atop Technologies

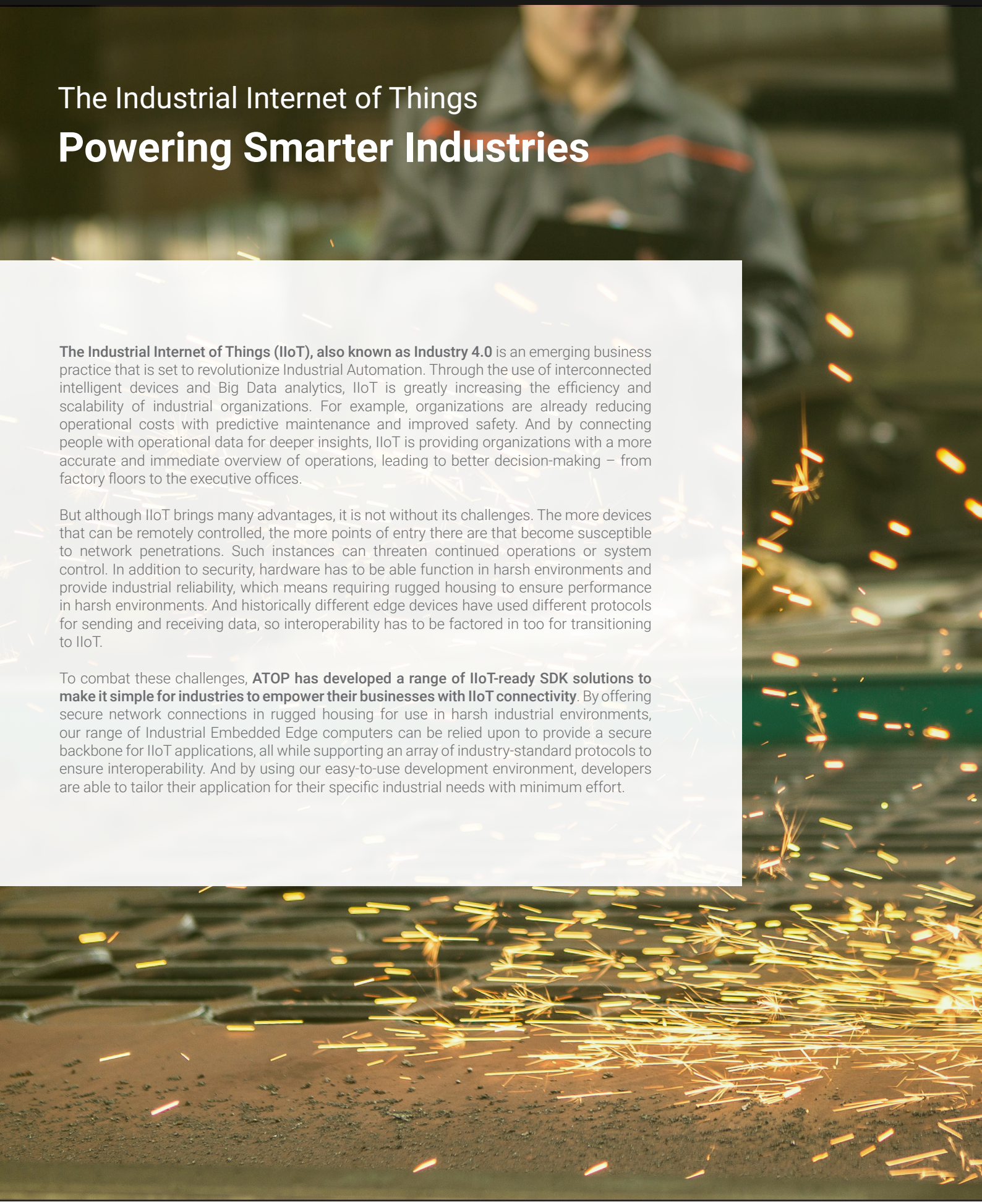
ATOP SDK

Your Gateway
to Industry 4.0

Whitepaper

Engineered and
manufactured
in Taiwan

Contents



The Industrial Internet of Things

Powering Smarter Industries

The Industrial Internet of Things (IIoT), also known as Industry 4.0 is an emerging business practice that is set to revolutionize Industrial Automation. Through the use of interconnected intelligent devices and Big Data analytics, IIoT is greatly increasing the efficiency and scalability of industrial organizations. For example, organizations are already reducing operational costs with predictive maintenance and improved safety. And by connecting people with operational data for deeper insights, IIoT is providing organizations with a more accurate and immediate overview of operations, leading to better decision-making – from factory floors to the executive offices.

But although IIoT brings many advantages, it is not without its challenges. The more devices that can be remotely controlled, the more points of entry there are that become susceptible to network penetrations. Such instances can threaten continued operations or system control. In addition to security, hardware has to be able function in harsh environments and provide industrial reliability, which means requiring rugged housing to ensure performance in harsh environments. And historically different edge devices have used different protocols for sending and receiving data, so interoperability has to be factored in too for transitioning to IIoT.

To combat these challenges, **ATOP has developed a range of IIoT-ready SDK solutions to make it simple for industries to empower their businesses with IIoT connectivity**. By offering secure network connections in rugged housing for use in harsh industrial environments, our range of Industrial Embedded Edge computers can be relied upon to provide a secure backbone for IIoT applications, all while supporting an array of industry-standard protocols to ensure interoperability. And by using our easy-to-use development environment, developers are able to tailor their application for their specific industrial needs with minimum effort.

IIoT Building Blocks

SDK Solutions from ATOP

Utilizing a proven SDK, ATOP's rugged hardware offers ideal building blocks for bringing IIoT connectivity to your network, by providing you with full hardware control for tailoring communications between devices, the Cloud, and your application requirements. In addition to a solid Linux workplace, our easy-to-use development environment helps simplify your workflow design, by offering a full set of powerful APIs. These can be used in your binary application, or they can be used to wire visually in our customized version of Node-RED.

