Artila Electronics has more than 15 years of experience in Industrial Computing. Artila’s product lines include the intelligent IoT gateway, programmable automation controller, IoT device platform, and web-based remote I/O. Artila’s products have been widely used in energy management, intelligent buildings, lighting control and environmental monitoring, and so on. Artila also provides hardware and software customization services to meet customer requirements for special specifications and features. From product design to production quality, Artila Electronics strives for delivering top-notch solutions and services to our customers in the industrial automation market.

Your Trusted Partner for Device Networking & Computing

www.artila.com

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Intelligent IoT Gateway  IoT Device Platform
Programmable Automation Controller  Remote I/O
Industrial Communication Gateway  HMI

www.artila.com
About Artila

Your Trusted Partner for Device Networking & Computing

Founded in 2004, Artila provides trusted innovative industrial computing products. Artila offers comprehensive system integration, hardware, software, and customer-centric services including the intelligent IoT gateway, programmable automation controller, IoT device platform, and remote I/O. We cooperate closely with our partners to help provide complete solutions for a wide array of applications across a diverse range of industries, such as energy management, lighting control and environmental monitoring. Artila has always been an innovator in the development and manufacturing of high-quality, high-performance computing products, and our mission is to empower these innovations by offering trustworthy automation products and services.

Looking for A Reliable and Tiny Solution? Arm + Linux is What You Need.

Artila provides all Linux building blocks for customers.

Customers Focus on

• Low power consumption ARM
• Highly integrated SoC
• Machine and mass market technology

Android Things

• Market proven open technology
• Complete application building blocks
• Life-cycle is under your control + Linux is What You Need

Looking for a Tiny Solution? Arm + Linux is What You Need.

About Artila

The Full Range of IoT Products

Intelligent IoT Gateway

Matrix Arm-based IoT Gateway is a Linux-ready industrial computing platform designed for data concentration and device gateway. Built rugged, its extra low-power RISC architecture realizes fankless computing. For real-time and small footprint applications such as protocol conversion and real-time control, the compact and easy-to-use FreeRTOS is the Artila’s choice of software operation platform. Artila Intelligent IoT Gateway allows customers to integrate in their systems efficiently and painlessly.

IoT Device Platform

Artila M-series Arm-Linux ready System on Module (SoM) is an application-ready platform for designers to reduce cost and time in hardware and software design. The M-series SoM, including Arm SoC, memory and flash, and pre-installed Linux OS, are in a compact size module with pin header or SO-DIMM form factor. The pre-loaded file system includes busybox utility collection, Linux Kernel 2.6.x, Ethernet / CAN / Serial / USB device drivers. Artila M-series accelerate the adoption of IoT and facilitate innovation in the digital enterprise.

Programmable Automation Controller

PAC series is a Linux-based, C/C++ programmable automation controller. Network-enabled and web-ready PAC features rich analog and digital I/O for real-world I/O control. Based on M-series SoM, PAC is a true Linux computing platform with file system support. With failure prevention and the design of redundant start-up, Artila PAC series are ideal for many mission-critical applications.

Modbus Gateway

The Aport series come with Arm cortex M-series controller plus FreeRTOS and programmer friendly APIs make your life easy. For budget limited project, the low power ARM CORTEX-M plus the high efficient FreeRTOS make-Aport Series an ideal light weight computing platform for device networking and remote monitoring.

Remote I/O

The RIO family, a web-ready, analog and digital I/O product lines, allows users to access and monitor the real-world data by using web interface or Modbus TCP / RTU protocols. Windows and Linux API library are also included in the RIO family. Thus, users can access the RIO products easily with the fast-paced and ever-changing trend of the industrial computing industry.
## Intelligent IoT Gateway

- Low Power Arm SoC for Wide Temperature Operating
- Linux and C / C++ based Real-Time Operating System
- Easy to Expand Wireless module via miniPCIe interface
- WEB / FTP / DHCP / SNMP / PHP / MySQL
- Palm Size, Wall Mount and DIN RAIL Mount

## Matrix Series  
**Arm-based Linux-ready Industrial IoT Gateway**

- Ability to multi-communication protocols (Ethernet, Serial, USB)
- User-friendly programming through the LCD touch screen
- Over-temperature and over-voltage protection
- 8-bit PWM support
- Supports GPIO/Lights Out/Event Triggering

### CPU
- AT91SAM9G20
- AT91SAM9G45
- i.MX6ULL
- ATSAMA5D35

### RAM
- 512MB DDR2 SDRAM
- 64MB SDRAM

### Flash
- 8GB eMMC / 8MB Data Flash
- 16MB / 256MB / 128MB DDR2 SDRAM

### Micro-SD Card
- 1 (Support boot from SD card)

### Ethernet
- 10/100Mbps
- GLAN

### RF Capability (Optional)
- YES

### Linux Kernel
- 4.9.5

### Dimensions (W x H x D)
- 78 x 108 x 24

### Power Input
- +9 ~ +48VDC

## Aport-PG Series  
**Programmable Device Server**

- Programmable device server with low power Arm Cortex-M plus high efficient FreeRTOS.
- Tiny but mighty computing platform for device networking comes with FreeRTOS which is a market leading RTOS (Real Time OS) and professionally developed, strictly quality controlled, robust, supported, and free to embed in commercial products, is designed for users who are looking for a tiny but mighty C/C++ programmable platform which has FreeRTOS and lwIP pre-installed.

### CPU
- Arm-based Linux
- AT91SAM9G20
- NXP LPC1768

### RAM
- 128KB SRAM
- 32KB SRAM

### Flash
- 1MB
- 512KB

### Serial Console
- 115200 baud rate

### Dimensions (W x H x D)
- 78 x 55 x 28

### Power Input
- +9 ~ +48VDC

## Matrix Series  
**Comparison Table**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Arm Cortex-A9</td>
<td>Arm Cortex-A8</td>
<td>Arm 100MHz</td>
<td>Arm 100MHz</td>
<td>Arm100MHz</td>
<td>Arm100MHz</td>
<td>Arm100MHz</td>
<td>Arm100MHz</td>
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<tr>
<td>RAM</td>
<td>512MB</td>
<td>512MB</td>
<td>128MB</td>
<td>256MB</td>
<td>512MB</td>
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<td>Flash</td>
<td>16GB</td>
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<td>Micro SD card slot</td>
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<td>1</td>
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</tr>
<tr>
<td>Ethernet</td>
<td>10/100Mbps</td>
<td>10/100Mbps</td>
<td>10/100Mbps</td>
<td>10/100Mbps</td>
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<td>10/100Mbps</td>
<td>10/100Mbps</td>
<td>10/100Mbps</td>
<td>10/100Mbps</td>
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<tr>
<td>RJ45 Capabilities</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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<td>Bluetooth stacking</td>
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<td>1</td>
<td>2</td>
<td>N/A</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td>GNSS</td>
<td>N/A</td>
<td>N/A</td>
<td>GPS+</td>
<td>Glonass</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>IMU (int.)</td>
<td>N/A</td>
<td>N/A</td>
<td>Gyro+</td>
<td>E-Compass</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>No. of Serial Port</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>4</td>
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<td>4</td>
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<tr>
<td>RS-232/422/485</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>RS-485</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>CAN (Isolation)</td>
<td>N/A</td>
<td>2</td>
<td>2</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>USB 2.0</td>
<td>2 x HOST</td>
<td>2 x HOST</td>
<td>2 x HOST</td>
<td>2 x HOST</td>
<td>2 x HOST</td>
<td>2 x HOST</td>
<td>2 x HOST</td>
<td>2 x HOST</td>
<td>2 x HOST</td>
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<td>GPIO</td>
<td>N/A</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>DIO Channels (Total)</td>
<td>Digital Input x4</td>
<td>Relay Out x2</td>
<td>Digital Input x4</td>
<td>Relay Out x2</td>
<td>Digital Input x4</td>
<td>Relay Out x2</td>
<td>Digital Input x4</td>
<td>Relay Out x2</td>
<td>Digital Input x4</td>
</tr>
<tr>
<td>Power Input</td>
<td>+9 ~ +48VDC</td>
<td>+9 ~ +48VDC</td>
<td>+9 ~ +40VDC</td>
<td>+9 ~ +48VDC</td>
<td>+9 ~ +60VDC</td>
<td>+9 ~ +40VDC</td>
<td>+9 ~ +40VDC</td>
<td>+9 ~ +48VDC</td>
<td>+9 ~ +48VDC</td>
</tr>
</tbody>
</table>

## Programmable Device Server  
**Comparison Table**

<table>
<thead>
<tr>
<th>Model</th>
<th>Aport-214PG</th>
<th>Aport-212PG</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Arm Cortex-A9</td>
<td>Arm Cortex-A8</td>
</tr>
<tr>
<td>RAM</td>
<td>128KB</td>
<td>128KB</td>
</tr>
<tr>
<td>Flash</td>
<td>1MB</td>
<td>1MB</td>
</tr>
<tr>
<td>Micro SD card slot</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Ethernet</td>
<td>10/100Mbps</td>
<td>10/100Mbps</td>
</tr>
<tr>
<td>RJ45 Capabilities</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>USB</td>
<td>2 x HOST</td>
<td>2 x HOST</td>
</tr>
<tr>
<td>GPIO</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>DIO Channels (Total)</td>
<td>Digital Input x4</td>
<td>Digital Input x4</td>
</tr>
<tr>
<td>Power Input</td>
<td>+9 ~ +48VDC</td>
<td>+9 ~ +48VDC</td>
</tr>
</tbody>
</table>
Matrix-700

**Features**
- ATMEL ATSAM5D35S 150MHz Cortex-A5 CPU
- Linux kernel 4.9.x with file system
- Toolchain: gcc 6.2.x + glibc 2.24
- 1 x Gigabit Ethernet and 1 x 10/100Mbps Ethernet
- 4 x RS-232/485 serial ports
- Ultra-low power consumption, less than 3 Watts

**H/W Specifications**
- CPU / Memory: ATMEL ATSAM5D35S 150MHz Cortex-A5 CPU
- Linux-ready Cortex-A5 536MHz Industrial IoT Gateway with 512MB SDRAM, 8GB eMMC Flash
- Toolchain: gcc 6.2.x + glibc 2.24
- Supports bootup from eMMC or SD card
- Boot Loader: Barebox
- CPU: ATMEL ATSAMA5D35 536MHz w/MMU
- Flash: 8GB, eMMC
- DataFlash: 8MB, for system backup

**S/W Specifications**
- Supports bootup from eMMC or SD card
- Linux kernel 4.9.x with file system

**Network Interface**
- Type: 1 x Gigabit and 1 x 10/100Mbps Ethernet

**Software Development**
- Toolchain: gcc 6.2.x + glibc 2.24
- Supports in-place C/C++ code compilation
- Package repository: Artila self-maintained repository
- Toolchain gcc 6.2.x + glibc 2.24
- Linux kernel 4.9.x

**TTV (serial) Ports**
- Serial console port (inside the box)
- Supports microUSB console port
- RS-232 Signals: TX, RX, RTS, CTS
- RS-485 Signals: Data+, Data-

**TTY (Serial) Port Parameters**
- Flow Control: RTS / CTS, XON / XOFF, None
- Stop Bits: 1, 1.5, 2
- Data Bits: 5, 6, 7, 8
- Baud Rate: up to 921.6Kbps
- RS-485 Automatic Flow Control: Yes
- RS-485 Signals: Data+, Data-
- RS-232 Signals: TX, RX, RTC, CTS

**Connector: Terminal block**
- Direction Control: Auto, by hardware
- Port 5, 6, 7, 8: RS-485
- Port 1, 2, 3, 4: Isolated RS-485 (2500Vrms isolation)

**Operating System**
- Linux kernel 4.9.x
- Supports bootup from eMMC or SD card
- Boot Loader: Barebox
- CPU: ATMEL ATSAMA5D35 536MHz Cortex-A5

**General**
- Watchdog: Yes
- Real-Time Clock (RTC): Yes
- Buzzer: Yes
- Power Input Voltage: +9~+48VDC (terminal block)
- Typical Consumption: 12VDC@500mA
- Dimensions (W x L x H): 166 x 103 x 35mm (6.5 x 4.0 x 1.37in)
- Operating Temperature: 0~70°C (32~158°F)
- Dimensions (W x H x D): 78 x 108 x 24mm (3.0x4.25x0.94in)
- Typical Consumption: 12VDC@200mA

**Ordering Information**
- Matrix-700
- DIN RAIL Mounting Kit
- PWR-12V-1A (31-62100-000)
- DK-35A (36-DK35A-000)
- Web server: Apache/Nginx/Lighttpd

Matrix-710

**Features**
- ATMEL ATSAM5D35S 150MHz Cortex-A5 CPU
- Linux kernel 4.9.x with file system
- Toolchain: gcc 6.2.x + glibc 2.24
- 1 x Gigabit Ethernet and 1 x 10/100Mbps Ethernet
- 4 x USB host ports
- 4 x isolated RS-485 serial ports and 4 x RS-485 serial ports
- 2 x CAN ports
- 1 x Full-rate miniPCIe socket installed
- Ultra-low power consumption

**H/W Specifications**
- CPU / Memory: ATMEL ATSAM5D35S 150MHz Cortex-A5 CPU
- Linux-ready Cortex-A5 536MHz Industrial IoT Gateway with 512MB SDRAM, 8GB eMMC Flash
- Toolchain: gcc 6.2.x + glibc 2.24
- Supports bootup from eMMC or SD card
- Boot Loader: Barebox
- CPU: ATMEL ATSAMA5D35 536MHz Cortex-A5
- Flash: 8GB, eMMC
- DataFlash: 8MB, for system backup

**S/W Specifications**
- Linux kernel 4.9.x
- Supports bootup from eMMC or SD card
- Boot Loader: Barebox
- CPU: ATMEL ATSAMA5D35 536MHz Cortex-A5

**Network Interface**
- Type: 1 x Gigabit and 1 x 10/100Mbps Ethernet

**Software Development**
- Toolchain: gcc 6.2.x + glibc 2.24
- Supports in-place C/C++ code compilation
- Package repository: Artila self-maintained repository
- Toolchain gcc 6.2.x + glibc 2.24
- Linux kernel 4.9.x

**TTV (serial) Ports**
- Serial console port (inside the box)
- Supports microUSB console port
- RS-232 Signals: TX, RX, RTC, CTS
- RS-485 Signals: Data+, Data-

**TTY (Serial) Port Parameters**
- Flow Control: RTS / CTS, XON / XOFF, None
- Stop Bits: 1, 1.5, 2
- Data Bits: 5, 6, 7, 8
- Baud Rate: up to 921.6Kbps
- RS-485 Automatic Flow Control: Yes
- RS-485 Signals: Data+, Data-
- RS-232 Signals: TX, RX, RTC, CTS

**Connector: Terminal block**
- Direction Control: Auto, by hardware
- Port 5, 6, 7, 8: RS-485
- Port 1, 2, 3, 4: Isolated RS-485 (2500Vrms isolation)

**Operating System**
- Linux kernel 4.9.x
- Supports bootup from eMMC or SD card
- Boot Loader: Barebox
- CPU: ATMEL ATSAMA5D35 536MHz Cortex-A5

**General**
- Watchdog: Yes
- Real-Time Clock (RTC): Yes, backup by super capacitor
- Buzzer: Yes
- Power Input Voltage: +9~+48VDC (terminal block)
- Typical Consumption: 12VDC@500mA
- Dimensions (W x L x H): 166 x 103 x 35mm (6.5 x 4.0 x 1.37in)
- Operating Temperature: 0~70°C (32~158°F)
- Regulation: CE Class A, FCC Class A
- Installation: Wall mounting, DIN-rail mounting (path optional)

**Ordering Information**
- Matrix-710
- DIN RAIL Mounting Kit
- PWR-12V-1A (31-62100-000)
- DK-35A (36-DK35A-000)
- Web server: Apache/Nginx/Lighttpd
- Database: MySQL/SQLite3/PostgreSQL
- Web server: Apache/Nginx/Lighttpd
- Text editor: vim/nano/sed
- Command: Using standard apt-get command

Linux-ready Cortex-A5 Industrial IoT Gateway
**Matrix-713**

**Key Features**

- **High Ability IoT Gateway**
  - Support reliable communication interface
  - Support Plug & play networking protocol (IP & M2M)
  - Location smart, supports GPS / 3-Axis Gyro/Sensor, e-compass

- **Information Smart**
  - Sensor / Data acquisition
  - Database Management
  - Rich I/Os fulfill different applications
  - Support Host-Idle visual writing tool for IoT

- **GNSS/IMU/Cellular Specifications**

  **GNSS (Global Navigation Satellite System)**
  - 72-channel data link, 116-bit eGNSS engine
  - Support Dual Satellite: GPS & GLONASS
  - 1.44MHz for accurate time and location
  - Support Access/Reference/Autonomous, OA, SAG & IAG Complete
  - Max nav: update rate: Single channel up to 1MHz, 2 Concurrent GNSS up to 1MHz
  - Accuracy (Position) 2.5m CEP
  - 1 x Active Antenna

