

SmartEdge Industrial IoT Gateway, Powered by Raspberry Pi



PN: AVTSE-RPI-IIOTG

ACCELERATE YOUR IOT SOLUTIONS

Bring your IoT solutions to life with Avnet's SmartEdge Industrial IoT Gateway, offering a level of simplicity, capability, and accessibility unique in the industry.

Powered by Raspberry Pi, the SmartEdge IIoT Gateway has wall and DIN-rail mount options and is built to withstand tough conditions whether out in the field, on the factory floor or connected to a pump or HVAC system.

With best-in-class pricing, secure module on board and serial / industrial connections like RS 485, CAN etc. the versatile gateway is your go-to solution to accelerate Industrial IoT applications.

Pre-configured with Avnet's IoTConnect, an enterprise-ready IoT platform, it is easy to aggregate data from sensors and connected assets and send the data to the cloud. Visualize data and derive insights with feature rich dashboards and a user-friendly interface.

- Powered by Raspberry Pi
- Quad-Core ARM Based Platform
- Reliable Industrial Connectivity
- Comprehensive Data Security
- Free 30-Day IoT Connect Trial
- Easy Configuration
- Real-Time Data Visualization
- Rugged Hardware Platform



ONE GATEWAY - ENDLESS SOLUTIONS



Smart
Factory



Smart Asset
Monitoring



Smart
Connected
Worker



Smart
Warehouse



Smart
Building



Smart
Office



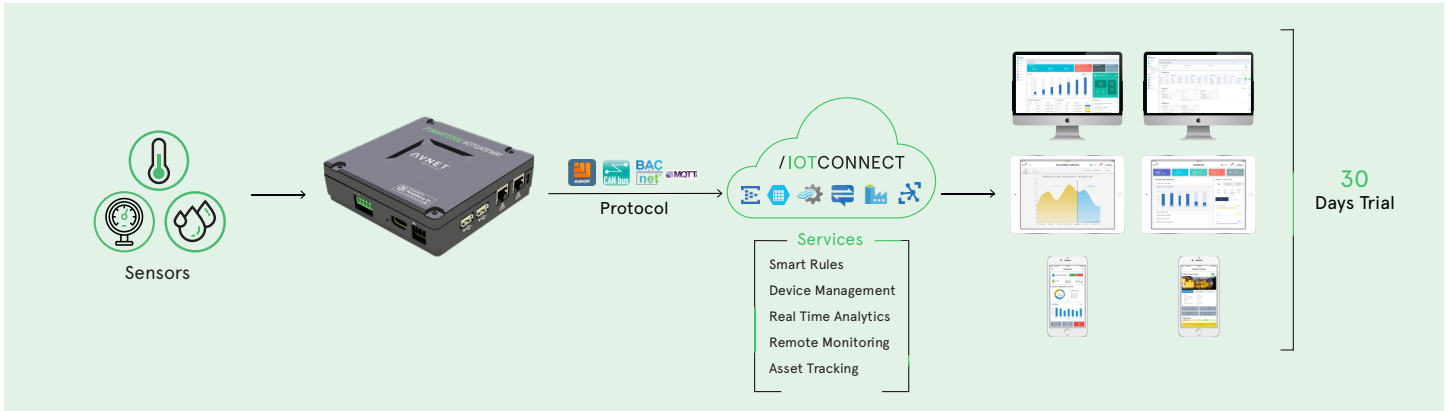
Smart
Retail



Smart
Healthcare



Smart Fleet
Management



SMARTEDGE INDUSTRIAL IOT GATEWAY – SPECS

| Feature | Details |
|----------------------------|---|
| Processor / Speed / Memory | Broadcom BCM2837 (Quad-core ARM A53) SoC, 900 MHz, 1GB LPDDR2 |
| Dimensions / Weight | 125mm W x 127mm D x 43mm H (55mm H with included expansion ring); 0.4kg |
| Environmental / Design | Operating Temperature: -20C to +70C ambient EMC: FCC, CE RED, IC |
| Form Factor | Headless and Fanless ; Wall & DIN rail mounting options (height adjustable to support HATs) |
| Power input | 12V – 24V DC Input (terminal block) |
| Real Time Clock | Embedded RTC with battery backup |
| Hardware Watchdog Timer | Selectable timeout (1-255 seconds) |
| I/O | USB: 2 x USB 2.0 Serial Interface: Isolated RS-232/485 ; CANbus (CAN 2.0) Wireless LAN: 2.4GHz, 802.11b/g/n/ Bluetooth Low Energy 4.2 Ethernet: 2 x 10/100 (RJ-45) Antenna: Internal / External Display: HDMI Expansion: 40-pin GPIO, mPCIe (Cellular) |
| Security | Trusted Platform Module (TPM) 2.0 ; Secure Boot |
| Storage | 8GB eMMC |
| Operating System | Raspbian |
| Cloud / Platform | Avnet IoT Connect with free 30 day trial and Microsoft Azure Certification |