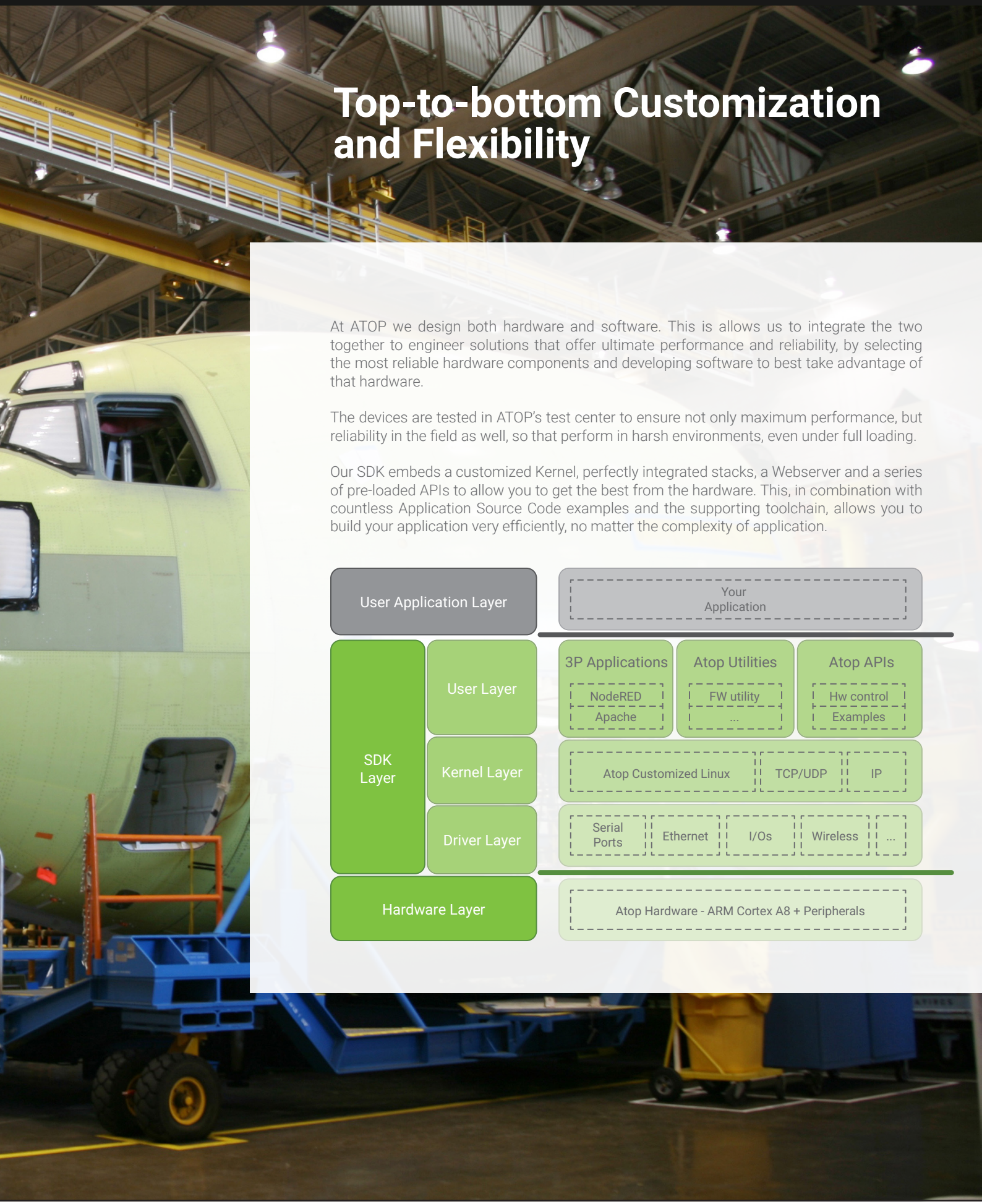
Configurable Hardware

Our SDK-ready networking devices have extensive expansion capabilities to accommodate I/O and interface cards, graphics cards, additional memory and increased storage capacity, allowing them to be configured for your specific application. For example, your customized application can be written in C language and run on our powerful Industrial low-power 800MHz ARM Cortex A8 TI Sitara AM3354 CPU. But if you prefer a more user-friendly environment, then you can use our ATOP-Customized Node-RED version. Based on Node.js, Node-RED is an open source Building-Block programming environment that allows you to build your IIoT application within a user-friendly, hardware-tailored application design environment.

Reliable Hardware

With over 25 years of experience, ATOP has built a reputation for developing and manufacturing hardware that performs reliably in harsh environments, that offers data security over networks, and that has the performance and fast responsiveness to make sure that your network performs and delivers under demanding circumstances.

For instance, our SE5901B offers high EMC protection, a wide temperature operation, and an array of models to ensure you have the flexibility to use a device that is specific to your application in the field. A dedicated I/O version provides 2 Digital Inputs and 2 Digital Outputs; a GPS version provides Global positioning system geolocation; and, specifically for IIoT, a version that provides additional 15 seconds power during a power failure, allowing the device to relay its failure status back to the host.



Top-to-bottom Customization and Flexibility

At ATOP we design both hardware and software. This is allows us to integrate the two together to engineer solutions that offer ultimate performance and reliability, by selecting the most reliable hardware components and developing software to best take advantage of that hardware.

The devices are tested in ATOP's test center to ensure not only maximum performance, but reliability in the field as well, so that perform in harsh environments, even under full loading.

Our SDK embeds a customized Kernel, perfectly integrated stacks, a Webserver and a series of pre-loaded APIs to allow you to get the best from the hardware. This, in combination with countless Application Source Code examples and the supporting toolchain, allows you to build your application very efficiently, no matter the complexity of application.

Visual Programming with Node-RED

An Environment for Smarter Developments

Introduction

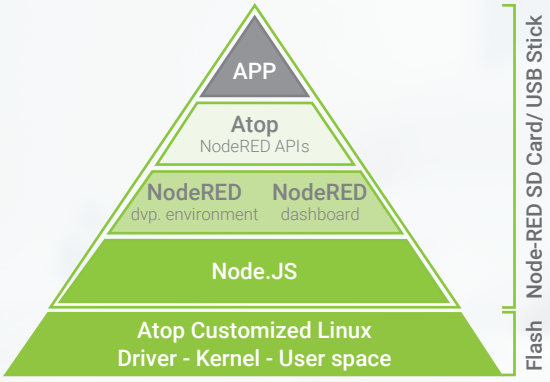
Node-RED is a programming tool for wiring together hardware devices, APIs and online services. As a flow-based programming tool, Node-RED breaks down an application's behavior into discrete components called Nodes. Each node has a well-defined purpose: it receives data; processes it, and then it passes that data on, with the network being responsible for the flow of data between the nodes. What this does is to separate the control flow of software from the actual software logic, allowing Node-RED users to understand the flow of data and direct it with simple links, all without needing to understand the individual lines of code of each node.

Node-RED

Using Node-RED, developers can wire input, output, and processing nodes to create flows to process data, control things, and send alerts. You can wire up web services or custom nodes to each other to perform actions. Created flows are stored using JSON, which can be easily be imported and exported for sharing flows with other users in your organization. And because the Node-RED lightweight runtime is built on Node.JS, it is is ideal for running at the edge of a network on our hardware, as well as in the Cloud.