  **IMU (Inertial Measurement Unit)**
  - 3 x 8-Axis digital output Gyroscope
  - Gyroscope has a programmable full scale range of ±2g, ±1000, ±2000 and ±4000 degrees/second and very low noise rate at 0.01dps/Hz, 4g scale operation current: 3.2mA
  - 3 x 3-Axis Accelerometer (G-Sensor)
  - ±2g/±4g/±8g/±16g user-programmable accelerometer full-scale range
  - 4k data output
  - 3 x 3-Axis Magnetometer (E-Compass)
  - Supports Compass/Compass/Compass. 3-Axis magnetometer data out 10-bit data each 3-Axis magnetic components (Sensitivity: 0.15uT/LSB/deg)

**Rugged Reliable Device**

- Wide-range Temperature operating
- Low-Power consumption, saving power / memory
- Dual SIM slots to support cross zone communication / wants-free integration

**Features**

- Rugged Design, Wide-range Temperature operating
- ATMEG ATSAMD855156 MHz Cortex-A5 CPU
- Linux kernel 4.5 with file system
- Support Node-Red / the browser-based Flow editor
- STM32F756Zxx NAND
- BGA w/MMC Flash and SMD Dataflash for system backup
- 2 x Micro-SD socket
- 1 x Gigabit Ethernet and 1 x 10/100Base Ethernet
- Rich I/O: Assembled I²C, SPI, USB, SD/MMC, UART, USB-OTG, JTAG
- Support GNSS (EPP/SBAS/Glonass, Gryo, G-Sensor, e-Compass)
- ZerahBit file size & ZerahBit SIM card socket reserved

**H/W Specifications**

- **CPU / Memory**
  - CPU: ATMEG ATSAMD855156 MHz Cortex-A5
  - Memory: 512MB SDRAM, 4GB NAND Flash
- **Network Interface**
  - 1 x Gigabit Ethernet
  - 2 x USB host (one for debug)
  - 1 x microSD card socket
  - 2 x CAN bus
  - 2 x Serial ports (UART, RS422 / RS485, SD/MMC)
  - 1 x Micro-SD slot
  - 1 x Audio OUT
  - 2 x JTAG / Debug Port
  - 8 x GPIO
  - 1 x Line-out R/L port, optional Earphone R/L

**S/W Specifications**

- **Operation System**
  - Linux kernel 4.5.2
  - Supports boot-up from eMMC or SD card
- **Boot Loader**
  - Board ID: B001
- **Software Development**
  - Toolchain: gcc 6.2.0 - glibc 2.24
  - Supports win-ce / code compilation

**Package Management**

- Package repository: Artia self-maintained repository
- Command: Using standard apt-get command

**Popular Packages**

- Web Server: Apache/NGNIX/ghttpd
- Database: MySQL, SQLite3, InnoDB
- Script Language: PHP/Python/Perl/NodeJS
- Text editor: unmanaged
- Administration: Webmin

**Ordering Information**

- **Technical Support**
  - For North America: 1-888-929-4672
  - For Europe, Asia: +35312-638747
- **Support**
  - Artia website www.artila.com
  - Support: Support@artila.com
  - newsletter: newsletter@artila.com
  - Social Media: Facebook, LinkedIn, Twitter
  - Contact: Artia Sales Team

**Matrix-713**

- Linux-ready Cortex-A5 536MHz Industrial IoT Gateway with 512MB SDRAM, BGA MMC Flash, with RPI/GPS/G Sensor/3-compass

**Matrix-713-SA (for Europe, ASIA, LATAM)**

- Linux-ready Cortex-A5 536MHz Industrial IoT Gateway with 512MB SDRAM, BGA MMC Flash, with RPI/GPS/GNSS, with 4G LTE miniPCI Module with antenna

**Matrix-713-NA (for North America)**

- Linux-ready Cortex-A5 536MHz Industrial Gateway with 512MB SDRAM, BGA MMC Flash, with GPS/GNSS, with 4G LTE miniPCI Module with antenna

**Matrix-713-J (for China)**

- Linux-ready Cortex-A5 536MHz Industrial Gateway with 512MB SDRAM, BGA MMC Flash, with GPS/GNSS, with 4G LTE miniPCI Module with antenna

**MM7170**

- 2-4G Wi-Fi (2.411GHz) miniPCI Module with antenna

**DK-55A**

- 2G SIM (2G/2300MHz, 3G/2100MHz, 4G/1800MHz, 5G/1900MHz, 4G LTE Cat11)

**Power Consumption**

- 12VDC (1.1A) power input with 110 – 240AC power in
Matrix-500

**Features**
- Linux 2.6.14 compatible computing platform
- USB 2.0 compliant
- 4x RS-232 ports
- 4x RS-485 ports
- 2x USB 2.0 ports
- 1x SD 1.0 compliant socket
- 1x RJ-45 network port
- 16MB NOR Flash
- Ultra low power consumption: less than 3Watts
- 3 x 10/100Mbps Ethernet port
- 1 x 10/100Mbps Ethernet port
- 4 x RJ45 10/100Mbps full or half-duplex
- 2 x USB 2.0 host ports
- 1x 10/100Mbps Ethernet port
- 1x SD memory card slot
- 21 x TTY (Serial) ports
- ACPI C+C support
- Ultra low power consumption: less than 3Watts

**H/W Specifications**
- CPU / Memory: ATMEL ARM1176JZF-S 208MHz (16M RAM, 8M flash)
- Memory: 16MB SDRAM, 16MB NOR Flash
- Network Interface: Type 2 x 10/100BaseT, RJ45 connector
- Protection: 1x network isolation
- TTY (Serial) Ports
  - Port 1: Can be set as RS-232, RS-485 or RS-422
  - Port 2: Supports full modem signals
  - Connector: DB9 male connector
- TTY (Serial) Parameters
  - Baud Rate: Up to 921.6Kbps
  - Data Bits: 5, 6, 7, 8
  - Stop Bits: 1, 1.5, 2
  - Flow Control: RTS / CTS, XON / XOFF, None
- USB Host Ports
  - Port 1: Supports full-speed data rate
  - Port 2: Supports high-speed data rate
- Mass Storage
  - 1x SD 1.0 compliant socket
  - USB Host Ports
  - Mass Storage
- Ordering Information
  - Matrix-500

Matrix-512

**Features**
- Linux 2.6.14 compatible computing platform
- 2x USB 2.0 host ports
- 1x SD 1.0 compliant socket
- 1x RJ-45 network port
- 16MB NOR Flash
- Ultra low power consumption: less than 3Watts
- 3 x 10/100Mbps Ethernet port
- 4 x RJ45 10/100Mbps full or half-duplex
- 2 x USB 2.0 host ports
- 1x 10/100Mbps Ethernet port
- 1x SD memory card slot
- 21 x TTY (Serial) ports
- ACPI C+C support
- Ultra low power consumption: less than 3Watts

**H/W Specifications**
- CPU / Memory: ATMEL ARM1176JZF-S 208MHz (16M RAM, 8M flash)
- Memory: 16MB SDRAM, 16MB NOR Flash
- Network Interface: Type 2 x 10/100BaseT, RJ45 connector
- Protection: 1x network isolation
- TTY (Serial) Ports
  - Port 1: Can be set as RS-232, RS-485 or RS-422
  - Port 2: Supports full modem signals
  - Connector: DB9 male connector
- TTY (Serial) Parameters
  - Baud Rate: Up to 921.6Kbps
  - Data Bits: 5, 6, 7, 8
  - Stop Bits: 1, 1.5, 2
  - Flow Control: RTS / CTS, XON / XOFF, None
- USB Host Ports
  - Port 1: Supports full-speed data rate
  - Port 2: Supports high-speed data rate
- Mass Storage
  - 1x SD 1.0 compliant socket
  - USB Host Ports
  - Mass Storage
- Ordering Information
  - Matrix-512
Matrix-504

Features
- Linux 2.6.29 compatible computing platform
- 64MB SDRAM and 256MB NAND flash
- Ultra-low power consumption, less than 3 Watts
- 1 x 10/100Mbps Ethernet port
- 4 x 921.6Kbps high-speed TTY (serial) ports
- 2 x USB 2.0 host ports, 15Mbps
- 1 x microSD socket inside
- GNU C / C++ toolchain for Linux / Windows environment
- Extremely compact design, 78 x 108 x 24mm

CPU / Memory
- CIL: Linux, kernel 2.6.29
- Boot Loader: U-Boot
- File Systems: UB, JFS2, ETXU, ETXU, V4AT, V4AT, NMT

Pre-installed Utilities
- bash, bourjouis, spyni, egrep, ping (for internet), pamics, apache, otclsh, iptables, syslog, ssh, wireless tools, toolkit, menu mount / umount, usbutils, Artila utility

Package Management & System Administration
- supports cpan to manage the package installation, upgrade and removal
- supports webmin (via telnet install webmin to install) for web-based system administration

Toolschain for Linux
- GCC / C / C++ / PC cross compiler
- GLIBC: POSIX Library

H/W Specifications
- CPU / Memory
  - CPU: CIL, Linux, kernel 2.6.29
  - Memory: 64MB SDRAM, 256MB NAND Flash
  - Boot Loader: U-Boot
  - File Systems: UB, JFS2, ETXU, ETXU, V4AT, V4AT, NMT
- Pre-installed Utilities
  - bash, bourjouis, spyni, egrep, ping (for internet), pamics, apache, otclsh, iptables, syslog, ssh, wireless tools, toolkit, menu mount / umount, usbutils, Artila utility
- Package Management & System Administration
  - supports cpan to manage the package installation, upgrade and removal
  - supports webmin (via telnet install webmin to install) for web-based system administration
  - Toolschain for Linux
    - GCC / C / C++ / PC cross compiler
    - GLIBC: POSIX Library

Ordering Information
- Matrix-504
  - Linux-ready Arm9 Industrial IoT Gateway with 256MB on-board RAM and on-board 32MB SD card inside
  - Temperature: -20~80°C
  - Power Consumption: 1.5kW
  - GRE: Ethernet

Matrix-516

Features
- 1 x 10/100/1000Base-T Ethernet port
- 1 x microSD socket inside
- 2 x 10/100Mbps Ethernet ports
- 1 x microSD slot

CPU / Memory
- CPU: ARM, Linux, kernel 2.6.29

Pre-installed Utilities
- bash, bourjouis, spyni, egrep, ping (for internet), pamics, apache, otclsh, iptables, syslog, ssh, wireless tools, toolkit, menu mount / umount, usbutils, Artila utility

Package Management & System Administration
- supports cpan to manage the package installation, upgrade and removal
- supports webmin (via telnet install webmin to install) for web-based system administration

Toolschain for Linux
- GCC / C / C++ / PC cross compiler
- GLIBC: POSIX Library

Ordering Information
- Matrix-516
  - Linux-ready Arm9 Industrial IoT Gateway
  - Temperature: -20~80°C
  - Power Consumption: 1.5kW
  - GRE: Ethernet

DIN RAIL Mounting Kit
- DIN-RAIL Mounting Kit

USB Ports
- Host Ports: 2
- Device Port: 1
- Reserved
- Speed: USB 2.0 compliant, supports low-speed (1.5Mbps) and full-speed (2Mbps) data rate

Ordering Information
- Matrix-516
  - Linux-ready Arm9 Industrial IoT Gateway
  - Temperature: -20~80°C
  - Power Consumption: 1.5kW
  - GRE: Ethernet

DIN RAIL Mounting Kit
- DIN-RAIL Mounting Kit
Matrix-518

Features
- ATMEL ATM7062S-C340M 400MHz CPU
- Linux kernel 2.6.29 with file system
- SDMMC SDRAM and 256MB NAND flash
- 1 x microSD socket inside
- 2 x 10/100Mbps Ethernet ports
- 8 x RS-232 / 422 / 485 serial ports
- USB / GPIO / Audio jack
- Ultra-low power consumption, less than 3 Watts

H/W Specifications
- CPU / Memory: CPU: ATMEL ATM7062S-C340M 400MHz w/ SDRAM Memory: SDMMC SDRAM and 256MB NAND flash
- Power Supply: 12VDC@190mA

5/W Specifications
- General
  - OS: Linux, kernel 2.6.29
  - Boot Loader: u-Boot
  - File Systems: UFS, JFFS2, ETXFS
  - File System Backup

Pre-installed Utilities
- bash, busybox, sysvinit, procps, xargs, iwconfig, uuciadm, psmisc, ufi, watchdog, syslog, klogd
- net tethering and 3G modem support
- Package Management & System Administration
  - Supports webmin (use ‘ipkg install webmin’ to install)
  - Supports ipkg to manage the package installation, upgrade and removal
  - Supports yum, rpm, amgrd (Artila broadcast search daemon)

Toolchain for Linux
- GCC / C / C++ / CC cross compiler
- GLIBC: POSIX Library

Ordering Information
- Matrix-518: Linux-ready Arm9 Industrial IoT Gateway
- CR-0125-C10-150 (91-0125-C10)
- Serial Cable (RS485 to DB9 Female, 150cm)
- CBL-220028-09-1P03M-09P-01: Console Cable (10Pin Header to DVI Male, 20cm)
- DE-35A (36-DE35A-000): DVI/RAIL Mounting kit

Matrix-522

Features
- ATMEL ATM7062S-C340M 400MHz CPU
- Linux kernel 2.6.29 with file system
- SDMMC SDRAM and 256MB NAND flash
- 1 x microSD socket inside, up to 32GB capacity
- 2 x CAN bus ports support SocketCAN / CANopen
- 2 x 10/100Mbps Ethernet ports
- 2 x RS-232 / 422 / 485 serial ports
- 2 x USB hosts, 2 x GPIOs
- Ultra-low power consumption, less than 3 Watts

H/W Specifications
- CPU / Memory: CPU: ATMEL ATM7062S-C340M 400MHz w/ SDRAM Memory: SDMMC SDRAM and 256MB NAND flash
- Power Supply: 12VDC@190mA

5/W Specifications
- General
  - OS: Linux, kernel 2.6.29
  - Boot Loader: u-Boot
  - File Systems: UFS, JFFS2, ETXFS
  - File System Backup

Pre-installed Utilities
- bash, busybox, sysvinit, procps, xargs, iwconfig, uuciadm, psmisc, ufi, watchdog, syslog, klogd
- net tethering and 3G modem support
- Package Management & System Administration
  - Supports webmin (use ‘ipkg install webmin’ to install)
  - Supports ipkg to manage the package installation, upgrade and removal
  - Supports yum, rpm, amgrd (Artila broadcast search daemon)

Toolchain for Linux
- GCC / C / C++ / CC cross compiler
- GLIBC: POSIX Library

Ordering Information
- Matrix-522: Linux-ready Arm9 Industrial CAN Bus Box Computer
- CBL-F310028-09-0P09M-001: Console Cable (10Pin Header to DVI Male, 20cm)
- DE-35A (36-DE35A-000): DVI / RAIL Mounting Kit
Matrix-505

Features
- Linux 2.6.36 compatible computing platform
- 128MB DDR2 SDRAM and 256MB NAND Flash
- System backup Data Flash: 2MB
- 2 x 10/100Mbps Ethernet ports
- 1 x RS-232 / 422 / 485, 3 x RS-232 / 485, TY ports
- 1 x USB 2.0 host ports, up to 480Mbps
- 1 x microSD socket inside
- Ultra-low power consumption, less than 3 Watts

H/W Specifications
- CPU / Memory: ARM 11, 1GHz, 128MB DDR2 SDRAM 256MB NAND Flash
- Network interface: 2GB Ethernet, USB 2.0
-軟件: Lubuntu, ETX2 / ETX3, VFAT / FAT, NFS

S/W Specifications
- Pre-installed utilities: bash, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, su, s
### Long-Term Partnership with Arm

