<br>2 x UART Headers |
| **I/O and Misc.** | Power on button<br>Reset Button<br>Indication LEDs |
| **OS Support** | Windows<br>Linux<br>Android |
| **Power** | DC input 7V-21V<br>Battery for RTC |
| **Temperature** | Commercial: 0°C to 40°C |
| **Dimensions** | Board: 100mm x 80mm<br>Enclosure: 124 x 80 x 28mm |
| **Enclosure** | Optional extruded aluminum (IP32) enclosure |



# Network

## Unparalleled performance for networking solutions

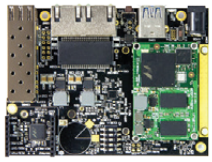
Networks are becoming the foundation for devices and operations in almost every sector. As the bulk of the network's work load moves closer to the edge, there is a growing need to deploy an edge infrastructure to meet the demanding needs of ever growing networks.

This network optimization will provide foundation for advances in AI, machine learning, IoT and industrial automation – with the introduction of powerful gateways, NFVs, access points and much more.

Welcome to the age of edge computing.

# Solutions

SolidRun's edge computing and powerful networking solutions combine hardware, software, services, and an ecosystem of partnerships to simplify applications development and overcome deployment challenges.
Our approach to network solutions focuses on NXP and Marvell based processors, powering up feature-rich platforms from embedded modular solutions to high-end fanless switch routers.

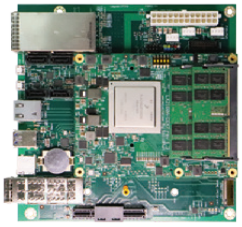


### ClearFog Base/Pro

Marvell A388 based Embedded networking platform


### ClearFog GT 8K

Marvell A8040 based feature-rich networking platform



### ClearFog CX LX2K

Powerful mini ITX NXP LX2160A based 16 core networking board

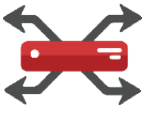

### ClearFog GTR

Marvell A385 based Industrial grade NVR PoE solution

# Applications

Edge Computing

Access Point



Switch Router

Network Function Virtualization

Network Security

Network Attached Storage

# Network SOMs/COMs

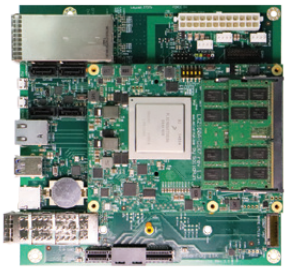
As part of our unique approach to embedded solutions, SolidRun offers a range of networking System-on-Modules and Computer-on-Modules harnessing robust Marvell and NXP based processors, offering a flexible approach to designing network solutions.

| | SOM A388 | COM CEx7 LX2160A |
|---|---|---|
| **Core** | | |
| **Processor Core** | Marvell ARMADA A388 dual core Arm Cortex A9 | NXP LX2160A 16 core Arm Cortex A72 |
| **Processor Speed** | 1.6GHz Commercial<br>1.3GHz Industrial | Up to 2GHz |
| **Virtualization** | Container based | Full virtualization |
| **Floating Point** | Yes | Yes |
| **SIMD** | Neon | Neon |
| **L1 Cache** | 32KB per core | 48KB I-cache and 32KB D-cache |
| **L2 Cache** | 1MB shared | Up to 8MB |
| **L3 Cache** | no | 8MB shared |
| **Memory** | 32 bit, Up to 2GB DDR3L | Dual channel SO-DIMM DDR4; up to 64GB 3200MT/s (not included by default) |
| **ECC Memory** | Optional, supported upon customer request | Optional, supported upon customer request |
| **SPI Flash** | 32 Mbit | Up 1Gbit |
| **eMMC** | 8GB by default | 64GB by default (up to 128GB) |
| **Connectivity** | | |
| **1GbE MAC** | 3 ports | 1 port |
| **10GbE MAC** | 1 port | 4 ports |
| **On card GbE PHY** | 1 | 1 |
| **SDIO** | Yes | Yes |
| **I2S / SPDIF / TDM** | Yes | No |
| **USB** | 3 x USB 2.0, 2 x USB 3.0 | 2 x USB3.0 |
| **RTC Support (battery on SBC)** | Yes | Yes |
| **GPIO pins** | Yes | No |
| **Power Management Signaling** | Optional | No |
| **JTAG** | Yes | No |
| **Total Muxed SERDes** | 6 | 24 |
| **SATA** | 4 x Gen III | 2 x Gen III |
| **PCIe** | 4 x Gen 2.0 | 18 x Gen 4.0 (5 controllers) |
| **QSGMII** | 1xQSGMII (3MACs) | 4 x 1/2.5 GbE ports (SGMII/HSGMII/RGMII) |
| **OS Support** | U-Boot \| Linux Kernel \| OpenWRT/LEDE \| Yocto | Linux Kernel \| Yocto \| DPDK \| UEFI \| KVM/ QEMU/ Containers \| NFV Openstack compute node |
| **Mechanical/Electric** | | |
| **Temperatue Range*** | Commercial: 0℃ to 70℃<br>Industrial: -40℃ to 85℃ | Commercial: 0℃ to 70℃<br>Industrial: -40℃ to 85℃ |
| **Voltage** | 3.3V - 5V (3.3V, 1.8V IO voltage) | 12V (3.3V IO voltage) |
| **Dimensions** | 35mm x 50mm | Standard COM Express type 7- basic 125mm x 95mm |