Node-RED on ATOP

On ATOP's devices, Node.JS and Node-RED run on ATOP's Customized version of Linux, so there is no hassle of having to install and port Node-RED to the platform. ATOP's customized version of Node-RED is supplied on SD, Micro-SD cards or USB sticks.
Node-RED will be automatically run on ATOP's devices out of the box, and you will have access to plenty of add-on software from ATOP that can be configured through a user friendly Web-UI.
IPsec, OpenVPN, PPTP, SNMP, NAT and several other services are available for you to enhance the IIoT capabilities, with one click.



This allows you to concentrate better on developing, without worrying about how to build an environment in which to develop and how to configure the device.

ATOP Node-RED products embed IPsec, OpenVPN, PPTP security, NTP Server, SNMP and several Standard Nodes come pre-installed, allowing your device to be the gateway to AWS, Azure, IBM Bluemix and many more

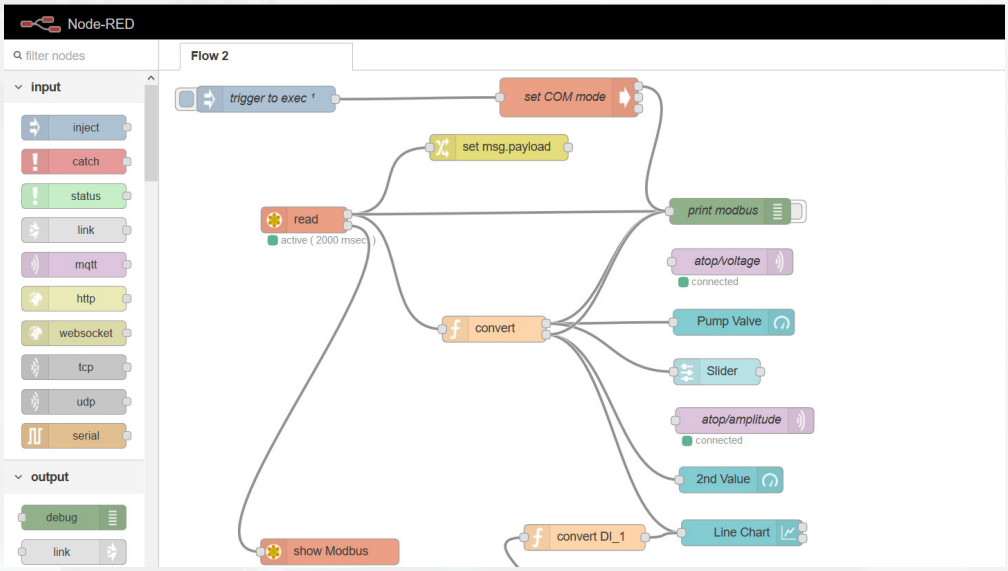
amazon web services

Microsoft Azure

IBM Bluemix™

Node-RED Development Environment

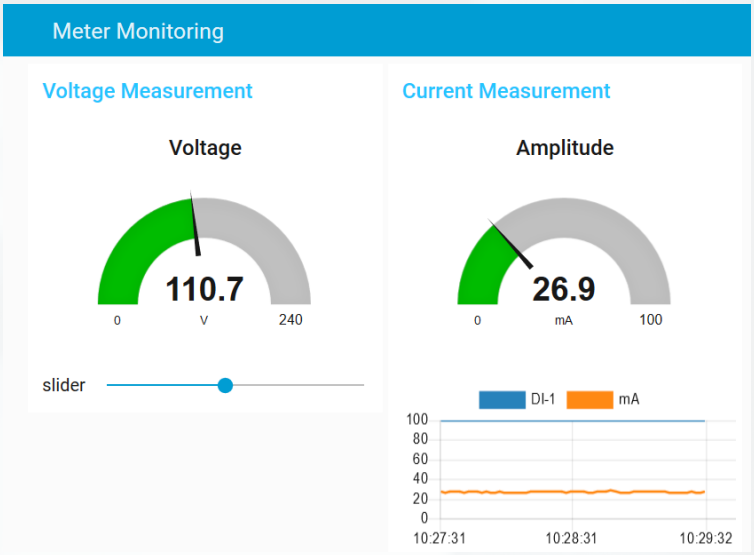
Node-RED consists of a Node.js-based runtime, which you can access through a web browser. From the browser, you create your application by dragging nodes into the Node-RED workspace. You can then wire them together from an array of options. For added flexibility, individual code can also be used. Then with a single click, the application can be deployed to the runtime. The ATOP-customized Node-RED Environment provides the already customized building-blocks that will allow you to access the hardware-specific features, such as Digital Inputs/Outputs, Serial ports, Buzzer, Relays and more.



Node-RED's dashboard nodes provide a comprehensive set of UI components for building fully functional dashboards that are suitable for IIoT and industrial applications. Known as Dashboard Widgets, they include bar charts, donut charts, gauges, notifications, basic text, as well as sliders, inputs, and forms.

For example, a gauge display can be used for displaying all the physical measurements in a known range, such as temperature, humidity, atmospheric pressure, and wind speed. A donut chart can be used for displaying several values, such as the distribution of power consumed by different devices.

It's this sort of flexibility in Node-RED's dashboard that allows such ease-of-use to be combined with powerful applications.