A solid foundation for 32-bit Arm® processor-based MCUs

#### Linux Arm System On Module


#### Linux Arm Single Board Computer


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### Comparison Table

<table>
<thead>
<tr>
<th>Model</th>
<th>M-X6ULL</th>
<th>M-ASD15</th>
<th>M-501</th>
<th>M-502</th>
<th>M-503</th>
<th>M-9645A</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>ARM Cortex-A7 500MHz</td>
<td>ARM Cortex-A7 500MHz</td>
<td>ARM Cortex-A5 536MHz</td>
<td>ARM Cortex-A5 536MHz</td>
<td>ARM Cortex-A5 536MHz</td>
<td>ARM Cortex-A5 536MHz</td>
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<tr>
<td>Floating Point Unit</td>
<td>YES</td>
<td>N/A</td>
<td></td>
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<tr>
<td>RAM</td>
<td>512MB SDRAM</td>
<td>64MB SDRAM</td>
<td>128MB DDR3 RAM</td>
<td>256MB DDR3 RAM</td>
<td>256MB DDR3 RAM</td>
<td>256MB DDR3 RAM</td>
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<td>Flash</td>
<td>16MB Flash</td>
<td>16MB Flash</td>
<td>16MB NOR Flash</td>
<td>256MB NOR Flash</td>
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<td>256MB NOR Flash</td>
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<td>SD / MMC</td>
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<td>N/A</td>
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<tr>
<td>Display</td>
<td>24-bit RGB</td>
<td>N/A</td>
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<td>Camera Interface</td>
<td>YES</td>
<td>N/A</td>
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<tr>
<td>Ethernet</td>
<td>10/100Mbps x 2</td>
<td>10/100Mbps x 1</td>
<td>10/100Mbps x 1</td>
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<tr>
<td>UART</td>
<td>4-wire x 2, 2-wire x 1</td>
<td>4-wire x 1, 2-wire x 1</td>
<td>4-wire x 1, 2-wire x 1</td>
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<td>CAN Bus</td>
<td>1</td>
<td>1</td>
<td>N/A</td>
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<tr>
<td>Console</td>
<td>serial console x1</td>
<td>N/A</td>
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<tr>
<td>USB 2.0</td>
<td>OTG x2</td>
<td>USB x1, Host x1</td>
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<td>Dc</td>
<td>2</td>
<td>N/A</td>
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<td>N/A</td>
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<td>SPI</td>
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<td>4</td>
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<tr>
<td>GPIO</td>
<td>8-pin</td>
<td>21-pin</td>
<td>32-pin 3.3V CMOS</td>
<td>16-pin 3.3V CMOS</td>
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<tr>
<td>Linux Kernel</td>
<td>4.14.x</td>
<td>4.9.x</td>
<td>2.6.14</td>
<td>2.6.29</td>
<td>2.6.38</td>
<td>2.6.38</td>
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<tr>
<td>Boot Loader</td>
<td>U-Boot</td>
<td>Barebox</td>
<td>U-Boot</td>
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<tr>
<td>Software Development</td>
<td>Tool Chain: gcc + glibc</td>
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<td></td>
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<tr>
<td>Package management</td>
<td>Standard apt-get, support opkg &amp; webmin</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Node- Red</td>
<td>YES</td>
<td>N/A</td>
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<tr>
<td>Dimensions</td>
<td>Width: 45 x 65 mm, Height: 30 x 55 mm, Depth: 50 x 50 mm</td>
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<td></td>
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<tr>
<td>Power Input</td>
<td>5V/DC</td>
<td>5V/DC</td>
<td>3.3V/DC</td>
<td>3.3V/DC</td>
<td>3.3V/DC</td>
<td>3.3V/DC</td>
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<tr>
<td>RTC, Waking Timer</td>
<td>YES</td>
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</tbody>
</table>
M-X6ULL

Features
- ARM® Cortex-A7 CPU, up to 1GHz
- Linux kernel 4.14 with boot loader & file system
- TrustZone, 64-bit internal clock
- Preloaded with Debian 9
- Armv8-M 400MHz
- Dual 10/100/1000 Ethernet interface
- 3x UART, 2x OTG/HOST/USB, 4x GPIO and I2C/12SPI
- 240-pin GPIO display interface
- SD/MMC 20-pin interface
- Compact size: 68 x 43mm
- Single 5VDC operation

Display Interface
- One 240-pin digital parallel display interface
- Support max 85MHz display clock and up to WXGA (1366 x 768)
- 16-bit color

Touch Sensor Interface
- Touch controller to support 4-wire and 5-wire resistive touch panel

General
- Power Input: 5VDC
- SD/MMC 20-pin I/F
- NOR Flash: 16MB
- eMMC: 4GB (optional for Micro-SD I/F)

Network Interface
- 2x10/100/1000 Ethernet (RJ45)
- Protection: 75 magnetic isolation
- TY(Teralry) Ports
- 2 x isolated RS-485 compliant ports
- 1 x RS-232 (TX/RX)
- 2 x isolated RS-485 (1500Vrms isolation), Signal: Data+, Data-

S/W Specifications

Operation System
- Linux kernel 4.14
- Support boot from SD or SD card
- Board loader: U-Boot
- E2L Engine X1

Desktop Environment
- Desktop HW Interface
- Built-in Firefox / Chromium browser + virtual keyboard

Software Development
- Toolchain: gcc 6.2.x + glibc 2.24

Package Management
- Repository via std maintained repository
- Command: using standard apt-get command

Power Requirement
- 1 x miniPCIe socket
- Power I/O: +5/+12VDC
- 9~48Vdc (terminal block)

Display Interface
- 2x40pin USB interface & TTL display interface
- Support max 85MHz display clock and up to WXGA (1366 x 768) at 60Hz

Touch Sensor Interface
- Standard resistive touch sensor interface to support 5-wire resistive touch panel

Expansion
- 1 x eMMC full-size socket
- 1 x microSD card socket reserve

GNSS/IMU/Cellular Specifications

GNSS (Global Navigation Satellite System)
- 72-channel u-blox M8 E-GNSS engine
- Support Dual Satellite: GPS & GLONAS
- 146dBm Tracking and Navigation Sensitivity
- Supports Differential GPS/AutoCorrection

OMA SUPL & 3GPP Compliant
- Max rms update rate: 100Hz
- 2 Concurrent GNSS, up to 10MHz
- Accuracy (Position): 5-7 m CE
- 1 x Active Antenna

IMU (Inertial Measurement Unit)

GNSS (Global Navigation Satellite System)
- 5 x 3-Axis digital output Gyroscope
- Gyroscope has full scale range of ±250, ±500, ±1000, and ±2000 degrees/sec and very low rate noise at 0.01dps/Hz. Gyroscope operating current: 3.2mA
- 5 x 3-Axis Accelerometer (G-Accelerometer)
- 2 x40pin USB, user programmable accelerometer full scale range
- 16-bit data output
- 1 x 3-Axis Magnetometer (D-Campus)
- Build-in SPI to converter for programmable accelerometer data output 16-bit data
- Each 3-Axis magnetic component (Sensitivity 0.15uT/LSB-typ)

Ordering Information

M-X6ULL
- Linux-ready Cortex-A7 1GHz System on Module with 512MB SDRAM

M-X6ULL Starter Kit
- Includes one M-X6ULL SoM and one CB-X6ULL carrier board with power circuitry, Ethernet, Serial Ports, USB/HAND, and SD/MMC eMMC socket.
Features

- ATMEL Arm Cortex-A5 ATSAMA5D35 536MHz CPU
- Linux kernel 4.0.x with file system
- Toolchain gcc 6.2.x and glibc 2.24
- 512MB LPDDR2 SDRAM
- 8GB eMMC Flash and 8MB DataFlash for system backup
- Dual Ethernet interface, 1 x Gigabit and 1 x 10/100Mbps, with on-board PHY
- SPI / DC / I2S / UART / USB / GPIO / CAN / I2C
- Miniature size, 50 x 30mm only
- Single 5VDC operation, less than 1.0W

H/W Specifications

- CPU / Memory
  - CPU: ATMEL Cortex-A5 ATSAMA5D35
  - SDRAM: 512MB LPDDR2
- Flash: 8GB eMMC
- DataFlash: 8MB, for system backup
- Network Interface
  - Type: 1 x Gigabit and 1 x 10/100Mbps Ethernet
  - Phy: Micrel KSZ8081RNAIA (10/100Mbps)
    - Phy: Micrel KSZ9031RNXCA (Gigabit)
- UART Interface
  - UART1: TX, RX, RTS, CTS (shared with CAN1 TX)
  - UART2-4: TX, RX, RTS, CTS
- Signal Level: 3.3V
- Common (UART Parameters)
  - Baud Rate: up to 921.69kBps
  - Parity: None, Even, Odd, Mark, Space
  - Data Bits: 5, 6, 7, 8
  - Stop Bits: 1, 1.5, 2
  - Flow Control: RTS / CTS, XON / XOFF: None
- CAN Interface
  - CAN1: TX (shared w/ UART1 TX), RX
  - CAN2: TX, RX
- Console / Debug Ports
  - Serial console port (UART interface)
  - USB console port
- USB 2.0 Host Interface
  - Supports 480Mbps high-speed mode
  - Host ports: 2
- SPI Interface
  - Signals: MISO, MOSI, clock
  - Chip Select: 4: CS0-CS3
- I2C Interface
  - Signals: data, clock
- I2S Interface
  - Transmits: data, clock, sync
  - Receives: data, clock, sync
- SD 2 Interface
  - Signals: cmd, clock, data0-3, card_detect
  - SD2K Compatible
- Watchdog Interface
  - 1 x external watchdog timer input
  - 1 x watchdog timer output
- GPIO (General-purpose i/O)
  - 16 of Pin25
- Power Requirement
  - Power Input: 5VDC
  - Power Consumption: 0.75W (typical)
- General
  - Dimensions: W x L: 50 x 30mm
  - Pins: Total 50/2 pins, 1.27mm pitch Female header
  - Mounting Hole: Ø 2.0mm (M2) in diameter

S/W Specifications

- Operation System
  - Linux kernel 4.0.x with file system
  - Supports bootup from eMMC or SD card
  - Boot Loader: Barebox
- Software Development
  - Toolchain gcc 6.2.x + glibc 2.24
  - Supports in-place C/C++ code compilation
- UART Interface
  - 1 x external watchdog timer input
  - 1 x watchdog timer output
- GPIO (General-purpose i/O)
  - 16 of Pin25
- Power Requirement
  - Power Input: 5VDC
  - Power Consumption: 0.75W (typical)
- General
  - Dimensions: W x L: 50 x 30mm
  - Pins: Total 50/2 pins, 1.27mm pitch Female header
  - Mounting Hole: Ø 2.0mm (M2) in diameter

Pin Assignment

- CPU / Memory
  - CPU: ATMEL Cortex-A5 ATSAMA5D35
  - SDRAM: 512MB LPDDR2
- Flash: 8GB eMMC
- DataFlash: 8MB, for system backup
- Network Interface
  - Type: 1 x Gigabit and 1 x 10/100Mbps Ethernet
  - Phy: Micrel KSZ8081RNAIA (10/100Mbps)
    - Phy: Micrel KSZ9031RNXCA (Gigabit)
- UART Interface
  - UART1: TX, RX, RTS, CTS (shared with CAN1 TX)
  - UART2-4: TX, RX, RTS, CTS
- Signal Level: 3.3V
- Common (UART Parameters)
  - Baud Rate: up to 921.69kBps
  - Parity: None, Even, Odd, Mark, Space
  - Data Bits: 5, 6, 7, 8
  - Stop Bits: 1, 1.5, 2
  - Flow Control: RTS / CTS, XON / XOFF: None
- CAN Interface
  - CAN1: TX (shared w/ UART1 TX), RX
  - CAN2: TX, RX
- Console / Debug Ports
  - Serial console port (UART interface)
  - USB console port
- USB 2.0 Host Interface
  - Supports 480Mbps high-speed mode
  - Host ports: 2
- SPI Interface
  - Signals: MISO, MOSI, clock
  - Chip Select: 4: CS0-CS3
- I2C Interface
  - Signals: data, clock
- I2S Interface
  - Transmits: data, clock, sync
  - Receives: data, clock, sync
- SD 2 Interface
  - Signals: cmd, clock, data0-3, card_detect
  - SD2K Compatible
- Watchdog Interface
  - 1 x external watchdog timer input
  - 1 x watchdog timer output
- GPIO (General-purpose i/O)
  - 16 of Pin25
- Power Requirement
  - Power Input: 5VDC
  - Power Consumption: 0.75W (typical)
- General
  - Dimensions: W x L: 50 x 30mm
  - Pins: Total 50/2 pins, 1.27mm pitch Female header
  - Mounting Hole: Ø 2.0mm (M2) in diameter

Ordering Information

M-A5D35
- Linux-ready Cortex-A5 536MHz System on Module with 512MB SDRAM, 8GB eMMC, Flash

M-A5D35 Starterkit
- Includes one M-A5D35 SoM and one carrier board with power circuitry, Ethernet, Serial port/USB and SD socket
**Features**

- AT91RM9200 CPU at 180MHz
- Linux kernel 2.6.14
- SD/SDHC card slot
- 64MB SDRAM
- 16MB NOR Flash
- 1 x 10/100Mbps Ethernet
- 2 x USB 2.0 hosts supporting full speed of 12Mbps
- 1 x SD (secure digital) interface
- 4 x 160MHz UARTs at hardware flow control
- External bus (A0-A7, D0-D7, RD, WR) with 4 x GPIO select
- Ultra-low power consumption, less than 2.5 Watts
- GNU/C / C++ toolchain is included

**CPU / Memory**

- CPU: AT91RM9200 180MHz
- Memory: 64MB SDRAM, 16MB NOR Flash

**Network Interface**

- Type: 1 x 10/100Mbps Ethernet
- PHY: DAIWCON DM9161

**UART Interface**

- Port 0: TDI0, IDID, RT0, CS1, CS0, DCD1, DSR1, DTR1, GND
- Port 1: TDI1, IDID, RT1, CS1, CS0, DCD1, DSR1, DTR1, GND
- Port 2: TDI2, IDID, RT2, CS1, CS0, DCD1, DSR1, DTR1, GND
- Port 3: TDI3, IDID, RT3, CS1, CS0, DCD1, DSR1, DTR1, GND
- Signal Level: CMOS / 3.3V compatible

**Common UART Parameters**

- Baud Rate: 4800
- Parity: None
- Stop Bits: 1
- Data Bits: 8
- Flow Control: RTS/CTS

**Pre-defined Pins**

- Port 0: TXD0, RXD0, RTS0, CTS0, GND
- Port 1: TXD1, RXD1, RTS1, CTS1, DCD1, DTR1, DSR1, GND
- Port 2: TXD2, RXD2, RTS2, CTS2, GND
- Port 3: TXD3, RXD3, RTS3, CTS3, GND

**SD (Secure Digital Card Interface)**

- Signals: MCCDA, MCCK, MCDA0~MCDA3

**SPI (Serial Peripheral Interface)**

- Signals: MISO, MOSI, SPCK, CS1, CS2

**I²S (Inter-IC Sound)**

- Receiver Signals: RSCK, RWS, RSD
- Transmitter Signals: TSCK, TWS, TSD

**I²C (Inter-IC Bus)**

- Supported Devices: Driver has been built-in
- Signals: TWD, TWCK

**USB Ports**

- Host Ports: 2, USB 2.0 compliant
- Host Signals: UdataA+, UdataA-, UdataB+, UdataB
- Supports 9-bit Multi-drop mode
- Supports hardware auto-direction control

**32 x GPIOs can be programmed as digital input or output**

- Supports interrupt function when GPIOs are set as digital input
- Signal Level: CMOS / 3.3V compatible

**Pre-defined Pins**

- Port 0: TXD0, RXD0, RTS0, CTS0, GND
- Port 1: TXD1, RXD1, RTS1, CTS1, DCD1, DTR1, DSR1, GND
- Port 2: TXD2, RXD2, RTS2, CTS2, GND
- Port 3: TXD3, RXD3, RTS3, CTS3, GND

**Power Requirement**

- Power Input: 13.5VDC (Typical)
- Power Consumption: 2W

**Ordering Information**

- M-501T
  - Includes one M-501 SoM and one carrier board with power circuitry,
  - 16MB NOR Flash, Wide-temp. Version

- M-501 Starter Kit
  - Includes one M-501 SoM and one carrier board with power circuitry,
  - 1 x ISDN 232 port, 1 x IS 322 / 422 / 485 port, 1 x Ethernet port, 1 x USB host, 1 x SD socket (set rear side), 2 x GPIO connectors, Real Time Clock, EAPPROM, and local bus connector

**General**

- CPU: Linux Kernel 2.6.14
- Boot Loader: U-Boot
- File Systems: JFFS2, ETX2, VFAT / FAT, NTFS

- Daemons Started by Default
  - ssh (secured shell)
  - logging / debug system and kernel log
  - network server (disable root permission in /etc/security)
  - no server (lighttpd)
  - web server (lighttpd)
  - amgrd (Artila broadcast search daemon)

- Common UART Parameters
  - Baud Rate: Up to 120400bps
  - Parity: None
  - Stop Bits: 1
  - Data Bits: 7, 8
  - Flow Control: RTS/CTS

- Toolchain for Linux
  - GCC: C / C++ PC cross compiler
  - GLIBC: POSIX library

- Standard Device Drivers
  - SD / MMC, USB, Ethernet, GPIO, Buzzer
  - Real Time Clock (RTC) Supports RTC8533
  - EAPPROM Supports ATmel AT24C16 and its compatible

- Pre-built USB Host Drivers (Could be Customized)
  - Generic Flash drive
  - E2FS 1.19 driver
  - 10/100/1000Base Ethernet adapter
  - IS-322 adapter
  - ACS modem
  - SD card (SD / SDXC / SDXC compatible)

- GPIO Interface
  - ISDN modem (CDC / ACM compatible)
  - ADSL modem
  - RS-232 adapter
  - IEEE-802.11 WiFi adapter
  - Generic Flash drive
  - Real-Time Clock (RTC) Supports RTC8533
  - EAPPROM Supports ATmel AT24C16 and its compatible

- UART Interface
  - Rx: TXD2, TXD3, TXD0, TXD1, TXD0
  - Rs: RXD2, RXD3, RXD0, RXD1, RXD0

- Power Supply
  - Power Consumption: 2W
  - Power Input: 13.5VDC (Typical)

- Built-in Internal Watchdog Timer
  - Use Linux kernel

-H/W Specifications

- CPU: AT91RM9200 180MHz
- Memory: 64MB SDRAM, 16MB NOR Flash

- Interface
  - Type: 1 x 10/100Mbps Ethernet
  - PHY: DAIWCON DM9161

- UART Interface
  - Port 0: TDI0, IDID, RT0, CS1, CS0, DCD1, DSR1, DTR1, GND
  - Port 1: TDI1, IDID, RT1, CS1, CS0, DCD1, DSR1, DTR1, GND
  - Port 2: TDI2, IDID, RT2, CS1, CS0, DCD1, DSR1, DTR1, GND
  - Port 3: TDI3, IDID, RT3, CS1, CS0, DCD1, DSR1, DTR1, GND
  - Signal Level: CMOS / 3.3V compatible