Learn more at: element14.com/gateway

SmartEdge Industrial IoT Gateway Datasheet



OVERVIEW

The Avnet SmartEdge Industrial IoT Gateway connects your sensors and other devices to the cloud. This allows you to view status and control connected devices from a customizable web portal from any internet connected location.



SPECIFICATIONS

RASPBERRY PI 3 CORE

- 64-Bit, Quad-core ARM A53 (Broadcom BCM2837) SoC
- Direct connection to enclosure heat sink for heat dissipation
- Maximum clock speed limited to 900MHz for enhanced thermal range
- 1GB LPDDR2 SDRAM
- WiFi/BT, 2.4GHZ, 802.11bgn, BT 4.2

STORAGE MEDIUM

- 8GB (minimum) eMMC onboard

INPUT POWER

- Voltage: 12-24VDC Input
- Power: 12W minimum, 18W recommended. Additional power may be needed for installed USB devices or expansion cards (mPCIe or HATs). Be sure to verify the power supply high temperature derating for your application.

ENVIRONMENTAL

- Ambient Operating Temperature Range: -20°C to 70°C*, non-condensing humidity
- Storage Temperature Range: -40°C to 85°C, non-condensing humidity

**Note: depending on processor workload, CPU throttling may occur above 50C ambient*

DIMENSIONING & MOUNTING

- Dimensions: 125mm W x 127mm D x 43mm H (55mm H with included expansion ring)
- Weight: 0.4kg
- Mounting: Desktop, Wall (sheet metal screws included), or DIN Rail (w/ included DIN rail bracket for 35mm "top hat")

FRONT PANEL LEDS

- Power / Activity LED
- User LED

HARDWARE WATCHDOG TIMER (WDT)

- Selectable timeout (1-255 seconds)

TRUSTED PLATFORM MODULE (TPM) & SECURE BOOT

- SLB9670 TCG 2.0 Trusted Platform Module
- Secure Boot Option when used with Avnet's Image

REAL-TIME CLOCK (RTC) WITH BATTERY BACKUP

- PCF8563 real-time clock
- BR1225 backup battery

LONGEVITY


- SmartEdge IIOT Gateway will remain in production until at least January 2026

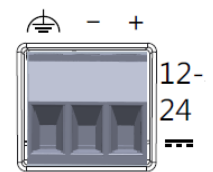
EXTERNAL CONNECTIONS

DC-INPUT

- 12VDC - 24VDC +/- 10%
- Recommended Wire: 18-24AWG Solid or 18-22AWG Stranded
- Install Protective Earth Wire

DCIN Terminal Block Connections

| Symbol | Signal Name |
|---|----------------------|
|  | Protective Earth GND |
| - | 0V (GND) |
| + | 12-24VDC |



DUAL ETHERNET PORTS

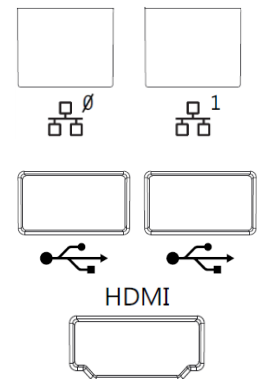
- 10/100 Base-T
- Link / Activity LEDs

DUAL USB PORTS

- USB 2.0 High-Speed
- 5V @ 1.2A Output, shared among all USB ports

DISPLAY CONNECTOR

- HDMI / DVI Compatible

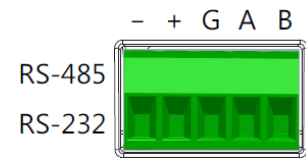


ISOLATED RS-485 / RS-422 / RS232

- SC16IS740 UART (16C550 compatible)
- Jumper selection
 - Enable RS485 termination [installed by default, 120ohm termination]
 - Port Shutdown [not installed by default, Port Enabled]
 - Slow Slew Rate [not installed by default, Fast Slew Rate]
 - RS232 Mode [not installed by default, RS485 mode]
 - Full Duplex [not installed by default, RS485 half duplex]