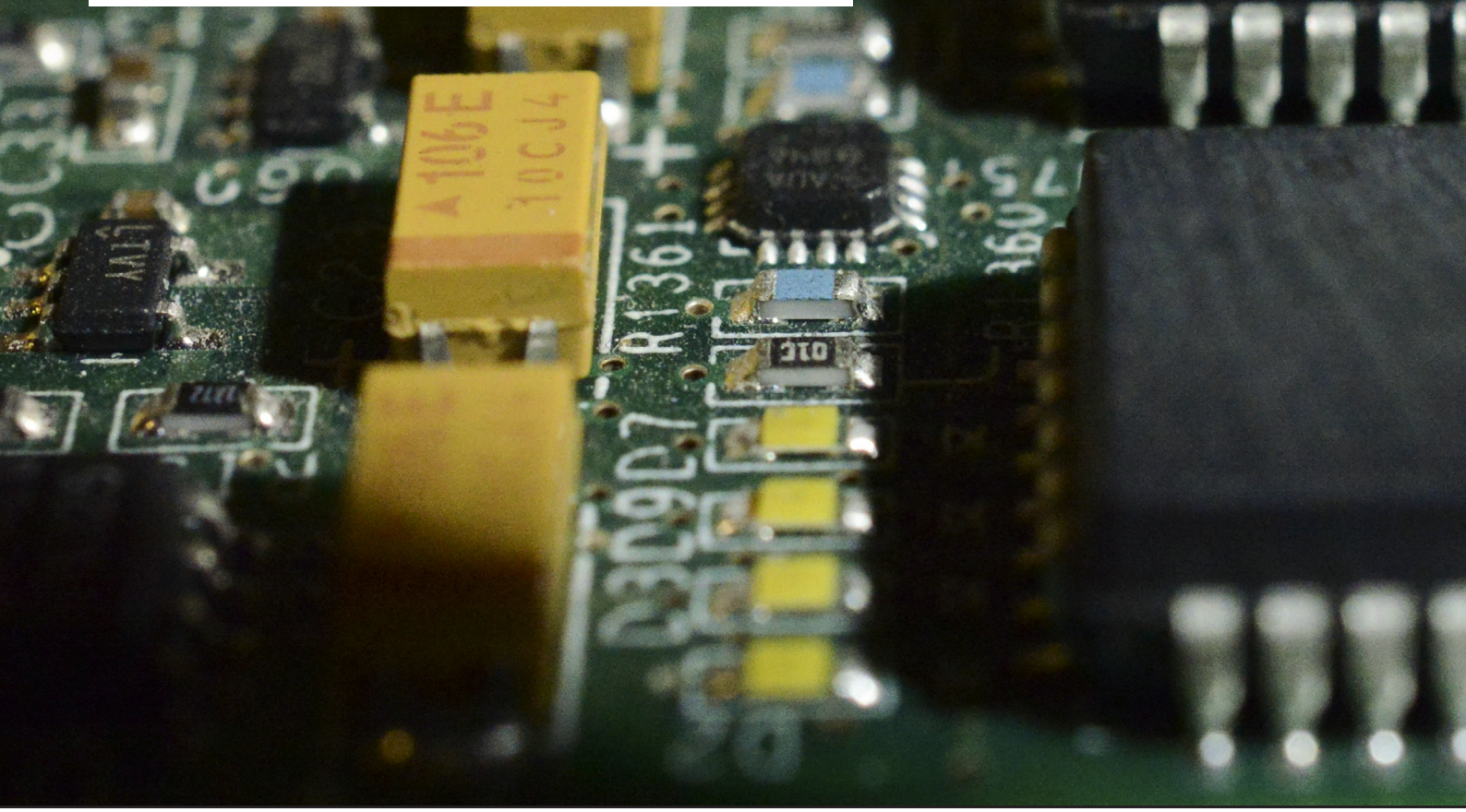
SDK Solutions from ATOP

Our SDK-ready devices have extensive customization options that allow us to offer you a device that can be as close as possible to Your final needs.
Devices offer different I/O options, power input, Power over Ethernet, Fiber Optic or Copper Ethernet Connectivity, DSub-9 or Terminal Block connectors and when needed Optional isolation.

The devices come by default with the Flash/RAM configuration described in the datasheets (where Node-RED version is equipped with 256MB DDR by default) but are scalable to larger memory when required. For specific needs, feel free to ask to Your Distributor or ATOP Sales Representatives.

Our Industrial Embedded Computers offer support for various Industry-standard protocols, making them ideal flexible gateways to providing IIoT connectivity.

They can be supplied fully configured and integrated into racks.



Rugged Building Blocks for supporting IIoT in Your Network

SE5901B SDK

3G/4G LTE 1-Ethernet 1-Serial port
Industrial Embedded Edge Computer with Opt. IOs
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SE5901 SDK

2-Ethernet 1-Serial port
Industrial Embedded Edge Computer
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SE5904D SDK

2-Ethernet 4-Serial port
Industrial Embedded Edge Computer
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SE5908 / SE5916 SDK

2-Ethernet and 8 / 16-Serial port
Industrial Embedded Edge Computer
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SE5900A SDK

6-Ethernet ports IEC61850-3 Certified
Industrial Embedded Edge Computer
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SE5908 / SE5916 SDK

6-Ethernet 8 or 16-Serial port IEC61850-3 Certified
Industrial Embedded Edge Computer
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SE5901B SDK Series

3G/4G LTE Cellular to Ethernet and Serial Industrial Embedded Edge Computer

FEATURED HIGHLIGHTS

- Ideal for IoT and IIoT applications; supports NodeRED and dashboard
- Extensive 3G and LTE Band Support:
  - EU: 2100/1800/850/2600/900/800MHz (B1/B3/B5/B7/B8/B20)
  - US: 1900/AWS/850/700/700/1900MHz (B2/B4/B5/B13/B17/B25)
- High-performance IPsec VPN throughput; data-rate up to 37.9Mbps*
- Wide temperature range for Industrial-grade performance
- 1 x 10/100/1000Mbps Ethernet port
- 1 x RS-232/485 port – baud rate up to 921.6 Kbps
- 1 x USB2.0 high speed OTG port; 1 x Port USB Power-only port
- 2 x Digital Inputs; 2 x Relays in the I/O version
- Additional embedded power-bank for fault-relay capability in B Version

PRODUCT DESCRIPTION

Overview

SE5901B SDK is your ideal solution for decentralized Edge applications, where 3G/4G connectivity is a must. Based on a high-performance TI Sitara AM3354-800MHz CPU, SE5901B embeds an Industrial Cellular module for high-speed applications, one Gigabit RJ45 port, up to two Serial ports and a high-speed USB 2.0 port. CE and FCC Certified, SE5901B's wide Operation Temperature allows deployment in critical environments.

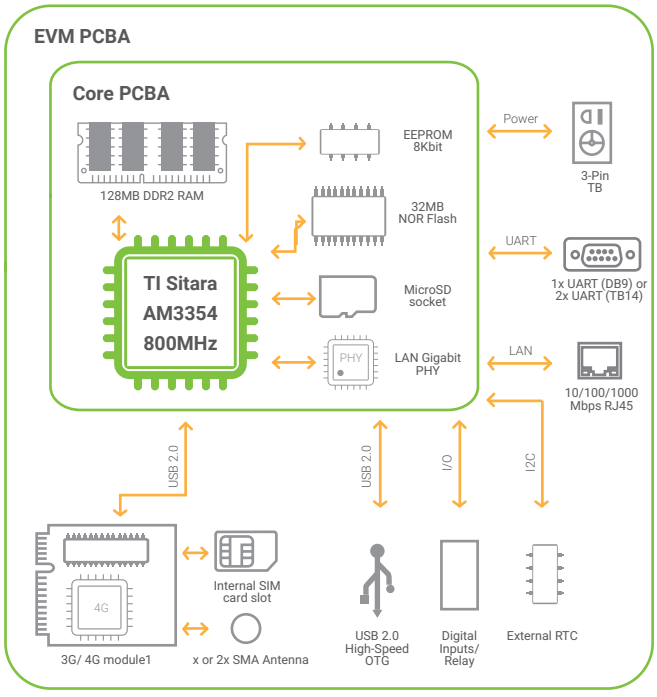
Scalability

If you embedded application requires a large amount of data storage, then you can use a dedicated micro SD socket and the integrated USB 2.0 high-speed port to flexibly increase storage space.