- Common UART Parameters
  - Baud Rate: 4800
  - Parity: None
  - Stop Bits: 1
  - Data Bits: 8
  - Flow Control: RTS/CTS

- Pre-defined Pins
  - Port 0: TXD0, RXD0, RTS0, CTS0, GND
  - Port 1: TXD1, RXD1, RTS1, CTS1, DCD1, DTR1, DSR1, GND
  - Port 2: TXD2, RXD2, RTS2, CTS2, GND
  - Port 3: TXD3, RXD3, RTS3, CTS3, GND

- SD (Secure Digital Card Interface)
  - Signals: MCCDA, MCCK, MCDA0~MCDA3

- SPI (Serial Peripheral Interface)
  - Signals: MISO, MOSI, SPCK, CS1, CS2

- I²S (Inter-IC Sound)
  - Receiver Signals: RSCK, RWD, RSR

- I²C (Inter-IC Bus)
  - Signals: TWD, TWI, TWS, TSD

- USB Ports
  - Host Ports: 2, USB 2.0 compliant
  - Host Signals: UdataA+, UdataA-, UdataB+, UdataB

- GPIO (General-purpose I/Os)
  - Signals: MCCDA, MCCK, MCDA0~MCDA3

- Galvanic Isolation
  - 1.5KV magnetic isolation

- Protection
  - 1.5KV magnetic isolation

- Local Bus
  - Address Bus: 8-bit (A0~A7)
  - Data Bus: 8-bit (D0~D7)
  - Control Bus: RD, WR

- Debug Ports
  - Console Port: TX / RX serial console (share RTS2, CTS2)
  - Console Port: TX / RX serial console (share RTS2, CTS2)
  - Console Port: TX / RX serial console (share RTS2, CTS2)

- Console Port: TX / RX serial console (share RTS2, CTS2)

- Signal Level
  - CMOS / 3.3V compatible

- undefined Digital I/O Pins
  - Reserved

- General M-501

- Power Requirement
  - Power Consumption: 2W
  - Power Input: 13.5VDC (Typical)

- General
  - CPU: Linux Kernel 2.6.14
  - Boot Loader: U-Boot
  - File Systems: JFFS2, ETX2, VFAT / FAT, NTFS

- Daemons Started by Default
  - ssh (secured shell)
  - logging / debug system and kernel log
  - network server (disable root permission in /etc/security)
  - no server (lighttpd)
  - web server (lighttpd)
  - amgrd (Artila broadcast search daemon)

- Common UART Parameters
  - Baud Rate: Up to 120400bps
  - Parity: None
  - Stop Bits: 1
  - Data Bits: 7, 8
  - Flow Control: RTS/CTS

- Toolchain for Linux
  - GCC: C / C++ PC cross compiler
  - GLIBC: POSIX library

- Standard Device Drivers
  - SD / MMC, USB, Ethernet, GPIO, Buzzer
  - Real Time Clock (RTC) Supports RTC8533
  - EAPPROM Supports ATmel AT24C16 and its compatible

- Pre-built USB Host Drivers (Could be Customized)
  - Generic Flash drive
  - E2FS 1.19 driver
  - 10/100/1000Base Ethernet adapter
  - IS-322 adapter
  - ACS modem
  - SD card (SD / SDXC / SDXC compatible)
H/W Specifications

- **CPU / Memory**
  - CPU: ATMEL, ARM9Mu AT91SAM9G20/CFU w/ MMU
  - Memory: 64MB SDRAM, 256MB NAND Flash
  - Datasheet: PDF for system backup

- **Network Interface**
  - Type: 1 x 10/100Mbps Ethernet
  - PHY: DAVICOM DM9161
  - Protection: 1.5KV magnetic isolation

- **UART**
  - Port 1: TxD0, RxD0, RTS0, CTS0, GND
  - Port 2: TxD2, RxD2, RTS2, CTS2, GND
  - Signal Level: CMOS / 3.3V compatible

- **Common UART Parameters**
  - Baud Rate: Up to 921.6Kbps
  - Flow Control: RTS / CTS, XON / XOFF, None
  - Stop Bits: 1, 1.5, 2
  - Parity: None, Even, Odd, Mark, Space
  - Port 1: TXD1, RXD1, RTS1, CTS1, DCD1, DTR1, DSR1, GND
  - Port 2: TXD2, RXD2, RTS2, CTS2, GND
  - Port 3: TXD3, RXD3, RTS3, CTS3, GND
  - Protect: 1.5KV magnetic isolation

- **USB Ports**
  - Host Ports: 2, USB 2.0 compliant
  - Host Signals: VBUS+, VBUS-, D+ (D+/D-), D- (D+/D-)
  - Device Signals: 1, USB 2.0 compliant

- **Device (Client) Signals**
  - USB: D+/D-, VBUS, Data
  - UART: RTS, CTS
  - Control Bus: VBUS, Data
  - Signal Level: CMOS / 3.3V compatible

- **Pre-defined Pins**
  - Based on USB
  - Buzzer (UV, snack, speaker)
  - Audio (line out, headphone)
  - Device: 1, USB 2.0 compliant
  - Device (Client): 1, USB 2.0 compliant

- **JTAG Port**
  - for low level debug

- **Power Requirement**
  - Power Input: 3.3VDC
  - Power Consumption: 2W

- **Real Time Clock**
  - Chip: ST Style
  - Backup Battery: Lithium, 40mAh

- **Packaging & Design**
  - Power Consumption: 2W
  - Power Input: +3.3VDC (Typical)
  - Chip: ST Style
  - Backup Battery: Lithium, 40mAh

- **System Ready LED**
  - Output

- **Ordering Information**
  - CPU: AT91SAM9G20/CFU with MMU
  - Memory: 64MB SDRAM, 256MB NAND Flash
  - USB Ports: 2, USB 2.0 compliant
  - Ethernet: 1 x 10/100Mbps Ethernet
  - Connections: 2 x USB 2.0 hosts supporting full speed of 12Mbps
  - 1 x SD (secure digital) interface
  - 4 x 921.6Kbps UARTs with hardware flow control
  - 32 x GPIOs, CMOS / 3.3V compatible
  - Compact size: 50 x 80mm only
  - Ultra-low power consumption: less than 2.5 Watts

- **Software Features**
  - CPU back-emulated watchdog timer used by Linux kernel
  - Additional watchdog timer is available for users’ applications
  - Standard Device Drivers
  - Standard USB Host Drivers
  - Real Time Clock, SD / MMC, UART, Ethernet, GPIO, Buzzer
  - Included with M-502 SoM and one carrier board with power circuitry, 3 x RS-232 ports, 1 x RS-232 / 422 / 485 port, 1 x Ethernet port, 2 x USB hosts, 1 x SD socket at rear side, 2 x GPIO connectors, Real Time Clock, E2PROM, and local bus connector

- **General**
  - CPU: Linux, Kernel 2.6.29
  - Boot Loader: U-Boot
  - File System: UFS, FAT32, ETFS, JFFS2, YAFFS, JFFS2
  - Pre-Installed Utilities
    - bash, buzybox, syncDNS, agp, ipcache (for amd64), nc, lighttpd, openvpn, apr, squid, sshd, system-tools, uci, linux-mount, ifconfig, uci-units, usb-tools, Ami, gdm
  - Pre-installed Utilities
    - ISO mount, ping, ipconfig, ifconfig, ping, ssh, etc
  - Add-ons
    - Daemons Started by Default
    - ipconfig, ping, ifconfig, nslookup, telnet server, bootup script
    - System parameters (including user permissions in /etc/securetty)
    - IP port (stdout)
    - web server (httpd)
    - amig (Ami, gdm, bootup script)
    - Package Management & System Administration
      - Supports package management, installation, upgrade and removal
      - Supports subsystem (e.g., graphical interface) installation for web-based system administration
      - Toolchain for Linux
        - GCC, C / C++ cross compiler
        - GLIBC, POSIX library
      - Standard Driver Devices
        - Real Time Clock, SD / MMC, UART, Ethernet, GPIO, Buzzer
        - E2PROM
        - Supports AT91SAM9G20/CFU with MMU
      - Pre-installed USB Host Drivers (Could Be Customized)
        - Generic Flash Drive
        - IDE / IDE 119 Win adapter
        - 10/100Mbps Fast Ethernet adapter
        - RS-232 adapter
        - ACPI power
        - Gnome modem (Modem / ACM compatible)
M-503 Linux-ready Arm9 System on Module

### H/W Specifications

- **CPU / Memory**
  - CPU: ARM11, ARM926EJ-S, ARM946EJ-S, MPU
  - Memory: 256MB DDR2 SDRAM

- **Network Interface**
  - Type: 10/100Mbps Ethernet
  - IEEE 802.11b/g/n wireless
  - USB Ports: 1, USB 2.0 compliant

- **Development Tools**
  - GNU C / C++ toolchain is included
  - Boot Loader: U-Boot

### S/W Specifications

- **Boot Loader / OS**
  - Boot Loader: U-Boot
  - OS: Linux 2.6.38

- **Daemons Started by Default**
  - Webmin (Lighttpd)
  - ftp server (vsftpd)
  - telnet server (disable root permission in /etc/securetty)
  - syslog / klogd
  - ssh

- **Pre-installed Utilities**
  - Python, JamVM, PHP, MySQL, Perl, Qt4-embedded, SQLite, SNMP, Artila
  - wget, ipkg, procps (for webmin), psmics, lighttpd, vsftpd, iptables, bash, busybox, gtk+, x11, gpe, alsa, madplayer, psplash, sysvinit

### Ordering Information

- **M-503**
  - Includes one M-503 SoM and one carrier board with power circuitry, 3 x RS-232 ports, 1 x RS-232 / 422 / 485 port, 1 x Ethernet port, 2 x USB ports, 1 x 3-way switch to select 2.0, 2 x GPIO connectors, Real Time Clock, EEPROM, and local bus connector.
Features
ATMEL 400MHz ARM9 M-9G45A CPU w/ MLIU
Linux kernel 2.6.38 with file system
128MB DDR2 SDRAM and 256MB NAND Flash
GPI / C / + toolchain is included
Compatible with a 6-Bit only
Ultra-low power consumption, less than 2.5 Watts
24-pin TLE Interface with differential control, supports TIT panel up to 1280 x 800 pixels
Supports 4-wire touchscreen
1 x 10/100Mbps Ethernet interface, with PHY and transformer on board

H/W Specifications
CPU / Memory
- CPU: ATMEL 400MHz ARM9 M-9G45A w/ MLIU
- Memory: 128MB DDR2 SDRAM and 256MB NAND Flash
- CPU: ATMEL 400MHz AT91SAM9G45 w/ MMU
- Memory: 128MB DD2 RAM and 256MB NAND Flash

Network Interface
- Type: 1 x 10/100Mbps Ethernet
- Signals: ETX+, ETX-, FS, CK
- PHY: DAVICOM DM9161, on-board
- Protection: 1.5KV magnetic isolation

UART
- UART: 1, TX, RX, RTS, CTS, CTR, DS, GND
- UART: 2, TX, RX, RTS, CTS, GND
- UART: 3, TX, RX, RTS, CTS, GND
- UART: 4, TX, RX, RTS, CTS, GND
- Signal Level: CMOS / 3.3V compatible

GPIO Interface
- Signals: NE0, NE1, NE2, NE3, NE4
- Signal Level: CMOS / 3.3V compatible

ACPI Interface
- Signals: NE0, NE1, NE2, NE3, NE4
- Signal Level: CMOS / 3.3V compatible

Real Time Clock
- Clock: DS1346
- Backup Battery: Lithium, 4.0mA, on-board
- External Battery Input: on (CN1, pin#3), output

Debug Ports
- Type: RS-232 serial console
- Signals: TX, RX, GND
- Type: RS-232 serial console
- Signals: TX, RX, GND

LCD Interface (ITF)
- Resolution: Up to 1280 x 800
- RGB Signals: R, G, B
- Control Signals: Dot Clock, Data Enable, Hsync, Vsync, Dot Clock

Touchscreen Interface
- Type: Support 4-wire touchscreen
- Signals: Top, Bottom, Left, Right

Power Requirement
- Power Input: +3.3VDC (Typical)
- Power Consumption: 2 Watts (Typical)

General
- Board Dimensions (W x L): 80 x 50mm
- Pins: Total 128 pins, 2.0mm pitch
- Connector: 28 pins, 2.0mm pitch
- connector: 10 pins, 2.0mm pitch
- Mounting Holes: x 2, 2.0mm (42) in diameter

S/W Specifications
General
- OS: Linux, kernel 2.6.38
- Board Loader: U-Boot

File Systems
- UFS, FAT32, EXT3, EXT4, VFS, JFFS2, UFS, JFFS2

Pre-installed Utilities
- bash, bootlog, gtop, iftop, ip (internal tools), mail (email client), net (network tools), nmap, packet, ping, snmp, top, sar, web, wds, xinetd, xinetd, xinetd, xinetd, xinetd

Daemons Started by Default
- sshd (secure shell with ip)
- xinetd (xinetd server)
- System Log (syslog)
- Server (server)
- Memcached (memcached)
- Xorg (X server)

Tools for Linux
- GCC: C / C++ cross compiler
- GLIBC: POSIX library
- GLX: OpenGL 2.0 library
- Gnome: X server (GNOME)
- Qt4-Embedded

PKG Package Management
- Supports pkg to manage the package installation, upgrade and removal

WebMin System Administration
- Supports webmin for web-based system administration

Standard Device Drivers
- LCD: Real Time Clock, SD, MMC, UART, Ethernet, GPIO, Bluetooth
- EED: Bluetooth

Pre-load USB Device Drivers (Could Be Customized)
- Generic Flash Drive
- IDE: IDE, 11.9GB adapter
- USB: USB, 11.9GB adapter
- SD: 11.9GB adapter
- WebCam: WebCam
- Keyboard / Mouse: Keyboard / Mouse
- S3: S3 ( stopping)

Ordering Information
M-9G45A
- M-9G45A + Linux 2.6.38 System on Module with 256MB NAND Flash, 128MB DDR2 1064MHz
- M-9G45A Starter Kit
- M-9G45A Starter Kit includes one M-9G45A SA and one carrier board with power supply, 1 x RS-485 port, 3 x USB 2.03, 1 x Ethernet port, 4 x USB 2.0, 1 x microSD socket, Real Time Clock, EEPROM, and local bus connector

Mounting Holes: x 2, 2.0mm pitch
Pins: Total 128 pins, 2.0mm pitch
Connectors: 10 pins, 2.0mm pitch
Mounting Holes: x 2, 2.0mm (42) in diameter

CPU / Memory
- CPU: ATMEL 400MHz ARM9 M-9G45A w/ MLIU
- Memory: 128MB DDR2 SDRAM and 256MB NAND Flash
- CPU: ATMEL 400MHz AT91SAM9G45 w/ MMU
- Memory: 128MB DD2 RAM and 256MB NAND Flash

Network Interface
- Type: 1 x 10/100Mbps Ethernet
- Signals: ETX+, ETX-, FS, CK
- PHY: DAVICOM DM9161, on-board
- Protection: 1.5KV magnetic isolation

UART
- UART: 1, TX, RX, RTS, CTS, CTR, DS, GND
- UART: 2, TX, RX, RTS, CTS, GND
- UART: 3, TX, RX, RTS, CTS, GND
- UART: 4, TX, RX, RTS, CTS, GND
- Signal Level: CMOS / 3.3V compatible

GPIO Interface
- Signals: NE0, NE1, NE2, NE3, NE4
- Signal Level: CMOS / 3.3V compatible

ACPI Interface
- Signals: NE0, NE1, NE2, NE3, NE4
- Signal Level: CMOS / 3.3V compatible

Real Time Clock
- Clock: DS1346
- Backup Battery: Lithium, 4.0mA, on-board
- External Battery Input: on (CN1, pin#3), output

Debug Ports
- Type: RS-232 serial console
- Signals: TX, RX, GND
- Type: RS-232 serial console
- Signals: TX, RX, GND

LCD Interface (ITF)
- Resolution: Up to 1280 x 800
- RGB Signals: R, G, B
- Control Signals: Dot Clock, Data Enable, Hsync, Vsync, Dot Clock

Touchscreen Interface
- Type: Support 4-wire touchscreen
- Signals: Top, Bottom, Left, Right

Power Requirement
- Power Input: +3.3VDC (Typical)
- Power Consumption: 2 Watts (Typical)

General
- Board Dimensions (W x L): 80 x 50mm
- Pins: Total 128 pins, 2.0mm pitch
- Connector: 28 pins, 2.0mm pitch
- connector: 10 pins, 2.0mm pitch
- Mounting Holes: x 2, 2.0mm (42) in diameter

S/W Specifications
General
- OS: Linux, kernel 2.6.38
- Board Loader: U-Boot

File Systems
- UFS, FAT32, EXT3, EXT4, VFS, JFFS2, UFS, JFFS2

Pre-installed Utilities
- bash, bootlog, gtop, iftop, ip (internal tools), mail (email client), net (network tools), nmap, packet, ping, snmp, top, sar, web, wds, xinetd, xinetd, xinetd, xinetd, xinetd

Daemons Started by Default
- sshd (secure shell with ip)
- xinetd (xinetd server)
- System Log (syslog)
- Server (server)
- Memcached (memcached)
- Xorg (X server)

Tools for Linux
- GCC: C / C++ cross compiler
- GLIBC: POSIX library
- GLX: OpenGL 2.0 library
- Gnome: X server (GNOME)
- Qt4-Embedded

PKG Package Management
- Supports pkg to manage the package installation, upgrade and removal

WebMin System Administration
- Supports webmin for web-based system administration

Standard Device Drivers
- LCD: Real Time Clock, SD, MMC, UART, Ethernet, GPIO, Bluetooth

Pre-load USB Device Drivers (Could Be Customized)
- Generic Flash Drive
- IDE: IDE, 11.9GB adapter
- USB: USB, 11.9GB adapter
- SD: 11.9GB adapter
- WebCam: WebCam
- Keyboard / Mouse: Keyboard / Mouse
- S3: S3 ( stopping)

Ordering Information
M-9G45A
- M-9G45A + Linux 2.6.38 System on Module with 256MB NAND Flash, 128MB DDR2 1064MHz
- M-9G45A Starter Kit
- M-9G45A Starter Kit includes one M-9G45A SA and one carrier board with power supply, 1 x RS-485 port, 3 x USB 2.03, 1 x Ethernet port, 4 x USB 2.0, 1 x microSD slot, Real Time Clock, EEPROM, and local bus connector
**Programmable Automation Controller**

- Arm-based, Linux-ready Industrial-grade Programmable Controller
- Dual Ethernet and RS-485
- DIN RAIL Mounting

**RIO-PG Comparison Table**

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**Remote IO-PG Series FreeRTOS Programmable Remote I/O Module**

The device manager utility featuring device discovery, network configuration, user’s web page and firmware upload is also included. An example program which demonstrates how to push sensor data to IBM Bluemix using MQTT is also included for quick sensor to cloud application development. Low power consumption of ARM cortex M4 plus high efficiency of FreeRTOS make RIO-2014PG an ideal light weight computing platform for device networking and remote monitoring.