*ARMADA 38x SoC die temperature must be below 115℃

# Network Carriers/SBCs

SolidRun's ClearFog family of embedded networking carriers and SBCs allows OEMs and developers versatility in implementing a vast array of networking solutions, owing to a broad range of configuration options and features.



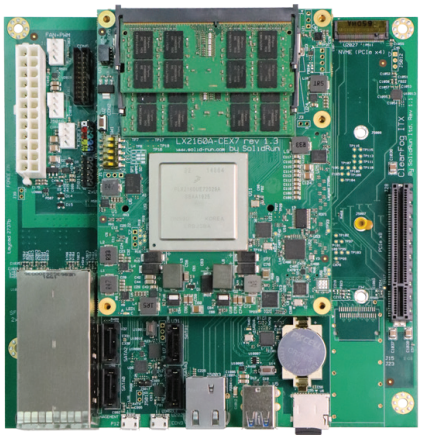
| | ClearFog Base | ClearFog Pro | ClearFog CX LX2K |
|---|---|---|---|
| **Features** | | | |
| **Processor** | Marvell ARMADA based A388 Dual core Arm Cortex A9 up to 1.6 GHz | Marvell ARMADA based A388 Dual core Arm Cortex A9 up to 1.6 GHz | NXP CEx7 LX2160A 16 core Arm Cortex A72 (COM Express type 7 module) |
| **Memory & Storage** | Up to 2GB DDR3L<br>M.2*<br>MicroSD/8GB eMMC** (Optional) | Up to 2GB DDR3L<br>M.2*<br>MicroSD/8GB eMMC** (Optional) | Up to 64GB DDR4 dual channel 3200MT/s<br>M.2 2240/2280<br>MicroSD<br>eMMC (64GB by default)<br>4 x SATA (gen III) |
| **Network** | 2 x Port dedicated Ethernet<br>1 x SFP | 1 x Port dedicated Ethernet<br>5 x Port switched Ethernet<br>1 x SFP | 1 x QSFP28 cage (40Gbp)<br>4 x SFP+ ports (2x2)<br>1 x RJ45 (1GbE) |
| **Connectivity** | 1 x mPCIe<br>1 x USB 3.0 | 2 x mSATA / mPCIe<br>1 x USB 3.0 | 1 x PCIe x8 Gen 4.0, open slot (can support x16)<br>3 x USB 3.0<br>3 x USB 2.0 |
| **I/O** | mikroBUS<br>Indication LEDs<br>User Push Buttons<br>PoE expansion header<br>RTC Battery<br>FTDI (Console Only) | Analog Audio/ TDM module support<br>GPIO Header (mikroBUS)<br>Indication LEDs<br>User Push Buttons<br>PoE expansion header<br>RTC Battery<br>FTDI (Console Only)<br>JTAG Header | MicroUSB for debug (UART over USB)<br>MicroUSB to STM32 for remote management |
| **OS Support** | Linux Kernel<br>OpenWRT/LEDE<br>Yocto | Linux Kernel<br>OpenWRT/LEDE<br>Yocto | Linux Kernel<br>Mainline Linux |
| **Power** | Wilde range 9V to 32V | Wilde range 9V to 32V Advanced Power Control<br>Fan Control | ATX standard |
| **Temperature Range** | Commercial: 0°C to 70°C<br>Industrial: -40°C to 85°C | Commercial: 0°C to 70°C<br>Industrial: -40°C to 85°C | Commercial: 0°C to 70°C<br>Industrial: -40°C to 85°C |
| **Dimensions** | Board: 103mm x 75mm<br>Encloser: 125 x 80 x 31mm | Board: 225mm x 100mm<br>Encloser: 256 x 104 x 33mm | Board: 170mm x 170mm |
| **Enclosure** | Optional extruded aluminum (IP32) enclosure | Optional extruded aluminum (IP32) enclosure | Not included<br>Supports mini ITX form factor enclosures |