Additional Optional features

SE5901B is available in multiple versions. The IO-version provides 2 Isolated Digital Inputs and 2 Relay outputs. The -B version enhances the device you choose with an internal capacitor to provide up to 40 seconds of back-up power in the event of a power failure. This would allow you to relay back to the control station or to the user an alarm or to issue time-critical commands.

BLOCK DIAGRAM



** : Node-RED only - Test carried out with one VPN-IPsec Tunnel, Peer-to-Peer mode, Ethernet cable. Performance can change based on the Cellular Network.*

SPECIFICATIONS

Hardware Specifications				
CPU	Texas Instruments Sitara ARM Cortex A8 AM3354 800MHz			
Flash	SDK version: 32 MB NOR Flash (supports up to 128 MB) Node-RED version: 64 MB NOR Flash			
RAM	SDK version: 128 MB DDR2 (supports up to 256 MB) Node-RED version: 256 MB DDR2			
EEPROM	24LC64			
Watchdog	ADM706			
Real Time Clock (RTC)	Yes - with external chip			
Buzzer	Yes			
Console port	Yes - on-board connector			
Reset button	Yes			
Wireless Interface				
Standard	GSM/ GPRS/ EDGE/ UMTS/ HSPA+/ SCDMA/ LTE			
Wireless Module	EU version: Quectel EC25-E, US version: Quectel EC20-A			
Antennas/ SIM card	1 (3G) or 2 (4G) - Included. Internal SIM card slot (x1)			
Band Options	Version	Band	Bands	
	EU	FDD LTE TDD LTE WCDMA GSM	2100/1800/850/2600/900/800MHz (B1/B3/B5/B7/B8/B20) 2600/2300/2500MHz (B38/B40/B41) 2100/850/900MHz (B1/B5/B8) 900/1800	
	US	FDD LTE UMTS GSM	1900/1700/850/700/700MHz 1900/1700/850MHz (B2/B4/B5) 850/1900MHz	
Data Rate	Version		Downlink Speed	Uplink Speed
	EU US		150 Mbps 100 Mbps	50 Mbps 50 Mbps
Network Interface				
Standards	IEEE 802.3, 802.3u, 802.3ab for 10BaseT/100BaseT(X), 1000BaseT(X)			
Ethernet Ports	1x 10/100/1000BASE-TX RJ-45			
Serial Interface				
Connector	D-Sub9 RS-232/485 software selectable (DB model) 14-Pin 5.08mm Terminal Block (integrated with DI/DOs)			
Ports	1 port RS-232/485 (2-wire) (DB-model) + 1 port RS-232 (IO model only)			
Configuration	Baud Rate Flow Control		50 ~ 921,600bps None, Xon/Xoff, RTS/CTS (RS-232 only)	
Other Interfaces				
Digital Inputs (DIs) Digital Outputs (DOs)	2 channels photo coupler isolated digital input 2 channels digital output. N.O.(2A@24VDC)			
USB ports	2 x USB A Type (USB 2.0) - 1-port High-Speed OTG + 1-port power only			
SD card	Micro-SD card slot (internal)			
Power, Environmental and Mechanical				
Input Voltage	9-48 VDC			
Operating Temperature	-40°C~70°C (-40°F~158°F)			
Dimensions	32mm x 122mm x 92mm			

SE5901 SDK Series

1-Port Ethernet to Serial Industrial Embedded Edge Computer

FEATURED HIGHLIGHTS

- Ideal for IoT and IIoT applications; supports NodeRED and dashboard
- Wide -40°C~85°C temperature range for Industrial-grade reliability
- High-performance VPN throughput; data-rate up to 37.9Mbps*
- 2 x 10/100Mbps Ethernet port
- 1 x RS-232/422/485 port – baud rate up to 921.6 Kbps
- 1 x USB2.0 high speed OTG port
- Optional 802.3af PoE models can be powered by Ethernet cable
- ATOP customized Linux SDK environment with reliable APIs
- Rugged metal housing with wall or DIN-Rail mount support
- Industrial EMC protection

PRODUCT DESCRIPTION

Overview

SE5901 SDK is the perfect solution for advanced, high-performance Edge computing applications, where Industrial-Grade, well-protected EMC is necessary. Based on a high-performance TI Sitara AM3354-800MHz CPU, SE5901 embeds two Fast-Ethernet ports, one Serial port and a high-speed USB 2.0 port. CE and FCC certified, SE5901's wide Operation Temperature range allows deployment in critical environments.

Scalability

If you embedded application requires a large amount of data storage, then you can use a the integrated USB 2.0 high-speed port to flexibly increase storage space.

Additional Optional features

SE5901 is available in multiple versions. The serial port can be either with D-Sub 9 (DB9) connector or 5-Pin 5.08mm Terminal Block. And if wiring and power is critical for your application, then a dedicated PoE version allows the device to be powered through Ethernet Cable, by using any IEEE802.3af-Capable PoE Ethernet Switch upstream.

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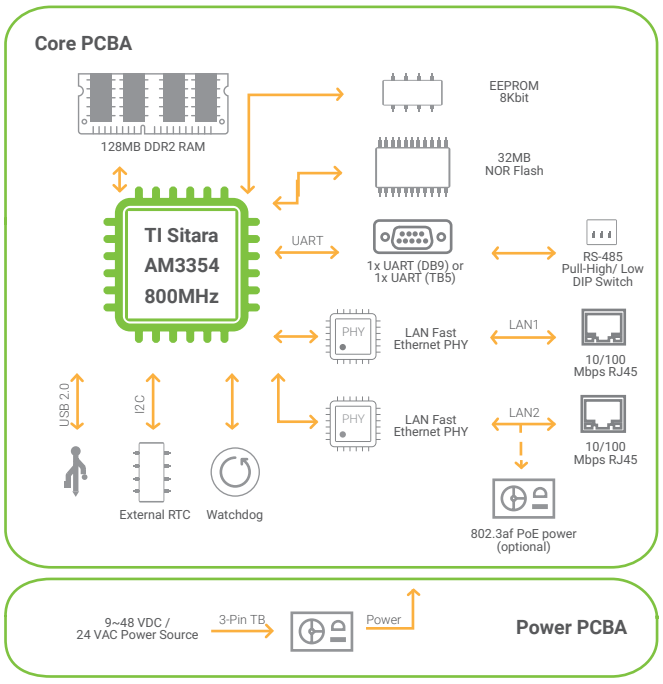