- Stand Alone Operation Without a Host PC
- Control Algorithm is Programmable by C Language
- FreeRTOS Real Time I/O

**Comparision Table**

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**PAC Series Linux Arm Programmable Automation Controllers**

Arm-based Linux-ready PAC (programmable automation controller) supporting analog inputs, isolated digital inputs and high-drive digital outputs. PAC series featuring a modular, Arm-based system, expandable the I/Os with lineup of discrete, analog and specialty I/O modules to solve advanced control problems in rugged, industrial environments.

- Redundant Network
- Efficient Performance
- Advanced Security
- Easy Management

**Comparison Table**

<table>
<thead>
<tr>
<th>Model</th>
<th>PAC-3020</th>
<th>PAC-4010</th>
<th>PAC-4070</th>
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**Programmable Automation Controller**

- Arm-based, Linux-ready Industrial-grade Programmable Controller
- Dual Ethernet and RS-485
- DIN RAIL Mounting

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</table>
### H/W Specifications

**CPU / Memory**
- **CPU**: ATMEL AT91SAM9G20 400MHz
- **Memory**: 64MB SDRAM, 256MB NAND Flash
- **DataFlash**: 2MB for system backup

**Network Interface**
- **No. of Ports**: 2
- **Type**: 10/100Mbps Ethernet, RJ-45 connector
- **Protection**: 1.5KV electromagnetic isolation

**Serial Ports**
- 2 x RS-485 or RS-232 (Port 1 and Port 2)
- 2 x RS-232 (Port 3 and Port 4)
- **Protection**: 15KV ESD for RS-232, 1500Vrms isolation and 15KV ESD for RS-485
- **Connector**: RJ-45 for RS-232; Terminal Block for RS-485

**Serial Port Parameters**
- **Data Bits**: 5, 6, 7, 8
- **Stop Bits**: 1, 1.5, 2
- **Parity**: None, Even, Odd, Mark, Space
- **Speed**: Supports low-speed (1.5Mbps) and full-speed (12Mbps)
- **Flow Control**: RTS / CTS, XON / XOFF, None
- **RS-485 Direction Control**: Auto, by hardware
- **ESD for RS-485**: Protection: 15KV ESD for RS-232; 1500Vrms isolation and 15KV ESD for RS-485
- **Protection**: 15KV ESD for RS-232, 1500Vrms isolation and 15KV ESD for RS-485
- **Connector**: RJ-45 for RS-232; Terminal Block for RS-485

**Power Consumption**
- **Source Voltage (VDD)**: 5~50VDC
- **Output Current**: 500mA max.
- **Buzzer**: Yes
- **Real-Time Clock (RTC)**: Yes, with backup battery
- **Real-Time Clock**: Yes, with backup battery
- **Power Input**: 48VDC
- **Power Consumption**: 12VDC/0.50W
- **Dimensions (W x H x D)**: 2.56x5.12x4.03in
- **Weight**: 0.16lb
- **Regulation**: CE Class A, FCC Class A

**Features**
- 8 x 500mA max. High-Drive digital outputs
- 2MB DataFlash for system recovery
- **Memory**: 64MB SDRAM and 256MB NAND Flash
- **CPU**: ATMEL AT91SAM9G20 400MHz
- **Network Interface**: Ethernet ports
- **Client Port**: 1
- **Host Ports**: 2, USB 2.0 compliant
- **Power Input**: 48VDC
- **Power Consumption**: 12VDC/0.50W
- **Dimensions**: 95 x 175 x 110mm (3.75" x 7" x 4.5")
- **Weight**: 0.50lb
- **Regulation**: CE Class A, FCC Class A

### Ordering Information

**PAC-4010**
- **Linux-based ARM9 Programmable Automation Controller**
- **CPU / Memory**: ATMEL AT91SAM9G20 400MHz
- **Memory**: 64MB SDRAM, 256MB NAND Flash
- **Network Interface**: Ethernet ports
- **Client Port**: 1
- **Host Ports**: 2, USB 2.0 compliant
- **Power Input**: 48VDC
- **Power Consumption**: 12VDC/0.50W
- **Dimensions**: 95 x 175 x 110mm (3.75" x 7" x 4.5")
- **Weight**: 0.50lb
- **Regulation**: CE Class A, FCC Class A

**PAC-4000**
- **Linux-based Arm9 Programmable Automation Controller**
- **CPU / Memory**: ATMEL AT91SAM9G20 400MHz
- **Memory**: 64MB SDRAM, 256MB NAND Flash
- **Network Interface**: Ethernet ports
- **Client Port**: 1
- **Host Ports**: 2, USB 2.0 compliant
- **Power Input**: 48VDC
- **Power Consumption**: 12VDC/0.50W
- **Dimensions**: 95 x 175 x 110mm (3.75" x 7" x 4.5")
- **Weight**: 0.50lb
- **Regulation**: CE Class A, FCC Class A

---

**PAC-4000**
- **Linux-based Arm9 Programmable Automation Controller**
- **CPU / Memory**: ATMEL AT91SAM9G20 400MHz
- **Memory**: 64MB SDRAM, 256MB NAND Flash
- **Network Interface**: Ethernet ports
- **Client Port**: 1
- **Host Ports**: 2, USB 2.0 compliant
- **Power Input**: 48VDC
- **Power Consumption**: 12VDC/0.50W
- **Dimensions**: 95 x 175 x 110mm (3.75" x 7" x 4.5")
- **Weight**: 0.50lb
- **Regulation**: CE Class A, FCC Class A

**PAC-4010**
- **Linux-based Arm9 Programmable Automation Controller**
- **CPU / Memory**: ATMEL AT91SAM9G20 400MHz
- **Memory**: 64MB SDRAM, 256MB NAND Flash
- **Network Interface**: Ethernet ports
- **Client Port**: 1
- **Host Ports**: 2, USB 2.0 compliant
- **Power Input**: 48VDC
- **Power Consumption**: 12VDC/0.50W
- **Dimensions**: 95 x 175 x 110mm (3.75" x 7" x 4.5")
- **Weight**: 0.50lb
- **Regulation**: CE Class A, FCC Class A
# Intelligent IoT Gateway

**www.artila.com**

- Linux-based Arm9 Programmable Automation Controller

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<td>- 2 x 10/100BaseT, RJ45 connector</td>
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<td>- IPv4, ICMP, ARP, HTTP, FTP, SMTP, SNMPv3 / v2, SSL, SSH, SSHv2/2.0</td>
</tr>
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<td><strong>Device Drivers</strong></td>
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## Features

- **CPU / Memory**
  - CPU: ATMEL ATSAMG25-Q20 400MHz w/ MMU
  - Memory: 512MB SDRAM, 256MB NAND Flash
  - Regulation: CE Class A, FCC Class A

- **Network Interface**
  - 2 x 10/100BaseT, RJ45 connector
  - IPv4, ICMP, ARP, HTTP, FTP, SMTP, SNMPv3 / v2, SSL, SSH, SSHv2/2.0

- **Device Drivers**
  - GLIBC: POSIX Library
  - GCC: C / C++ PC cross compiler for Linux, Cygwin
  - USB Host Drivers (Could Be Customized)
  - Flash disk
  - WiFi (IEEE-802.11)
  - USB (USB Host, USB Device)

## Development System

- GCC + C / C++ cross compiler for Linux, Cygwin
- GLIBC: POSIX Library
- WiFi (IEEE-802.11)
- USB (USB Host, USB Device)

### Ordering Information

**PAC-4070**

- **CPU / Memory**: ATMEL ATSAMG25-Q20 400MHz w/ MMU
- **Memory**: 512MB SDRAM, 256MB NAND Flash
- **Network Interface**: 2 x 10/100BaseT, RJ45 connector
- **CPU built-in watchdog timer, used by Linux kernel**
- **USB (USB Host, USB Device)**
- **Flash disk**

**H/W Specifications**

- **CPU / Memory**
  - CPU: ATMEL ATSAMG25-Q20 400MHz w/ MMU
  - Memory: 512MB SDRAM, 256MB NAND Flash
- **Network Interface**
  - 2 x 10/100BaseT, RJ45 connector
- **CPU / Memory General**
  - Boot Loader: U-Boot
- **CPU built-in watchdog timer, used by Linux kernel**
- **USB (USB Host, USB Device)**
- **Flash disk**
- **WiFi (IEEE-802.11)**
- **USB (USB Host, USB Device)**

### Ordering Information

**PAC-4070**

- **CPU / Memory**: ATMEL ATSAMG25-Q20 400MHz w/ MMU
- **Memory**: 512MB SDRAM, 256MB NAND Flash
- **Network Interface**: 2 x 10/100BaseT, RJ45 connector
- **CPU built-in watchdog timer, used by Linux kernel**
- **USB (USB Host, USB Device)**
- **Flash disk**

**H/W Specifications**

- **CPU / Memory**
  - CPU: ATMEL ATSAMG25-Q20 400MHz w/ MMU
  - Memory: 512MB SDRAM, 256MB NAND Flash
- **Network Interface**
  - 2 x 10/100BaseT, RJ45 connector
- **CPU / Memory General**
  - Boot Loader: U-Boot
- **CPU built-in watchdog timer, used by Linux kernel**
- **USB (USB Host, USB Device)**
- **Flash disk**
- **WiFi (IEEE-802.11)**
- **USB (USB Host, USB Device)**

### Ordering Information

**PAC-5010**

- **CPU / Memory**: ATMEL ATSAMG25-Q20 400MHz w/ MMU
- **Memory**: 512MB SDRAM, 256MB NAND Flash
- **Network Interface**: 2 x 10/100BaseT, RJ45 connector
- **CPU built-in watchdog timer, used by Linux kernel**
- **USB (USB Host, USB Device)**
- **Flash disk**

**H/W Specifications**

- **CPU / Memory**
  - CPU: ATMEL ATSAMG25-Q20 400MHz w/ MMU
  - Memory: 512MB SDRAM, 256MB NAND Flash
- **Network Interface**
  - 2 x 10/100BaseT, RJ45 connector
- **CPU / Memory General**
  - Boot Loader: U-Boot
- **CPU built-in watchdog timer, used by Linux kernel**
- **USB (USB Host, USB Device)**
- **Flash disk**
- **WiFi (IEEE-802.11)**
- **USB (USB Host, USB Device)**

### Ordering Information

**PAC-5010**

- **CPU / Memory**: ATMEL ATSAMG25-Q20 400MHz w/ MMU
- **Memory**: 512MB SDRAM, 256MB NAND Flash
- **Network Interface**: 2 x 10/100BaseT, RJ45 connector
- **CPU built-in watchdog timer, used by Linux kernel**
- **USB (USB Host, USB Device)**
- **Flash disk**
Features

- Linux kernel 2.6.14 OS with file system
- 64MB SDRAM and 16MB NOR Flash
- 4 x 16-bit high-precision multiplexed analog inputs
- 8 x 2500Vrms opto-isolated digital inputs
- 8 x 500mA High Drive digital outputs
- 2 x 10/100Mbps Ethernet ports
- 9 x RS-232 port, 1 x RS-485 port
- 2 x USB 2.0 host ports for add-on functionality expansion
- 1 x SD memory card slot included for storage expansion
- 9~40VDC input range

CPU / Memory
- CPU: ATMEL Arm9 AT91RM9200 180MHz w/MMU
- Memory: 64MB SDRAM, 16MB NOR Flash

Network Interface
- Type: 2 x 10/100BaseT, RJ45 connector

USB Ports
- Host Ports: 2, USB 2.0 compliant, with 10-pin header
- Data Rate: Up to 12Mbps

Mass Storage
- 1 x Micro-SD socket (at bottom side)
- SD / MMC, UART, Real Time Clock, Buzzer, Digital I/O, Ethernet, Watchdog Timer

TTY (Serial) Ports
- Parity: None, Even, Odd, Mark, Space
- Data Bits: 5, 6, 7, 8
- Stop Bits: 1, 1.5, 2
- Flow Control: RTS / CTS, XON / XOFF, None

TTY (Serial) Port Parameters
- Source Driver: UC1330 or UC1331A (Velleman Microsystems)
- Source Voltage (5V): 5~5VDC
- Output Voltage: 500mA max.

High Drive Digital Output
- No. of Channels: 8
- Source Driver: UC1330 or UC1331A (Velleman Microsystems)
- Source Voltage (5V): 5~5VDC
- Output Current: 500mA max.

H/W Specifications

General
- Operating Temperature: 0~70°C
- Power Input: +9V~+40VDC
- Power Consumption: 12-20W
- Dimensions (W x H x D): 160 x 104 x 32mm (6.3 x 4.13 x 1.26in)
- Weight: 1.2K ohms@0.5W
- Response Time: 20μs
- Opto-isolation: 2500Vrms

S/W Specifications

- bash: shell command
- tinylogin: login and user manager utility
- telnet: telnet client program
- busybox: Linux utility collection
- ftp: ftp client program
- pppd: dial in / out over serial port and PPPoE
- snmpd: SNMP agent program
- telnetd: telnet server program
- inetd: TCP server program
- ftptd: ftp server program
- boa: web server program
- sshd: secured shell server
- amgrd: Artila manager daemon

Device Drivers
- SD / MMC, UART, Real Time Clock, Buzzer, Digital I/O, Ethernet

USB Host Drivers (Could Be Customized)
- Flash drive
- USB (USB 2.0, 1.1)
- RS-232 adapters

Ordering Information

PAC-5070
- Linux-based Arm9 Programmable Automation Controller
- IP: 10.0.92.20 (if-092-000-001)
- Console Cable (DIN8 header to DIN8 Male, 20cm)

H/W Specifications

CPU / Memory
- CPU: ARM9, Linux kernel 2.6.14 OS
- Memory: 64MB SDRAM, 16MB NOR Flash

Network Interface
- Type: 2 x 10/100BaseT, RJ45 connector

USB Ports
- Host Ports: 2, USB 2.0 compliant, with 10-pin header
- Data Rate: Up to 12Mbps

Mass Storage
- 1 x Micro-SD socket (at bottom side)
- SD / MMC, UART, Real Time Clock, Buzzer, Digital I/O, Ethernet, Watchdog Timer

TTY (Serial) Ports
- Parity: None, Even, Odd, Mark, Space
- Data Bits: 5, 6, 7, 8
- Stop Bits: 1, 1.5, 2
- Flow Control: RTS / CTS, XON / XOFF, None

TTY (Serial) Port Parameters
- Source Driver: UC1330 or UC1331A (Velleman Microsystems)
- Source Voltage (5V): 5~5VDC
- Output Voltage: 500mA max.

High Drive Digital Output
- No. of Channels: 8
- Source Driver: UC1330 or UC1331A (Velleman Microsystems)
- Source Voltage (5V): 5~5VDC
- Output Current: 500mA max.