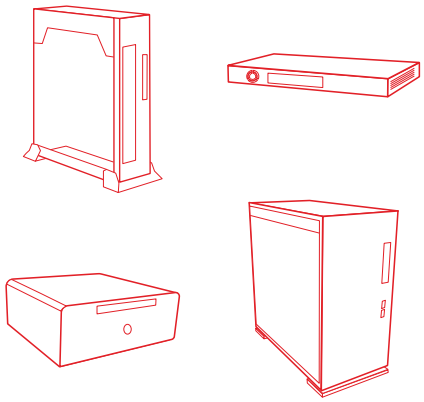
* Includes USB 3.0, SATA, GNSS, 3G modules support
** Assembly option on the COM

# HoneyComb LX2K

HoneyComb LX2K is a robust embedded Mini ITX platform designed for the COM Express type 7 form factor – offering a flexible and feature-rich carrier built as a powerful network compute Arm workstation.

This carrier board features strong networking with an array of 2 x 10GbE SFP+ connectors and 1 x 1GbE RJ45 port. Other features include 3 x USB 3.0 and 3 x USB 2.0 port, PCIe x8 (open slot), 4 x SATA, up to 64GB DDR4 memory (not included by default), eMMC (8GB by default), optional M.2, microSD, and GPIO header.





## We made it easy

HoneyComb LX2K was designed for easy setup based on the common mini ITX form factor – making it very simple to mount in a workstation case or wide range of enclosures. The board also features a variety of connectors to setup enclosure ports and fans.

Low Power - High Performance

Arm Development

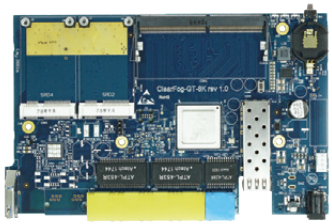
Industrial Grade Edge Computer

| Features | |
|---|---|
| **Processor** | NXP LX2160A 16 core Arm Cortex A72 (COM Express type 7 module) |
| **Memory & Storage** | Up to 64GB DDR4 (dual channel)<br>M.2 2240/2280<br>MicroSD<br>eMMC (64GB by default)*<br>4 x SATA 3.0 |
| **Network** | 1 x RJ45 (1GbE) |
| **Connectivity** | 1 x PCIe x8 Gen 4.0, open slot (can support x16)<br>3 x USB 3.0<br>3 x USB 2.0 |
| **I/O** | MicroUSB for debug (UART over USB)<br>USB to STM32 for remote management |
| **OS Support** | Linux Kernel<br>Mainline Linux |
| **Power** | ATX standard |
| **Temperature** | Commercial: 0°C to 70°C<br>Industrial: -40°C to 85°C |
| **Dimensions** | Mini ITX board: 170mm x 170mm |
| **Enclosure** | Optional fanned metal enclosure<br>Mini ITX workstation support |

* Assembly option on the COM

# ClearFog GT 8K

SolidRun's ClearFog GT family provides a variety of dynamic networking platforms, switch routers, NFV solutions and robust edge devices – designed to integrate into the complex networks of tomorrow.



| Features | |
|---|---|
| **Processor** | Marvell ARMADA A8040 Quad core Arm Cortex A72 (up to 2Ghz) |
| **Memory & Storage** | up to 16GB DDR4 DIMM<br>M.2 (optional support via adapter)<br>MicroSD<br>eMMC |
| **Connectivity** | 4 x 1GbE switched LAN (RJ45)<br>1 x 1GbE WAN (RJ45)<br>3 x mPCIe (USB 2.0 + PCIe)<br>1 x USB 3.0<br>1 x SFP+ (up to 10GbE) |
| **I/O** | GPIO header<br>Indication LEDs<br>User Push Buttons<br>UART header for debug |
| **OS Support** | Linux Kernel<br>Ubuntu 16.04<br>Google IoT Platform |
| **Power** | 12V input DC jack |
| **Temperature Range** | Commercial: 0°C to 70°C |
| **Dimensions** | Board: 177mm x 110mm<br>Enclosed: 195 x 118 x 32mm |
| **Enclosure** | Optional ruggedized extruded aluminum (IP32) enclosure |

# Industrial Networking

SolidRun's industrial networking platforms take networking solutions to the demanding industrial floor and harsh environments. These feature-rich solutions are tailor-made for the exceptional needs of industry 4.0, including robust PoE support.