** : Node-RED version only; test carried out with one VPN-IPsec Tunnel, Peer-to-Peer mode, Ethernet cable.*

SPECIFICATIONS

Hardware Specifications		
CPU	Texas Instruments Sitara ARM Cortex A8 AM3354 800MHz	
Flash	16 MB NOR Flash (customizable upon request up to 128 MB)	
RAM	16 MB NOR Flash (customizable upon request up to 128 MB) Node-RED version: 32 MB NOR Flash	
EEPROM	24LC64	
Watchdog	ADM706	
Real Time Clock (RTC)	Yes - with external chip	
Buzzer	Yes	
Console port	Yes - on-board connector	
Reset button	Yes	
Network Interface		
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X)	
Ethernet Ports	2x 10/100BASE-TX RJ-45	
Power over Ethernet	IEEE 802.3af on LAN2 (PoE version only)	
Serial Interface		
Connector	D-Sub9 RS-232/485 software selectable (DB model) 5-Pin 5.08mm Terminal Block	
Ports	1 port RS-232/422/485 (2 and 4-wire)	
Pull-high / Pull-low /Term. resistors	Selectable by DIP switch.	
Configuration	Baud Rate Data Bits Stop Bits Flow Control	50 ~ 921,600bps 7, 8 1, 2 None, Xon/Xoff, RTS/CTS (RS-232 only)
Other interfaces		
USB ports	1 x USB A Type (USB 2.0) - High-Speed OTG + power	
Power		
Input Voltage	9-48 VDC 24 VAC	
Connector	3-Pin 5.08mm Lockable Terminal Block	
Power Consumption	0.65A @ 9VDC (6 W Max)	
Reverse Polarity Protection	Yes	
Environmental limits		
Operating Temperature Storage Temperature Ambient Relative Humidity	-40°C~85°C (-40°F~185°F) -40°C~85°C (-40°F~185°F) 5%~95%, (Non-condensing)	
Mechanicals		
Housing	IP30 protection, SPCC metal housing	
Dimensions(W x H x D)	32 x 110 x 90 mm (1.26 x 4.33 x 3.54 in)	
Installation	DIN-Rail or Wall-Mount (optional kit)	
Weight	400 g	
Reset Button	Yes	

SE5904D SDK Series

4-Port Ethernet to Serial Industrial Embedded Edge Computer

FEATURED HIGHLIGHTS

- Ideal for IoT and IIoT applications; supports Node-RED and dashboard
- Wide -40°C~85°C temperature range for Industrial-grade reliability
- VPN over IPsec, OpenVPN or PPTP; data-rate up to 37.9Mbps*
- 2 x 10/100Mbps Ethernet port or 2x 100/1000 SFP slot
- 4 x RS-232/422/485 port – models available with or without isolation
- 1 x USB2.0 high speed OTG port
- Optional 802.3af PoE models can be powered by Ethernet cable
- ATOP customized Linux SDK environment with reliable APIs
- Rugged metal housing with wall or DIN-Rail mount support
- Industrial EMC protection

PRODUCT DESCRIPTION

Overview

SE5904D SDK is perfect for deployment of high-performance Edge computing applications and for scenarios that require multiple serial ports. Based on a powerful TI Sitara AM3354-800MHz CPU, it can be embedded with two Fast-Ethernet RJ45 ports or two Gigabit SFP Slots, four isolated or non-isolated Serial ports and a highspeed USB 2.0 port. CE, FCC, and UL61010-2-201 Certified, SE5904D's wide Operation Temperature, redundant power input and well EMC-protected hardware make it perfect for utilization in harsh environments.

Additional Optional features

SE5904D is available in multiple versions. The serial port can be either with D-Sub 9 (DB9) connector or 5-Pin 5.08mm Terminal Block (with/without isolation). If supplying power cabling is a concern, then a PoE version allows the device to be powered by using any IEEE802.3af-Capable PoE Ethernet Switch upstream. And for long distance wiring, the Gigabit SFP version supports the use of fiber optic cabling.

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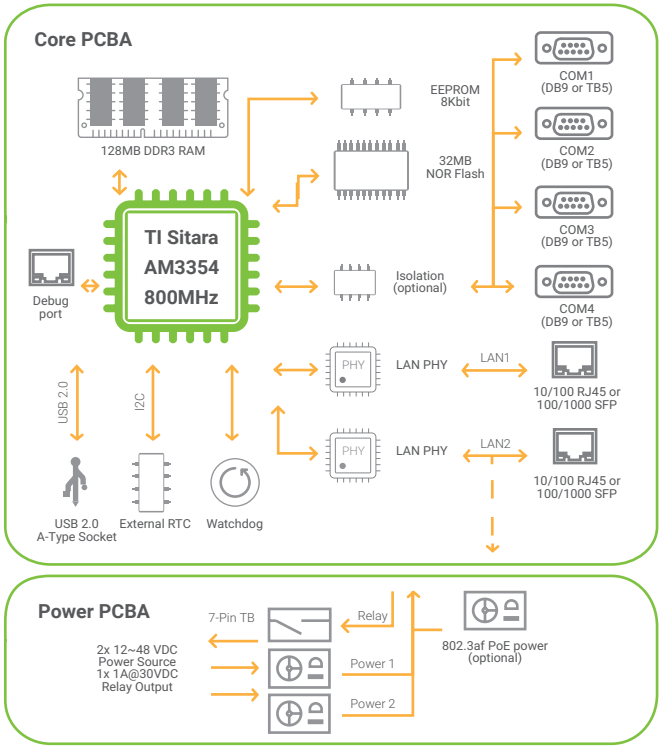