General
- Operating Temperature: 0~70°C
- Power Input: +9V~+40VDC
- Power Consumption: 12-20W
- Dimensions (W x H x D): 160 x 104 x 32mm (6.3 x 4.13 x 1.26in)
- Weight: 1.2K ohms@0.5W
- Response Time: 20μs
- Opto-isolation: 2500Vrms

S/W Specifications

- bash: shell command
- tinylogin: login and user manager utility
- telnet: telnet client program
- busybox: Linux utility collection
- ftp: ftp client program
- pppd: dial in / out over serial port and PPPoE
- snmpd: SNMP agent program
- telnetd: telnet server program
- inetd: TCP server program
- ftptd: ftp server program
- boa: web server program
- sshd: secured shell server
- amgrd: Artila manager daemon

Device Drivers
- SD / MMC, UART, Real Time Clock, Buzzer, Digital I/O, Ethernet

USB Host Drivers (Could Be Customized)
- Flash drive
- USB (USB 2.0, 1.1)
- RS-232 adapters

Ordering Information

PAC-5070
- Linux-based Arm9 Programmable Automation Controller
- IP: 10.0.92.20 (if-092-000-001)
- Console Cable (DIN8 header to DIN8 Male, 20cm)
### RIO-2010PG

**Features**
- NXP Arm Cortex-M3 LPC1768 100MHz CPU
- 512KB on-chip Flash, 64KB SDRAM
- 1 x full-duplex RS-232 and 1-isolated RS-485 serial port
- 1 x 10/100Mbps Ethernet port
- 1 x serial console port
- Support left and SSD socket library
- Support tiny web server
- Windows configuration utility included
- Toolchain: Sourcery CodeBench Lite or Keil from ARM

**H/W Specifications**
- CPU: NXP Arm Cortex-M3 LPC1768 100MHz
- Memory: 512KB on-chip Flash, 64KB SDRAM

**Network interface**
- Type: 1 x 10/100Mbps Ethernet, RJ45 connector
- Protection: 150V magnetic isolation

**Serial Ports**
- Port 1: RS-232 full modem
- Port 2: RS-485, 2500Vrms isolated
- Console: RS-232 full modem
- Serial Console: 1 x full modem RS-232, 1 x isolated RS-485

**Serial Port Parameters**
- Data Rate: 1.2~921.6Kbps
- Stop Bits: 1 to 2
- Data Bits: 5 to 8
- Flow Control: None / Hardware / Xon_Xoff

**CPU / Memory**
- CPU: NXP Arm Cortex-M3 LPC1768 100MHz
- Memory: 512KB on-chip Flash, 64KB SDRAM

**H/W Specifications**
- Operating Temperature: 0~70ºC (32~158ºF)
- Dimensions (W x H x D): 182 x 118 x 36 mm (7.16x4.64x1.4in)
- Power: 9~48VDC power jack and terminal block
- Synchronization: Manual or NTP (Network Time Protocol) setup and synchronization
- Real-Time Clock (RTC): Manual or NTP (Network Time Protocol) setup and synchronization
- Accuracy: +/-0.5°C
- Temperature Range: -55°C~125°C
- Temperature Sensor: Maxim DS18B20 (optional accessory 91-6DS18-001)

**Contact Rating**
- 30VDC@1A or 125VAC@0.5A

**No. of Channels**
- 8
- 16

**Logical Low**
- 0~1.5VDC

**Logical High**
- 5~24VDC

**Isolation Protection**
- Photo Isolation: 2500Vrms
- Isolated: 1500Vrms

**Relay Output**
- No. of Channels: 2
- Contact Rating: 30VDC@1A or 125VAC@0.5A
- LED indicator: Yes

**Ordering Information**
- Programmable Remote I/O Module
  - CB-P1005-20 (91-0P9M9-001)
  - Console Cable (10Pin Header to DB9 Male, 20cm)
  - DS18B20 (91-6DS18-001)
  - Programmable Resolution 1-wire Digital Thermometer
  - PWR-12V-1A (31-62100-000)
  - 110~240VAC to 12VDC 1A Power Adapter

### RIO-2014PG

**Features**
- 4 x Isolated digital inputs
- 2 x Relay outputs
- 4 x isolated Analog inputs
- 2 x Maxim 1-Wire interface
- 1 x isolated RS-485 port, 1 x Serial Console / RS-232 port
- 1 x microSD card interface
- Support left and SSD socket library
- Support tiny web server
- Windows configuration utility included
- Toolchain: Atmel Studio

**H/W Specifications**
- CPU: Atmel SAM4E16E Cortex M4 SoC 120MHz
- Memory: 128KB SDRAM, 1MB Flash inside SoC
- 128KB SDRAM, 1MB Flash on board via SPI expansion

**Network interface**
- Type: 1 x 10/100 Mbps Ethernet, RJ45 connector
- Protection: 150V magnetic isolation

**Serial Ports**
- Serial Console / RS-232 x 1
- RS-485 1500Vrms isolated x 1

**Isolated Analog Input**
- No. of Channels: 4
- Input Type: Differential input
- Input Mode: Current / Voltage
- Resolution: 16-bit
- Input Range
  - Unipolar: 0~20mA, 0~1V, 0~5V, 0~10V
  - Bipolar: +/-150 mV, +/-500 mV, +/-1V, +/-5V, +/-10V
- Current: 0~20mA
- Input Impedance: 20M Ohm (voltage), 120 Ohm (current)
- Accuracy: +/-0.1% FSR
- Isolated: 1500Vrms

**Relay Output**
- No. of Channels: 2
- Contact Rating: 30VDC@1A or 125VAC@0.5A
- LED indicator: Yes

**Maxim 1-Wire Interface**
- No. of Channels: 2
- Connector: 3-pin terminal block (VDD, DQ, GND)
- Interface: Maxim 1-Wire

**Ordering Information**
- Programmable Remote I/O Module
  - CB-P1014-20 (91-0P9M9-001)
  - Console Cable (10Pin Header to DB9 Male, 20cm)
  - DS18B20 (91-6DS18-001)
  - Programmable Resolution 1-wire Digital Thermometer
  - PWR-12V-1A (31-62100-000)
  - 110~240VAC to 12VDC 1A Power Adapter
C Programmable Remote I/O Module
RIO-2015PG

Features
- 4 x Opto-isolated digital inputs
- 2 x Relay outputs
- Power ATDC real-time operating system
- 4 x Isolation Analog inputs, 2 x isolation Analog outputs
- 5 x Maxoes 1-Wire interface
- 1 x isolation RS-485 port, 1 Serial Console / RS-232 port
- 1 x microSD card interface
- Support elf and ISO socket library
- Support tiny web server
- Windows configuration utility included
- Toolchain: Atmel Studio

Toolchain Interface
- No. of Channels: 1
- Connector: 3-pin terminal block (VDD, DQ, GND)

General
- Power Input: +9~+48VDC
- Operating Temperature: 0~70ºC (-4~158ºF)
- Dimension (WxDxH): 116x121.5x43mm (4.56x4.78x1.69in)
- Weight: 242g (0.53lb)
- Installation: DIN-rail mounting

Mass Storage
- microSD inside x 1

Isolated Analog Input
- No. of Channels: 4
- Input Type: Differential input
- Input Mode: Current / Voltage
- Resolution: 14-bit
- Input Range
  - Upper: 0~10 mV, 0~500 mV, 0~1V, 0~5V, 0~10V
  - Lower: 0~150mV, 0~500mV, 0~1V, 0~5V, 0~10V
- Current: 0~20mA
- Input Impedance: 200 Ohm (voltage), 120 Ohm (current)
- Accuracy: +/-0.1% FSR
- Isolation: 1500Vrms

Isolated Analog Output
- No. of Channels: 1
- Output Mode: Current / Voltage
- Resolution: 14-bit
- Output Range
  - Upper: 0~10mA, 0~50mA, 0~100mA, 0~200mA, 0~240mA
  - Lower: 0~150mV, 0~500mV, 0~1V, 0~5V
- Current: 0~100mA
- Input Impedance: 200 Ohm (voltage), 120 Ohm (current)
- Accuracy: +/-0.1% FSR
- Load Resistor: 0~1k Ohm
- Isolation: 1500Vrms

CPU / Memory
- No. of Channels: 4
- Isolation protection: 2500Vrms
- Logical High: 5~24VDC
- Logical Low: 0~10VDC
- LED indicator: Yes

Relay Output
- No. of Channels: 2
- Current Rating: 30VDC@1A or 125VAC@0.5A
- LED Indicator: Yes

Ordering Information
- RIO-2015PG
- C Programmable Remote I/O Module
- CBL-70SOM-20-21P-00M-001
- Console Cable (10Pin Header to DIN-Mar: 20cm)
- DS16833 (91-0DS16833-001)
- Programmable Resolution 1-wire Digital Thermometer
- PWR-12V-T1 (21-12710A-000)
- 110-240VAC to 12VDC 1A Power Adapter
Remote I/O
Easy-to-use DIN-rail mountable Web-ready Modbus/TCP I/O modules, supporting analog inputs, isolated digital inputs and relay outputs.

RIO-BM Series  IBM Bluemix Ready Remote I/O
RIO-BM is designed with FreeRTOS+lwIP (lightweight version of TCPIP), which can automatically connect to Bluemix with verified instructions and push sensor data to cloud with Transport Layer Security (TLS) and MQTT Protocol. Applying on a Watson IoT platform, users can easily create a web-based application to monitor and analyze data. RIO-BM supports Node-RED, a powerful visual wiring tool for the Internet of Things which is easy to wire together events and devices for the Internet of Things. With it, customers can take their IoT innovation to market faster and create new business value.

RIO Series
- Modbus TCP
- Stand-alone control (event trigger I/O)

RIO Series
- Modbus TCP
- Stand-alone control (event trigger I/O)

Remote I/O Comparison Table

<table>
<thead>
<tr>
<th>Remote I/O</th>
<th>RIO-2010</th>
<th>RIO-2017</th>
<th>RIO-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bluemix Ready Remote I/O</td>
<td>RIO-2010BM</td>
<td>RIO-2017BM</td>
<td>RIO-2018BM</td>
</tr>
<tr>
<td>CPU</td>
<td>NXP LPC1768 Arm Cortex M3 100MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>32KB SRAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash</td>
<td>1.2MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micro SD card socket</td>
<td>N/A</td>
<td>1</td>
<td></td>
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<tr>
<td>10/100Mbps Ethernet</td>
<td>N/A</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No. of Serial Port</td>
<td>1</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>RS-485</td>
<td>1 isolated</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Digital Input Channels</td>
<td>16</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Digital Input (Isolated)</td>
<td>1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Relay Output</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maxolls Interfance</td>
<td>3</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Isolated Analog Input</td>
<td>N/A</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Thermocouple Input</td>
<td>N/A</td>
<td>N/A</td>
<td>J, K type</td>
</tr>
<tr>
<td>Realtime OS</td>
<td>FreeRTOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windows Utility</td>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Node Server Support</td>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Node-RED'Briene based editor</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x H x D) mm</td>
<td>182 x 118 x 36</td>
<td>78 x 108 x 24</td>
<td>78 x 108 x 24</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0<del>70°C (32</del>158°F)</td>
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<td></td>
</tr>
<tr>
<td>Power</td>
<td>+9 ~ +48VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTC, Watchdog Timer</td>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buzzer, LED Indicators</td>
<td>YES</td>
<td></td>
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</tr>
<tr>
<td>Battery</td>
<td>1.2V 48mAh</td>
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<td></td>
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<tr>
<td>DIN Rail Kit</td>
<td>Plastic</td>
<td>YES</td>
<td></td>
</tr>
</tbody>
</table>
**Modbus / TCP Remote Digital I/O Module**

**RIO-2010**

**Features**
- Web based remote I/O monitoring and control
- Web server and web interface ready
- Modbus, AJAX, MQTT
- Stand-alone alarm relay control and email alert
- Periodically data and event publishing to server (broker) via MQTT
- 8x Relay Out Form A or Form B relay with contact rating: 30VDC@1A or 125VAC@0.5A
- 16 x isolated digital input and 3x Maxim 1-wire temperature measurement
- 1x 10/100Mbps Ethernet Port

**H/W Specifications**

**CPU / Memory**
- CPU: NXP LPC1768 Cortex-M3 100MHz
- Memory: 2MB on-chip Flash, 128MB SRAM

**Network Interface**
- Type: 1 x 10/100Mbps, RJ45 connector
- Protection: 1500Vrms magnetic isolation
- IS-485 Interface
- Isolation Protection: 2500Vrms

**Digital Input**
- No. of Channels: 16
- Photo Isolation (AC): 2500Vrms
- Logical High: 5-24VDC
- Logical Low: 0-1.5VDC
- Temperature Range: -55°C~125°C
- Accuracy: ±0.5°C
- Temperature Sensor: Maxim DS18B20 (optional accessory 91-6DS18-001)
- Connector: 3-pin header (VDD, DQ, GND)

**Relay Output**
- No. of Channels: 8
- Contact Rating: 30VDC@1A or 125VAC@0.5A
- Logical Low: 0-1.5VDC
- LED Indicators: Yes

**Maxim 1-wire Interface**
- No. of Channels: 3
- Connector: 3-pin header (VDD, DQ, GND)

**General**
- Temperature Sensor: Maxim DS18B20 (optional accessory 91-6DS18-001)
- Temperature Range: -55°C~125°C
- Accuracy: ±0.5°C
- Real Time Clock (RTC) Manual or NTP (Network Time Protocols) setup and sync
- Power Input: 110~240VAC (20VA)
- Dimensions (W x H x D): 102 x 118 x 36mm (3.64 x 4.61 x 1.42"
- Operating Temperature: 0-70°C (32-158°F)

**Access Control Guidelines**

**Default Access Ports**
- Modbus / TCP Port: 502
- Telnet Console Port: 5001
- HTTP Port: 5003

**Access Through Modbus Protocols**
- Modbus / TCP via LAN interface
- Modbus / RTU via RS-485 interface

**Access Through HTTP GET / POST Protocols**
- AJAX-enabled demo page for up-and-running web-based monitoring and controls

**Operation Mode**
- Modbus / TCP / RTU slave
- Web based I/O control
- MQTT auto data and event publish and log
- Stand-alone alarm relay control and email alert
- User web page conversion

**Ordering Information**

RIO-2010
- Modbus / TCP Remote Digital I/O Module
- http://www.artila.com/RIO-2010
- Product Code: CBL-0200R-20 (91-0QM82-001)
- Console Cable (DCE): 10pin (header to DB9 Male; 20cm)
- Dimensions (W x H x D): 182 x 118 x 36mm (7.16 x 4.61 x 1.42"
- Operating Temperature: 0-70°C (32-158°F)

**Analog Input Remote I/O Module**

**RIO-2017**

**Features**
- Remote analog input module with web access AJAX and Modbus TCP
- One 10/100Mbps Ethernet port
- 8x 16bit A/D, isolation up to 2500Vrms
- 1 x relay output
- Form A or Form B relay with contact rating: 30VDC@1A or 125VAC@0.5A
- Support web-based I/O control
- Optional DIN Rail mounting kit (DK-35A)
- Windows configuration utility included

**H/W Specifications**

**CPU / Memory**
- CPU: NXP LPC1768 Cortex-M3 100MHz
- Memory: 2MB on-chip Flash, 128MB SRAM

**Network Interface**
- Type: 1 x 10/100Mbps, RJ45 connector
- Protection: 1500Vrms magnetic isolation
- Protocol: Modbus / TCP, UDP, HTTP, DHCP

**Isolation Analog Input**
- No. of Channels: 8
- Input Type: Differential input
- Input Mode: Voltage / Current
- Isolation: 2500Vrms
- Input Impedance: 20M Ohm (voltage), 120 Ohm (current)
- Input Range: Unipolar: 0~150mV, 0~500mV, 0~1V, 0~5V, 0~10V
- Resolution: 16-bit
- Accuracy: ±0.1% FSR

**Relay Output**
- No. of Channels: 8
- Contact Rating: 30VDC@1A or 125VAC@0.5A
- Logical Low: 0-1.5VDC
- LED Indicators: Yes

**General**
- Power Input: 110~240VAC (20VA)
- Protection: Auto polarity and surge protection
- Dimensions (W x H x D): 78 x 108 x 24mm (3.0 x 4.25 x 0.94"
- Operating Temperature: 0-70°C (32-158°F)

**Access Control Guidelines**

**Default Access Ports**
- Modbus / TCP Port: 502
- Telnet Console Port: 5001
- HTTP Port: 5003

**Access Through Modbus Protocols**
- Modbus / TCP via LAN interface
- Modbus / RTU via RS-485 interface

**Access Through HTTP GET / POST Protocols**
- AJAX-enabled demo page for up-and-running web-based monitoring and controls

**Operation Mode**
- One 10/100Mbps Ethernet port
- Protocol: Modbus / TCP, UDP, HTTP, DHCP
- Protection: 1.5KV Magnetic isolation
- Type: 1 x 10/100Mbps, RJ45 connector
- Network Interface: 10/100Mbps Ethernet
- TCP / UDP
- Telnet Console Port: 5001
- HTTP Port: 5003

**Ordering Information**

RIO-2017
- Analog Input Remote I/O Module
- 91-0QM82-001
- DIN Rail mounting kit (DK-35A)
- Windows configuration utility included

**Windows Utility Functionalities**

- Broadcast search
- Configuration
- User web page conversion
Modbus / TCP Remote Digital I/O Module