| | ClearFog GTR | ClearFog GTI |
|---|---|---|
| **Features** | | |
| **Processor** | Marvell ARMADA A385 Dual core<br>Arm Cortex A9 (up to 1.6Ghz) | Marvell ARMADA A385 Dual core<br>Arm Cortex A9 (up to 1.6Ghz) |
| **Memory & Storage** | up to 2GB on-board DDR3L<br>2 x 7 pin SATA (optional replacment for 2 x mPCIe slot)<br>eMMC (8GB by defult) | up to 2GB on-board DDR3L<br>2 x 7 pin SATA (optional replacment for 2 x mPCIe slot)<br>eMMC (8GB by defult) |
| **Network** | S4: 4 x 1GbE switched LAN (RJ45)<br>1 x 1GbE WAN (RJ45) | S4: 4 x 1GbE switched LAN (RJ45)<br>1 x 1GbE WAN (RJ45) |
| | L8: 8 x 1GbE switched LAN (RJ45)<br>1 x 1GbE WAN (RJ45) | L8: 8 x 1GbE switched LAN (RJ45)<br>1 x 1GbE WAN (RJ45) |
| **Connectivity** | 3 x mPCIe* (1 x mPCIe supports LTE)<br>1 x USB 3.0<br>1 x SFP+ (up to 2.5GbE) | 3 x mPCIe* (1 x mPCIe supports LTE)<br>1 x USB 3.0<br>1 x SFP+ (up to 2.5GbE)<br>1 x RS485 |
| **I/O** | GPIO header<br>Indication LEDs<br>User Push Buttons<br>Micro USB to UART for development | GPIO header<br>DI/DO port<br>Indication LEDs<br>User Push Buttons<br>MicroUSB to UART for development |
| **PoE (Power over Ethenet)** | 4 x 1GbE switched LAN supporting 802.3at/af/bt PSE PoE<br>1 x 1GbE WAN supporting up to 802.3bt type -4 PD PoE | 8 x 1GbE switched LAN supporting 802.3at/af/bt PSE PoE**<br>1 x 1GbE WAN supporting up to 802.3bt type -4 PD PoE |
| **OS Support** | Linux 4.4x<br>Debian | Linux 4.4x<br>Debian |
| **Power** | 48-54V input DC jack - when PSE supported | 48-54V input DC jack - when PSE supported |
| **Temperature Range** | Industrial: -40°C to85°C | Industrial: -40°C to85°C |
| **Dimensions** | S4- Board: 177mm x 110mm<br>S4- Enclosure: 182 x 132 x 34 mm | S4- Board: 177mm x 110mm<br>S4- Enclosure: 182 x 132 x 34 mm |
| | L8- Board: 211mm x 127mm<br>L8- Enclosure: 253 x 132 x 32 mm | L8- Board: 211mm x 127mm<br>L8- Enclosure: 253 x 132 x 32 mm |
| **Enclosure** | Optional ruggedized extruded aluminum (IP32) enclosure | Optional ruggedized extruded aluminum (IP32) enclosure |

* Assembly option: 2 x SATA (7 pin) replace 2 x mPCIe slots.
** 802.3bt supported only for 4 of the RJ45 ports.

# Software & Support

## Software

SolidRun's software strategy is to focus on a value add, optimized BSP based on each chip vendor's base BSP. We focus on supporting long term support kernels and software releases in order to provide stability and longevity for our customers. In order to achieve this we focus on a core subset of distributions that we officially support, while contributing to mainline projects and community distributions for better long term support for customers that prefer to use their distribution of choice.
All of our public source code is available on our GitHub page.

## Supported Distributions

BuildRoot

debian

yocto PROJECT

OpenWrt Wireless Freedom

# SolidRun Developer Center

SolidRun developer center is a knowledge base platform that contains hundreds of articles about topics such as getting started, product documentation and reference designs, in depth software articles, software development guidelines and much more. New articles are added on a weekly basis by our hardware and software engineers.

Getting Started

Documentaion

Software

Reference Designs

**For developer resources & documentation visit:**

developer.solid-run.com

# Quality

Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) is a European Union regulation dating from 18 December 2006. REACH addresses the production and use of chemical substances, and their potential impacts on both human health and the environment. SolidRun is not aware of any substances that are used in production of its products that do not comply with Regulation (EC) No 1907/2006 and the SVHC list.

SolidRun Ltd. delivers two types of products:

- Standalone system modules and carrier boards (semi-finished goods), which are assemblies of other products. As such they are not marked with ay certification label.
- Complete products (finished goods) which are certified and marked accordingly. The table below presents the SolidRun Declaration of Conformation (DOC) for each complete product.

The RoHS 2 directive (2011/65/EU) is an evolution of the original directive and became law on 21 July 2011 and took effect 2 January 2013. It addresses the same substances as the original directive while improving regulatory conditions and legal clarity. It requires periodic re-evaluations that facilitate gradual broadening of its requirements to cover additional electronic and electrical equipment, cables and spare parts.

Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) is a European Union regulation dating from 18 December 2006. REACH addresses the production and use of chemical substances, and their potential impacts on both human health and the environment. SolidRun is not aware of any substances that are used in production of its products that do not comply with Regulation (EC) No 1907/2006 and the SVHC list.


SolidRun

# Contact Us

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