** : Node-RED version only - Test carried out with one VPN-IPsec Tunnel, Peer-to-Peer mode, Ethernet cable.*

SPECIFICATIONS

Hardware Specifications		
CPU	Texas Instruments Sitara ARM Cortex A8 AM3354 800MHz	
Flash	32 MB NOR Flash (customizable upon request up to 128 MB)	
RAM	SDK version: 128 MB DDR3 (customizable upon request up to 512 MB) Node-RED version: 256 MB DDR3 (upgradable upon request to 512 MB)	
EEPROM	24LC64	
Watchdog	ADM706	
Real Time Clock (RTC)	Yes - with external chip	
Buzzer	Yes	
Console port	Yes - RJ45 connector	
Reset button	Yes	
Network Interface		
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) and 100BaseF(X) IEEE 802.3z for 1000Base-X	
Ethernet Ports	2x 10/100 Mbps RJ-45 or 2x 100/1000 Mbps SFP slot (SFP version)	
Power over Ethernet	IEEE 802.3af on LAN2 (PoE version only)	
Serial Interface		
Connector	D-Sub9 RS-232/485 software selectable (DB model) 5-Pin 5.08mm Terminal Block (TB and SiS model)	
Ports	4 port RS-232/422/485 (2 and 4-wire) + 1 RJ45 console port	
Serial Port Isolation	3 kV (SiS version only)	
Pull-high / Pull-low /Term. resistors	Software selectable.	
Configuration	Baud Rate Flow Control	50 ~ 921,600bps None, Xon/Xoff, RTS/CTS (RS-232 only)
Other interfaces		
USB ports	1 x USB A Type (USB 2.0) - High-Speed OTG + power	
Power		
Input Voltage	12~48 VDC IEEE802.3 af (PoE) through LAN 2 - PoE version only	
Power Redundancy	Yes, 2 independent power inputs	
Relay Output	1x 1A @30 VDC (normal open)	
Connector	7-Pin 5.08mm Lockable Terminal Block	
Power Consumption	0.65A @ 9VDC (6 W Max)	
Reverse Polarity Protection	Yes	
Environmental limits		
Operating Temperature Storage Temperature Ambient Relative Humidity	-40°C~85°C (-40°F~185°F) -40°C~85°C (-40°F~185°F) 5%~95%, (Non-condensing)	
Mechanicals		
Housing	IP30 protection, SPCC metal housing	
Dimensions(W x H x D)	55 x 145 x 113 mm	
Installation	DIN-Rail or Wall-Mount (optional kit)	
Weight	400 g	
Reset Button	Yes	

SE5908 / SE5916 SDK Series

8 or 16-Port Ethernet to Serial Industrial Embedded Rack-mount Edge Computer

FEATURED HIGHLIGHTS

- Ideal for IoT and IIoT applications; supports NodeRED and dashboard
- Wide -20°C~70°C temperature range for Industrial EMC Protection
- VPN through IPsec, OpenVPN or PPTP; data-rate up to 37.9Mbps*
- 2 x 10/100Mbps Ethernet port
- Up to 16 x RS-232/422/485 port – selectable baud rate up to 921.6 Kbps
- 3 kV optional isolation on the serial ports (supports RS-485/422 only)
- SD Card slot
- Customizable LCM matrix and keypad
- Atop customized Linux SDK environment with reliable APIs
- 100~240VAC or 24~48VDC power input; one Relay Output alarm
- Rugged metal housing in 1U Rack-mount (rack-mount kit included)

PRODUCT DESCRIPTION

Overview

SE5908/16 SDK is our rack-mounted Industrial solution for high-port density Edge Computing applications. Based on a high-performance TI Sitara AM3354-800MHz CPU, the SE5908/16 Series integrates up to 16 RJ45 Isolated/non-Isolated Serial ports, two RJ45 Fast-Ethernet ports, Relay output, SD card socket, high-speed USB 2.0 port, and a programmable LCD Display and Keypad. Its Industrial-grade EMC Level-3 Hardware allows for deployment in harsh environments in temperatures between -20°C to 70°C.

Versions

The SE5908/16 Series is available with either 8 (SE5908) or 16 (SE5916) RJ45 serial ports, supporting RS-232, RS-485, and RS-422 standards. The optional 2.5kV serial port isolation (supporting RS-422 and RS-485 only) further protects the device from the dangers that come from the serial line. SE5908/16 is available with 100~240VAC power input or 24~48 VDC power input.

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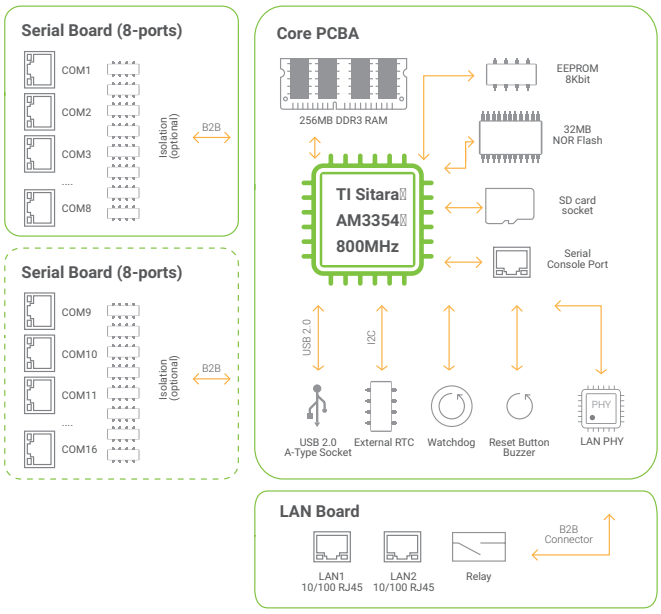


** Test carried out with one VPN-IPsec Tunnel, Peer-to-Peer mode.*

SPECIFICATIONS

Hardware Specifications		
CPU	Texas Instruments Sitara ARM Cortex A8 AM3354 800MHz	
Flash	Standard SDK: 32 MB NOR Flash (customizable upon request up to 128 MB) Node-RED version: 32 MB NOR Flash	
RAM	256 MB DDR3 (customizable upon request up to 512 MB)	
EEPROM	24LC64	
Watchdog	ADM706	
Real Time Clock (RTC)	Yes - with external chip	
Buzzer	Yes	
Console port	Yes - on-board connector	
Reset button	Yes	
Network Interface		
Standards	IEEE 802.3 for 10BaseT, IEEE 802.3u for 100BaseT(X)	
Ethernet Ports	2x 10/100 BASE-TX RJ-45	
Serial Interface		
Connector	RJ45 connector	
Ports	SE5908: 8 ports (RS-232/RS-422/RS-485, RS-422/RS-485 on Isolation vers.) SE5916: 16 ports (RS-232/RS-422/RS-485, RS-422/RS-485 on Isolation vers.)	
Serial Console	1x Serial Console port (RJ45)	
Serial Port Isolation	2.5 kV (SiS version only) - Isolation version supports only RS-422/RS-485	
Pull-high / Pull-low /Term. resistors	Software selectable.	
Configuration	Baud Rate Flow Control	50 ~ 921,600bps None, Xon/Xoff, RTS/CTS (RS-232 only)
Relay Output		
Relay Output	1x 1A@30VDC (Normal open)	
Other interfaces		
USB ports	1 x USB A Type (USB 2.0) - internal 1-port High-Speed OTG + power	
LCM Matrix	Programmable LCM Matrix with 5-buttons	
SD card	SD card slot (internal)	
Power		
Input Voltage Input Current Power Consumption	DC version: 24 - 48VDC; US-EU version: 100~240 VAC (EU or US Plug) DC version: 0.54 A @24VDC; US-EU version: 0.21A@100VAC Approximately 21 W (Max)	
Connector	DC version: 5.08mm 3-pin Lockable Terminal Block EU-US version: IEC 60320-1 C14 AC Power Inlet	
Power Redundancy	No	
Reverse Polarity Protection	Yes (DC version only)	
Environmental limits		
Operating Temperature Storage Temperature Ambient Relative Humidity	-20°C~70°C (-4°F~158°F) -40°C~85°C (-40°F~185°F) 5%~95% (Non-condensing)	
Mechanicals		
Housing	IP30 protection, SPCC metal housing	
Dimensions(W x H x D)	436 mm x 43.5 mm x 200 mm	
Installation	19" Rack-Mount (Kit included)	