**RIO-2018**

**Features**
- Remote thermocouple input module with web access API and Modbus / TCP
- 1 x 10/100Mbps Ethernet port
- 3 channels | 6 type thermocouple input with cold junction compensation
- 2 x 2000Vrms isolated digital input (bipolar input photocoupler)
- 1 x Form A relay with contact rating 30VDC@1A or 125VAC@0.5A
- 12V/24VDC@0.5A
- Support web-based temperature monitoring and DIO control
- Optional DIN (4A, mounting kit: DK-35A)
- Windows configuration utility included

**H/W Specifications**
- **CPU / Memory**
  - CPU: NXP LPC1768 Cortex-M3 100MHz
  - Memory: 2MB on-chip Flash, 128KB SRAM
- **Network Interface**
  - Type: 1 x 10/100Mbps Ethernet, RJ45 connector
  - Protocol: Modbus / TCP, UDP, HTTP, DHCP
- **Thermocouple Input**
  - J type: Maxim MAX31855J converter with CJC
  - Range: -210°C~+1200°C
  - J type: Maxim MAX31855J converter with CJC
  - Range: 200°C~+1350°C
- **Relay Output**
  - No. of Channels: 16
  - Contact Rating: 30VDC@1A or 125VAC@0.5A
  - Photo Isolation (AC in): 2500Vrms
  - No. of Channels: 8
  - Contact Rating: 30VDC@1A or 125VAC@0.5A
  - Stop Bits: 1, 1.5, 2
- **Digital Input**
  - No. of Channels: 8
  - Logic Low: 0~1.5VDC
  - Logic High: 5~24VDC
  - Stop Bits: 1, 1.5, 2
  - LED Indicators: Yes
  - Communication: 1-Wire Interface
- **Power Input: +9~+48VDC**

**Ordering Information**
- RIO-2010BM
- Analog Input Remote I/O Module with 8 type thermocouple input channel
- OMEGA PCC-SMP
- Power Consumption: 12VDC@0.25A (max.), 12VDC@0.5A (min)

**Modbus / TCP Remote Digital I/O Module

**RIO-2010BM**

**Features**
- Bluemix ready remote I/O monitoring and control
- MQTT and web interface ready
- Stand-alone alarm relay control
- Periodically data and event publishing to Bluemix IoT via MQTT
- Form A or Form B relay with contact rating 30VDC@1A or 125VAC@0.5A
- 16x isolated digital input and 3x Maxim 1-wire temperature measurement

**H/W Specifications**
- **CPU / Memory**
  - CPU: NXP LPC1768 Cortex-M3 100MHz
  - Memory: 2MB on-chip Flash, 128KB SRAM
- **Network Interface**
  - Type: 1 x 10/100Mbps Ethernet, RJ45 connector
  - Protocol: Modbus / TCP, UDP, HTTP, DHCP
- **Thermocouple Input**
  - J type: Maxim MAX31855J converter with CJC
  - Range: -210°C~+1200°C
  - J type: Maxim MAX31855J converter with CJC
  - Range: 200°C~+1350°C
- **Relay Output**
  - No. of Channels: 16
  - Contact Rating: 30VDC@1A or 125VAC@0.5A
  - Photo Isolation (AC in): 2500Vrms
  - No. of Channels: 8
  - Contact Rating: 30VDC@1A or 125VAC@0.5A
  - Stop Bits: 1, 1.5, 2
- **Digital Input**
  - No. of Channels: 8
  - Logic Low: 0~1.5VDC
  - Logic High: 5~24VDC
  - Stop Bits: 1, 1.5, 2
  - LED Indicators: Yes
  - Communication: 1-Wire Interface
- **Power Input: +9~+48VDC**

**Ordering Information**
- RIO-2010BM
- Analog Input Remote I/O Module with 8 type thermocouple input channel
- OMEGA PCC-SMP
- Power Consumption: 12VDC@0.25A (max.), 12VDC@0.5A (min)

**General**
- Temperature Sensor: Maxim DS18B20 (optional accessory)
- 1-Wire Interface
- 1-Wire Interface
- Programmable Resolution 1-wire Digital Thermometer

**Access Control Guidelines**
- Default Access Ports
  - Telnet Console Port: 5001
  - HTTP Port: 5003
- Access Through HTTP GET / POST Protocols
  - REST Web API
- Operation Mode
  - MQTT auto data and event publish and log
  - Stand-alone alarm relay control
  - C / C++ programmable controller (RII-2010PG)
- **Ordering Information**
- RIO-2010BM
- Analog Input Remote I/O Module
- Programmable Resolution 1-wire Digital Thermometer
- 12V-24V (21-62100-000)
- 110-240VAC to 12VDC 1A Power Adapter

**Contact Rating: 30VDC@1A or 125VAC@0.5A**

**Features**
- Remote thermocouple input module with web access API and Modbus / TCP
- 1 x 10/100Mbps Ethernet port
- 3 channels | 6 type thermocouple input with cold junction compensation
- 2 x 2000Vrms isolated digital input (bipolar input photocoupler)
- 1 x Form A relay with contact rating 30VDC@1A or 125VAC@0.5A
- 12V/24VDC@0.5A
- Support web-based temperature monitoring and DIO control
- Optional DIN (4A, mounting kit: DK-35A)
- Windows configuration utility included

**H/W Specifications**
- **CPU / Memory**
  - CPU: NXP LPC1768 Cortex-M3 100MHz
  - Memory: 2MB on-chip Flash, 128KB SRAM
- **Network Interface**
  - Type: 1 x 10/100Mbps Ethernet, RJ45 connector
  - Protocol: Modbus / TCP, UDP, HTTP, DHCP
- **Thermocouple Input**
  - J type: Maxim MAX31855J converter with CJC
  - Range: -210°C~+1200°C
  - J type: Maxim MAX31855J converter with CJC
  - Range: 200°C~+1350°C
- **Relay Output**
  - No. of Channels: 16
  - Contact Rating: 30VDC@1A or 125VAC@0.5A
  - Photo Isolation (AC in): 2500Vrms
  - No. of Channels: 8
  - Contact Rating: 30VDC@1A or 125VAC@0.5A
  - Stop Bits: 1, 1.5, 2
- **Digital Input**
  - No. of Channels: 8
  - Logic Low: 0~1.5VDC
  - Logic High: 5~24VDC
  - Stop Bits: 1, 1.5, 2
  - LED Indicators: Yes
  - Communication: 1-Wire Interface
- **Power Input: +9~+48VDC**

**Ordering Information**
- RIO-2010BM
- Analog Input Remote I/O Module with 6 type thermocouple input channel
- OMEGA PCC-SMP
- Power Consumption: 12VDC@0.25A (max.), 12VDC@0.5A (min)

**General**
- Temperature Sensor: Maxim DS18B20 (optional accessory)
- 1-Wire Interface
- Operate Mode
  - Auto T1/T2
  - Manual T1/T2
  - Access Through HTTP GET / POST Protocols
  - REST Web API
- Operation Mode
  - MQTT auto data and event publish and log
  - Stand-alone alarm relay control
  - C / C++ programmable controller (RII-2010PG)
- **Ordering Information**
- RIO-2010BM
- Analog Input Remote I/O Module with 6 type thermocouple input channel
- OMEGA PCC-SMP
- Power Consumption: 12VDC@0.25A (max.), 12VDC@0.5A (min)

**General**
- Temperature Sensor: Maxim DS18B20 (optional accessory)
- 1-Wire Interface
- Operate Mode
  - Auto T1/T2
  - Manual T1/T2
  - Access Through HTTP GET / POST Protocols
  - REST Web API
- Operation Mode
  - MQTT auto data and event publish and log
  - Stand-alone alarm relay control
  - C / C++ programmable controller (RII-2010PG)
Bluemix Ready Remote Analog Input Module

**RIO-2017BM**

**Features**
- Remote analog input module with Web API and MQTT
- One 10/100Mbps Ethernet port
- 5x 10/100Mbps isolated up to 2500Vrms
- One channel relay output port
- Form A or form B relay with contact rating 30VDC@1A or 125VAC@0.5A
- DIN Rail mounting
- Windows configuration utility for Bluemix settings

**H/W Specifications**
- **CPU / Memory**
  - CPU: NXP LPC1768 Cortex-M3 100MHz
  - Memory: 2MB on-chip Flash, 128KB SRAM
- **Ethernet**
  - Type: 10/100Mbps, RJ45
  - Protection: Auto polarity and surge protect
  - Power Input: +9~+48VDC (Terminal block)
- **Isolation Analog Input**
  - Channel Number: 8
  - Input Type: Differential input
  - Input Mode: Voltage / Current (0~20mA)
  - Resolution: 512 μA
  - Input Range: Unipolar: 0~150mV, 0~500mV, 0~1V, 0~5V, 0~10V
  - Bipolar: +/-150mV, +/-500mV, +/-1V, +/-5V, +/-10V
  - Current: 0~20mA
  - Input Impedance: 20M Ohm (voltage), 120 Ohm (current)
- **Relay Output**
  - No. of Channels: 1
  - Contact Rating: 30VDC@1A or 125VAC@0.5A
  - General:
    - Power Input: 9~24VDC (Terminal block)
    - Protection: Auto polarity and surge protect
    - Dimension: 108 x 18 x 24 mm (h x w x d) (3.0 x 4.25 x 0.94in)

**Ordering Information**

**RIO-2017BM**
- Bluemix ready remote analog input module
- DK-35A (36-DK35A-000)
- C / C++ programmable controller (RIO-2010PG)

**Access Control Guidelines**

**Default Access Ports**
- Telnet Console Port: 5501
- HTTP Port: 5003

**Access Through HTTP GET / POST Protocols**
- REST Web API

**Operation Mode**
- MQTT auto-data and event publish and log

**Ordering Information**

**RIO-2018BM**
- Bluemix ready remote input/output module
- 2x 2500Vrms isolated digital input (bipolar input photocouple)
- One Form C relay with contact rating 30VDC@1A or 125VAC@0.5A
- Support cloud-based temperature monitoring and DIO control
- Optional DIN Rail mounting kit (DK-35A)
- Windows configuration utility for Bluemix settings

**Features**
- Remote thermocouple input module with Web API and MQTT
- 1x 10/100Mbps Ethernet port
- 3 channels J or K type thermocouple input with cold junction compensation
- 2x 2500Vrms isolated digital input (bipolar input photocouple)
- One Form C relay with contact rating 30VDC@1A or 125VAC@0.5A
- Support cloud-based temperature monitoring and DIO control
- Optional DIN Rail mounting kit (DK-35A)

**H/W Specifications**
- **CPU / Memory**
  - CPU: NXP LPC1768 Cortex-M3 100MHz
  - Memory: 2MB on-chip Flash, 128KB SRAM
- **Ethernet**
  - Type: 10/100Mbps, RJ45
  - Protection: 1500V Magnetic isolation
  - Power Input: +9~+48VDC (Terminal block)
- **Thermocouple Input**
  - J Type: Maxim MAX31855K converter with CJC
  - Range: -210°C to +1200°C
  - Resolution: 14-bit, 0.25°C
  - Thermocouple fault detection
- **Relay Output**
  - No. of Channels: 1
  - Contact Rating: 30VDC@1A or 125VAC@0.5A
  - General:
    - Power Input: 9~24VDC (Terminal block)
    - Protection: Auto polarity and surge protect
    - Dimension: 108 x 18 x 24 mm (h x w x d) (3.0 x 4.25 x 0.94in)
**Industrial Communication Gateway**

Easy-to-use serial-to-Ethernet gateways allowing users access to nearly any device with serial ports to connect and share a WLAN network.

**Aport Series Industrial Communication Gateway**

Allow nearly any device with serial ports to connect and share a WLAN network.

Artila’s communication gateway is the ideal choice that provides connectivity for your serial devices, such as meters and sensors to 802.11 wireless local area networks (WLANs). Eliminating the need for the development of a wireless LAN driver and security supplicant, it is ideal for minimizing upfront engineering investment and reducing time to market.

**Configure via Web Browser & Windows Manager Utility**

Simple to configure Aport-213 by using any devices like Smart phone, Notebook or PC via web browser without any software installation. Windows Manager Utility is a software provided by Artila that is used to configure and test devices though network.

### Comparison Table

<table>
<thead>
<tr>
<th>Model</th>
<th>Aport-213</th>
<th>Aport-212</th>
<th>Aport-211S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Module</td>
<td>SW-200M</td>
<td>X</td>
<td>SE-100M</td>
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<tr>
<td>CPU</td>
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<td>NXP Arm Cortex-M3 LPC1768 100MHz</td>
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<td>No. of RS-232/485</td>
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<td>FreeRTOS</td>
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<td>+9~+48VDC</td>
<td>+9~+48VDC</td>
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<td>Buzzer, LED indicators</td>
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<td>YES</td>
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<tr>
<td>DIN Rail Kit</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>
Aport-213

Single-port Serial-to-WiFi Gateway

Features
- Connect RS-232/422/485 devices to IEEE 802.11b/g/n network
- 1210 Mbps baudrate for IEEE 802.11b/g/n transmission
- Radio frequency support FCC/ETSI/worldwide domain
- Modbus RTU to Modbus/TCP Gateway
- Supports TCP/Server mode and TCP/Client mode
- Secure data access with WEP-64/128, WPA, WPA2
- Windows application utility
- Web / Serial console for device configuration
- Firmware upgradable
- 1 x WiFi external antenna through SMA connector

WLAN Interface
- PIN Assignment

Serial Interface
- Type: RS-232 / 422 / 485, switch selectable
- Connector: DB9, male
- Signals: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
- Baud Rate: 115.2Kbps
- Parity: None, Even, Odd
- Data Bits: 7, 8
- Stop Bits: 1, 2
- Flow Control: None / Hardware / XON_XOFF
- Protection: 1500Vrms magnetic isolation

CPU / Memory
- CPU: NXP LPC1768 Cortex-M3 100MHz
- Memory: 2MB on-chip Flash, 128KB SRAM

Ordering Information
- PWR-12V-1A (31-62100-000)
- DK-35A (36-DK35A-000)
- CB-RJ2CON-100 (91-RJCON-100)
- Console Cable (RJ45 to DB9 Female, 100cm)
- 110-240VAC to 12VDC 1A Power Adapter

H/W Specifications
- Power Input: +9~+48VDC
- ESD Protection: 1500Vrms
- Flow Control: None, RTS / CTS, XON / OFF
- Stop Bits: 1, 2
- Data Bits: 7, 8
- Baud Rate: 1.2~38.4Kbps
- Signals: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
- Connector: DB9, male
- Type: RS-232 / 485, switch selectable

Aport-212

Dual-port Modbus Gateway

Features
- Gateway of Modbus / TCP to Modbus RTU / ASCII
- 2 x configurable RS-232 / 485 serial ports
- Supports up to 16 x Modbus / TCP masters or 32 x Modbus / TCP slaves
- Supports transparent serial to Ethernet conversion
- 1 x 10/100Mbps Ethernet port
- Supports telnet, web and serial console configuration
- Supports command line interface configuration
- Windows configuration utility included
- Firmware upgradable by Ethernet / Internet

CPU / Memory
- CPU: NXP LPC1768 Cortex-M3 100MHz
- Memory: 2MB on-chip Flash, 128KB SRAM

Ordering Information
- PWR-12V-1A (31-62100-000)
- DK-35A (36-DK35A-000)
- 110~240VAC to 12VDC 1A Power Adapter

H/W Specifications
- Power Input: +9~+48VDC
- ESD Protection: 1500Vrms
- Flow Control: None, RTS / CTS, XON / OFF
- Stop Bits: 1, 2
- Data Bits: 5, 6, 7, 8
- Baud Rate: 1.2~921.6Kbps
- Signals: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
- Connector: RJ45, male
- Type: 1 x 10/100Mbps Ethernet, RJ45 connector
- Memory: 2MB on-chip Flash, 128KB SRAM
- CPU: NXP LPC1768 Cortex-M3 100MHz

Ordering Information
- 110~240VAC to 12VDC 1A Power Adapter

Aport-212

Modbus Gateway with 2 x Serial Ports, and 1 x Ethernet Port
### Single-port Serial-to-Ethernet Gateway
**Aport-211S**

**Features**
- Connect RS-232 / 422 / 485 devices to TCP/IP network
- 8 x programmable digital I/Os
- 1 x 10/100Mbps Port
- Supports TCP / Server mode and TCP / Client mode
- Web / TELNET Serial consoles for device configuration
- Firmware upgradable

**Network Interface**
- Ethernet, RJ45 connector
- Supports TCP / UDP, HTTP, TELNET, IP, ICMP, ARP
- IPv6 addressing: DHCP, Static IP

**Operation Modes**
- TCP / Server and TCP / Client

**Serial Interface**
- Type: RS-232, RS-422, RS-485
- Signals: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
- Baud Rate: 1.2~38.4Kbps
- Parity: None, Even, Odd
- Data Bits: 7, 8
- Stop Bits: 1, 2
- Flow Control: None, RTS / CTS, XON / XOFF

**Programmable Digital I/Os**
- PIO0~PIO7: TTL level compatible
- PIO6~PIO7: CMOS level compatible
- Connector: DB9, male