SE5900A / SE5908A /SE5916A SDK Series

IEC61850-3 certified Industrial Embedded Computer, with up to 16 Serial Ports

FEATURED HIGHLIGHTS

- IEC 61850-3 certified for easy setup in IEC 61850-3 substations
- Ideal for IoT and IIoT applications; supports Node-RED apps and dashboard
- Wide -40°C~85°C temperature range; Industrial EMC protection
- 6 x 10/100Mbps RJ45 ports or 6 x 100Mbps SFP Slots
- Up to 16 x RS-232/422/485 ports – selectable baud rate up to 921.6 Kbps
- 3 kV optional isolation on the serial ports (supports RS-485/422 only)
- Internal SD Card slot
- ATOP customized Linux SDK environment with reliable APIs
- Redundant Power Input for fault protection: either 24~48 VDC or High-Voltage AC/DC (100~240VAC or 100~370VDC)
- Rugged metal housing in 1U Rack-mount (rack-mount kit included)

PRODUCT DESCRIPTION

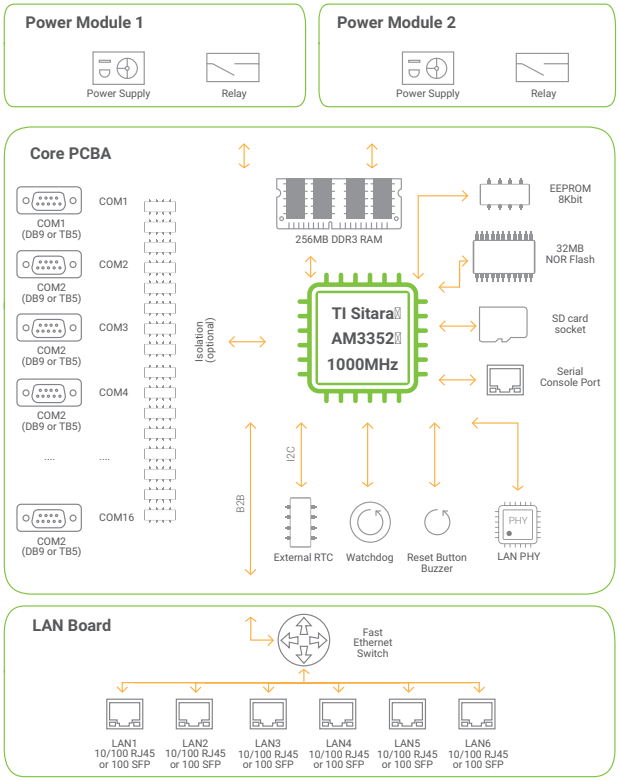
Overview

Complying with stringent IEC 61850-3 requirements for EMC protection and for use in harsh environments, the SE5900A series is a Smart-Grid Edge Computer that can be customized for your specific application. Its TI Sitara AM3352 1000MHz Processing power and reliable ATOP SDK SE5900A provides up to 16 isolated or non-isolated Serial Interfaces, and 6 Fast Ethernet ports or 6 100Mbps SFP slots – plus SD-card expansion potential.

Additional Optional features

SE5900A is available with 8 (SE5908A), 16 (SE5916A) or no D-Sub 9, TB5 (isolated/non-isolated) Serial ports. It is also available with 6 Copper or Fiber LAN interfaces, redundant power input and two Relay outputs. The SE5900A Series can be powered via 24~48VDC, 100~240VAC or 100~370 VDC, commonly used in Substation applications.

BLOCK DIAGRAM



** Test carried out with one VPN-IPsec Tunnel, Peer-to-Peer mode.*

SPECIFICATIONS

Hardware Specifications		
CPU	Texas Instruments Sitara ARM Cortex A8 AM3352 1000MHz	
Flash	32 MB NOR Flash (customizable upon request up to 128 MB)	
RAM	256 MB DDR3 (customizable upon request up to 1 GB)	
EEPROM	24LC64	
Watchdog	ADM706	
Real Time Clock (RTC)	Yes - with external chip	
Buzzer	Yes	
Console port	Yes - RJ45 Serial Console	
Reset button	Yes	
Network Interface		
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) and 100BaseF(X)	
Ethernet Ports	6x 10/100 BASE-T(X) RJ45 or 6x 100 BASEF(X) SFP Slots (SFP version)	
Ethernet Switch	Embedded 8-Ports Fast-Ethernet Switch (configurable). Each port can work as single Subnet or as Switch.	
Serial Interface		
Connector	DB version: D-Sub9 (DB9) connector TB and SiS version: 5-Pin Terminal Block (5.08mm)	
Ports	SE5900A: no serial ports SE5908A: 8 ports (RS-232/RS-422/RS-485, RS-422/RS-485 on Isolation vers.) SE5916A: 16 ports (RS-232/RS-422/RS-485, RS-422/RS-485 on Isolation v.)	
Serial Console	1x Serial Console port (RJ45)	
Serial Port Isolation	3 kV (SiS version only) - Isolation version supports only RS-422/RS-485	
Pull-high / Pull-low /Term. resistors	Software selectable.	
Configuration	Baud Rate Flow Control	50 ~ 921,600bps None, Xon/Xoff, RTS/CTS (RS-232 only)
Relay Output		
Relay Output	2x 1A@30VDC (Normal open)	
Other interfaces		
USB ports	No	
SD card	SD card slot (internal)	
Power		
Input Voltage	Redundant 24-48 VDC or Redundant 100-240 VAC/ 100-370 VDC (HV Series)	
Input Current	0.73 A @ 24 VDC, 0.35 A @ 100 VAC, 0.20 A @ 100 VDC	
Power Consumption	Approximately 20 W	
Connector	10-Pin Terminal Block	
Power Redundancy	Yes	
Environmental limits		
Operating Temperature Storage Temperature	-40°C~85°C (-40°F~185°F) -40°C~85°C (-40°F~185°F)	
Mechanicals		
Dimensions(W x H x D)	440.6 x 44 x 309 mm (1U Rack-mount)	

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