**Configuration Methods**
- Web console, TELNET Console and Serial Console

**General**
- Power Input: +5VDC@100mA
- Power Consumption: 3W
- Operating Temperature: 0~70°C, 5~95% RH

**Specifications**
- Dimensions (W x H x D): 108 x 95 x 24mm
- Weight: 55g
- CE / FCC compliant

**Ordering Information**
- Aport-211S
- DK-35A (36-DK35A-000)
- PWR-12V-1A (31-62100-000)

---

### Single-port Serial-to-WiFi Module
**SW-200M**

**Features**
- Connect Serial devices to IEEE 802.11b/g/n network
- 110Kbps baudrate for RS-232/422/485 transmission
- 35 cm cable with drop-in module adds Ethernet connectivity to RS-232 / 422 / 485 device
- Ethernet interface: 10/100Mbps, auto-select
- Serial interface asynchronous UART, TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
- TCP / Server, TCP / Client and UDP modes
- Easy-to-use ASCII command set is provided to help users implement their own configuration and/or management utilities
- Power input: +5VDC@100mA

**WLAN Interface**
- Connectivity: 2.4GHz, IEEE 802.11b/g/n
- Data Rate: (IEEE 802.11b) 1 to 11Mbps
- (IEEE 802.11g) 6 to 54Mbps
- (IEEE 802.11n) 54 to 150Mbps

**Specifications**
- Antenna: 2.4GHz, 5dBi (Broadband)
- Channel: Auto-Select
- Power: 1W max
- Dimensions (W x H x D): 65 x 54 x 15mm
- Weight: 30g
- CE / FCC compliant

**Ordering Information**
- SW-200M
- DK-35A (36-DK35A-000)
- PWR-12V-1A (31-62100-000)

---

### Single-port Serial-to-Ethernet Module
**SE-100M**

**Features**
- Connect Serial devices to Ethernet
- 101Kbps baudrate for RS-232/422/485 transmission
- 35 cm cable with drop-in module adds Ethernet connectivity to RS-232 / 422 / 485 device
- Ethernet interface: 10/100Mbps, auto-select
- Serial interface asynchronous UART, TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
- Power input: +5VDC@100mA

**Specifications**
- Antenna: 2.4GHz, 5dBi (Broadband)
- Channel: Auto-Select
- Power: 1W max
- Dimensions (W x H x D): 65 x 54 x 15mm
- Weight: 30g
- CE / FCC compliant
Linux-ready Arm-based 8" HMI Computing

HC-3080

Features
- Fanless / Rugged Design HMI Computing
- 8" TFT LED backlight LCD display
- TI AM3354 Sitara Arm Cortex-A8 1.3 GHz RISC Processor
- Onboard 256MB DDR3 SDRAM
- Onboard storage: eMMC 256MB NAND Flash
- IP65 compliance front panel, resistant to water and dust
- Rich IO with RS-232, USB, CANbus, and Gigabit LAN
- Easy panel mounting, no screw hole needed
- Low power consumption: 8W (+24V/320mA)

H/W Specifications
- CPU / Memory
  - CPU: TI AM3354 Sitara Arm Cortex-A8 1.3 GHz RISC Processor
  - Frequency: 800MHz to 1GHz
  - SDRAM: 256MB DDR3 (Up to 512MB)
  - microSD Card Slot reserved (inside the enclosure)
  - 2 x USB 2.0, Type A
- Display
  - Display Size: 8" TFT LED backlight LCD
  - Resolution: 800 x 600
  - Viewing Angle: 89° / 89°
  - Contrast Ratio: 500:1
  - Backlight: LED
  - Life: 20000hrs
- GUI Engine
  - Built-in Firefox / Chromium browser
  - Matchbox (X11) with virtual keyboard
  - Supports QT Library
  - File System: EXT4
- Operating System Support
  - Linux-based: using standard apt-get command
  - Node-Red
  - Supports bootup from eMMC or SD card
  - Supports in-place C/C++ code compilation
- Hardware Specifications
  - Controller: USB
  - Touch Type: Projective Capacity Touch
  - Ethernet
    - 1 x RJ45 Female (IP65) (10/100/1000Base-T)
    - 30000hrs
  - External I/O Ports
    - 2 x USB 2.0, Type A
    - 1 x CAN bus
    - 1 x CAN bus (Optional)
  - Dimensions
    - 260 x 210 x 50mm
    - Material: Die-casting aluminum (Front bezel), Metal (Case)
  - Net Weight: 1.82kg
  - Installation: Panel mount, VESA mount

Power Requirement
- +18~+30Vdc input

Ordering Information
HC-3080
Linux-ready Arm-based 8" HMI Computing

Arm-based Linux-ready HMI Computing

The Artila HMI Computing suits for visualization tasks directly on the machine or in the plant. The all-in-one Panel PC devices integrate an Arm-based Linux-ready computing and an capacity touch panel. It convinces through its robustness, performance, and a brilliant display. Various device families fulfill a wide range of requirements in manufacturing and process automation.

HMI Series

Comparison Table

<table>
<thead>
<tr>
<th>Model</th>
<th>HC-3120</th>
<th>HC-3080</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>AM3354</td>
<td>AM3354</td>
</tr>
<tr>
<td>Frequency</td>
<td>800MHz</td>
<td>1.3GHz RISC</td>
</tr>
<tr>
<td>Memory</td>
<td>256MB DDR3</td>
<td>256MB DDR3</td>
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<tr>
<td>Micro-SD Card</td>
<td>1 x SD slot</td>
<td>1 x SD slot</td>
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<tr>
<td>Graphics</td>
<td>SGX530 3D</td>
<td>SGX530 3D</td>
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<tr>
<td>Display</td>
<td>8&quot; TFT LCD</td>
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<td>Life</td>
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<td>1 x RJ45</td>
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<td>USB 2.0</td>
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<td>CANbus (Optional)</td>
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<td>File System</td>
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<tr>
<td>Power Requirement</td>
<td>8W (+24V/320mA)</td>
<td>8W (+24V/320mA)</td>
</tr>
</tbody>
</table>

Specifications

- Low power consumption, +18~+30Vdc
- Onboard storage: eMMC 256MB NAND Flash
- IP65 compliance front panel, resistant to water and dust
- Rich IO with RS-232, USB, CANbus, and Gigabit LAN
- Easy panel mounting, no screw hole needed
- Low power consumption: 8W (+24V/320mA)

Features

- Fanless / Rugged Design HMI Computing
- 8" TFT LED backlight LCD display
- TI AM3354 Sitara Arm Cortex-A8 1.3 GHz RISC Processor
- Onboard 256MB DDR3 SDRAM
- Onboard storage: eMMC 256MB NAND Flash
- IP65 compliance front panel, resistant to water and dust
- Rich IO with RS-232, USB, CANbus, and Gigabit LAN
- Easy panel mounting, no screw hole needed
- Low power consumption: 8W (+24V/320mA)

Ordering Information

HC-3080
Linux-ready Arm-based 8" HMI Computing

HMI Computing

- TFT LCD display / LED backlight with capacity touch
- Quiet, fanless, Arm-based Linux-ready computing
- Industrial HMI computing

Artila HMI Computing

- Arm-based Linux-ready computing
- Projective Capacity Touch
- 89° / 89° Viewing Angle
- 800 x 600 Resolution
- IP65 compliance front panel, resistant to water and dust
- Fanless, Rugged Design for harsh environment
- Easy panel mounting, no screw hole needed
- Low power consumption: 8W (+24V/320mA)

HMI Series

Comparison Table

<table>
<thead>
<tr>
<th>Model</th>
<th>HC-3120</th>
<th>HC-3080</th>
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<tbody>
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<td>CPU</td>
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<td>AM3354</td>
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<tr>
<td>Frequency</td>
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<td>1.3GHz RISC</td>
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<td>Memory</td>
<td>256MB DDR3</td>
<td>256MB DDR3</td>
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<td>Micro-SD Card</td>
<td>1 x SD slot</td>
<td>1 x SD slot</td>
</tr>
<tr>
<td>Graphics</td>
<td>SGX530 3D</td>
<td>SGX530 3D</td>
</tr>
<tr>
<td>Display</td>
<td>8&quot; TFT LCD</td>
<td>8&quot; TFT LCD</td>
</tr>
<tr>
<td>Backlight</td>
<td>800 x 600</td>
<td>800 x 600</td>
</tr>
<tr>
<td>Resolution</td>
<td>89° / 89°</td>
<td>89° / 89°</td>
</tr>
<tr>
<td>Contrast Ratio</td>
<td>500:1</td>
<td>500:1</td>
</tr>
<tr>
<td>Backlight</td>
<td>LED</td>
<td>LED</td>
</tr>
<tr>
<td>Life</td>
<td>20000hrs</td>
<td>20000hrs</td>
</tr>
<tr>
<td>Touch</td>
<td>Projective Capacity Touch</td>
<td>Projective Capacity Touch</td>
</tr>
<tr>
<td>Ethernet</td>
<td>1 x RJ45</td>
<td>1 x RJ45</td>
</tr>
<tr>
<td>USB 2.0</td>
<td>2 x USB 2.0</td>
<td>2 x USB 2.0</td>
</tr>
<tr>
<td>CANbus (Optional)</td>
<td>1 x CAN</td>
<td>1 x CAN (Optional)</td>
</tr>
<tr>
<td>CANbus (Optional)</td>
<td>1 x CAN</td>
<td>1 x CAN (Optional)</td>
</tr>
<tr>
<td>Built-in Firefox</td>
<td>1000000mbps</td>
<td>1000000mbps</td>
</tr>
<tr>
<td>File System</td>
<td>EXT4</td>
<td>EXT4</td>
</tr>
<tr>
<td>Power Requirement</td>
<td>8W (+24V/320mA)</td>
<td>8W (+24V/320mA)</td>
</tr>
</tbody>
</table>

Specifications

- Low power consumption, +18~+30Vdc
- Onboard storage: eMMC 256MB NAND Flash
- IP65 compliance front panel, resistant to water and dust
- Rich IO with RS-232, USB, CANbus, and Gigabit LAN
- Easy panel mounting, no screw hole needed
- Low power consumption: 8W (+24V/320mA)
Linux-ready Arm-based 12” HMI Computing
HC-3120

Features
- Fanless / Rugged Design HMI Computing
- 12” TFT LCD backlight LCD display with Projective Capacity Touch
- TI AM3354 Sitara Arm Cortex-A8 32-Bit RISC Processor
- Onboard 256MB DDR3 SDRAM
- Onboard storage eMMC 512MB NAND Flash
- IP65 compliant front panel, resistant to water and dust
- Rich I/O with IIS-232, USB, CAN bus and Gigabit LAN
- Easily Panel-mounting, no screw hole needed
- Low power consumption, +18~+30Vdc wide input range

CPU / Memory
- CPU: TI AM3354 Sitara Arm Cortex-A8 32-Bit RISC Processor
- Frequency: 800MHz, up to 1GHz
- SDRAM: 256MB DDR3, up to 512MB
- Onboard eMMC 512MB NAND Flash

Graphic
- SGAPI 3D Graphics Engine
- Industry Standard API Support of Direct3D Mobile, OGL-ES 1.1 / 2.0, OpenGL ES 1.0, and OpenMax

Display
- Display Size: 12” TFT LCD, 16.2M colors
- Resolution: 800 x 600
- Viewing Angle (H/V°): 89°/89°
- Luminance (cd/m2): 600
- Contrast Ratio: 1500:1
- Backlight: LED
- Life: 50000hrs

Touchscreen
- Type: Projective Capacity Touch
- Transparency: ≥85% at 550nm wavelength
- Controller: USB
- Explosion-proof

CAN Bus Ports
- Type: 1 x CAN bus 2.0A/8 compliant ports (second is optional)
- Speed: Up to 1Mbps

USB 2.0 Host Interface
- Host Ports: 2
- Supports 480Mbps Hi-speed mode
- Type A USB connector

SD Slot
- 1 x microSD socket
- SD 2.0 compliant, supports SDHC

Network
- 2 x Gigabit Ethernet (10/100/1000Mbps)
- Connector: RJ45

Power Requirement
- 1 x Phoenix male 2-pin terminal block
- Power Input: +24VDC typical (+18~+30VDC)
- Cable Length: up to 12m, 12m (Max.)
- Power Consumption: 14.4W (+24V/600mA)

Software Development
- Support QT Library
- Script Language: Python, PHP, NodeJS
- Web server: Apache/Nginx/Lighttpd
- Database: MySQL/SQLite3/PostgreSQL
- Text editor: vim/nano/sed
- Administration: Webmin

H/W Specifications

I/O PORTs
- CAN Bus
- USB Ethernet

Software Environment
- Matchbox (XT1) or virtual keyboard
- Built-in Firefox / Chromium browser

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Ordering Information
HC-3120
- Linux-ready Arm-based 12” HMI Computing

Dimension Drawing

Linux-ready Arm-based 12” HMI Computing
HC-3120

Operation System Support
- Linux kernel 4.9.x
- Supports bootup from eMMC or SD card
- File System: EXT4
- GUI Engine: X11
- Support Qt library

Desktop Environment
- Matchbox (XT1) or virtual keyboard
- Built-in Firefox / Chromium browser

Package Management
- Package repository: Artila self-maintained repository
- Command: Using standard apt-get command
- Support Node-Red
- Support Mono for running Windows .NET app

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Ordering Information
HC-3120
- Linux-ready Arm-based 12” HMI Computing

Dimension Drawing
Optional Accessories

### Serial Cable
- CB-RJ4SF9-150 (91-R4SF9-150)
  - Model No.: M-501, M-504, M-510, M-514
  - M-518, M-518, M-604, M-605, M-705, PAC-4000, PAC-4010, PAC-4070

### Console Cable
- CB-RJ2CON-100 (91-RJ2CON-100)
  - Model No.: M-501, M-504, M-510, M-514, M-604
  - Apom-212, Apom-212P

- CBL-F10MP-20 (91-0F9MP20-001)
  - Model No.: M-513, M-516, M-518, M-618, M-522
  - M-580K Starter Kit
  - PAC-5070, PAC-5070K
  - RIO-2010, RIO-2010PG, RIO-2015PG

### Power Adaptor
- PWR-12V-1A (31-62100-000)
  - 110~240VAC to 12VDC, 1A Power Adaptor

### WiFi / 3G
- Pigtail-WIFI-1001-20 (91-CST16-001)
  - PE8 to SMA Female Coaxial Cable, 20cm
  - Model No.: M-513

- Pigtail-3G-1001-20 (91-CST17-001)
  - PE8 to SMA Female Coaxial Cable, 20cm
  - Model No.: M-513

- Ant-WiFi-1001 (91-CRF38-001)
  - 5dBi External WiFi Antenna
  - Model No.: M-513

- Ant-3G-1001 (91-CRF37-001)
  - 5dBi External 2G/3G Antenna
  - Model No.: M-513

- M-9011 (ZA-CAR00-001)
  - Full-size miniPCIe 2G/3G Card, with SMA Socket
  - Model No.: M-513

- M-9001 (ZA-CAR00-002)
  - 802.11b/g/n USB Half-size miniPCIe Card, Realtek RTS5070, T2R
  - Model No.: M-513

### Sensor
- DS18B20 (91-6DS18-001)
  - Programmable Resolution 1-Wire Digital Thermometer
  - Model No.: RIO-2010, RIO-2010PG

- 5SRTC-KG-K2-24-36 (91-5SRTC-K50)
  - Subminiature Connector, K Thermocouple, Glass Braid Insulation, 24 AWG, 36 inch Length
  - Model No.: RIO-2018
  - Not Artila generally suggests our customers to purchase this item from the original manufacturer directly.

- 5SRTC-KG-J2-24-36 (91-5SRTC-J50)
  - Standard Size Connector, J Thermocouple, Glass Braid Insulation, 24 AWG, 36 inch Length
  - Model No.: RIO-2018
  - Not Artila generally suggests our customers to purchase

Application

Intelligent Conference Room Situational Control Solution

In such application structure, by placing the M-502 into the company’s power distribution board and with the multi-functional GPO interface of M-502, an intelligent control can be realized after conversation to achieve the function of auto-turning off meeting room facilities to ultimately realize the purpose of energy management such as the turning on/off of projectors, lighting control, electric curtains, intelligent air-conditioning, video systems, etc.

Also, the one-to-many instant monitoring and control function can be integrated for a relational situational control for multiple objects at the same time, for example, during a meeting, the instant data monitoring can be done for the speaker’s movement, interior temperature and humidity, light, sound, etc., and the instant control can be done for projector screen up/down, air-conditioning, lights and volume control for teleconference conferences.

Intelligent Household Environment Control Solution

Most of traditional household appliances cannot connect to internet directly, while it takes a long time for the change and evolution from design aspect. However, as the development trend of IoT is rapidly spreading into the household market, a stable and reliable gateway is expected to be developed for reading traditional control signals at one end and connecting to cloud platforms at the other end.

In such application structure, Matrix-504 enables developers to connect traditional household appliances to a cloud server in the simplest and fastest way, by which to immediately upgrade them into intelligent appliances that can be controlled and monitored by remote units for the intelligent adjustment and control function of household environmental conditions, and to effectively attain the purpose of energy-saving.
Artila Electronics has more than 15 years of experience in Industrial Computing. Artila's product lines include the intelligent IoT gateway, programmable automation controller, IoT device platform, and web-based remote I/O. Artila's products have been widely used in energy management, intelligent buildings, lighting control and environmental monitoring, and so on. Artila also provides hardware and software customization services to meet customer requirements for special specifications and features. From product design to production quality, Artila Electronics strives for delivering top-notch solutions and services to our customers in the industrial automation market.