RS-485/RS-422/RS-232 Terminal Block Connections

| Signal | 2-Wire RS485 (half) | 4-Wire RS485 (full) RS-422 | RS-232 |
|--------|---------------------|----------------------------|--------|
| - | (n/c) | RD (A) - | CTS |
| + | (n/c) | RD (B) + | RXD |
| G | GND | GND | GND |
| A | DATA (A) - | TD (A) - | TXD |
| B | DATA (B) + | TD (B) + | RTS |

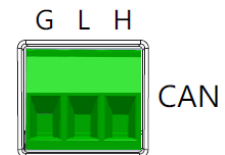


ISOLATED CANBUS

- MCP2515 CAN Controller
- Recommended Cable: Shielded Twisted Pair, 120ohm impedance (Belden 3105A)
- Route multiple device connections as daisy chain, with termination only at endpoints
- Jumper selection for: CAN termination

CAN Terminal Block Connections

| Signal | CANbus signal |
|--------|---------------|
| G | GND |
| L | CANL |
| H | CANH |

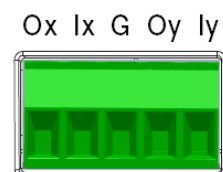


ISOLATED DIGITAL I/O

- Dual isolated blocks A & B, with each block having two (2) inputs and two (2) outputs
- Digital Outputs:
 - Outputs are open drain
 - High Level: up to 60V can be applied to Digital Output
 - Low Level: 1.5V max @ 500mA
- Digital Inputs:
 - Inputs have internal pull-down of 6.8kOhm.
 - High Level: minimum of 5V @ 1mA at the input terminal, 60V @ 10mA max
 - Low Level: maximum of 1V at the input terminal

Digital I/O Terminal Block Connections

| Label | Digital I/O Signal |
|-------|--------------------|
| Ox | Output x |
| Ix | Input x |
| G | Ground |
| Oy | Output y |
| Iy | Input y |



INTERNAL EXPANSION

HAT EXPANSION SLOT

- Support for standard Raspberry Pi HAT boards
- Standard device-tree overlays can be used
- Enclosure expansion rings can be stacked to increase the enclosure height
- HATs have access to full 40pin HAT I/O and alternate functions*

*NOTE: I2C1 Bus (GPIO2/GPIO3) is shared with onboard devices. I2C addresses: 0x33, 0x43, 0x44, 0x51 are reserved for onboard devices

Raspberry Pi HAT Expansion Connector (J8)

| Pin | Signal Name | Signal Name | Pin |
|-----|------------------|---------------|-----|
| 1 | 3.3Vout | 5Vout | 2 |
| 3 | I2C1_SDA (GPIO2) | 5Vout | 4 |
| 5 | I2C1_SCL (GPIO3) | GND | 6 |
| 7 | GPIO4 | GPIO14 | 8 |
| 9 | GND | GPIO15 | 10 |
| 11 | GPIO17 | GPIO18 | 12 |
| 13 | GPIO27 | GND | 14 |
| 15 | GPIO22 | GPIO23 | 16 |
| 17 | 3.3Vout | GPIO24 | 18 |
| 19 | GPIO10 | GND | 20 |
| 21 | GPIO9 | GPIO25 | 22 |
| 23 | GPIO11 | GPIO8 | 24 |
| 25 | GND | GPIO7 | 26 |
| 27 | ID_SD (GPIO0) | ID_SC (GPIO1) | 28 |
| 29 | GPIO5 | GND | 30 |
| 31 | GPIO6 | GPIO12 | 32 |
| 33 | GPIO13 | GND | 34 |
| 35 | GPIO19 | GPIO16 | 36 |
| 37 | GPIO26 | GPIO20 | 38 |
| 39 | GND | GPIO21 | 40 |

MINI-PCIE SLOT (J34)

- Full size mPCIe slot
- Supports USB, SIM, and WWAN LED for optional cellular modem

USB HEADER

- 2x4 header with two USB ports for optional internal USB devices
- Specially designed HATs can use USB

USB Header (J12)

| Pin | Signal Name | Signal Name | Pin |
|-----|-------------|-------------|-----|
| 1 | Vbus | Vbus | 2 |
| 3 | USB1- | USB2- | 4 |
| 5 | USB1+ | USB2+ | 6 |
| 7 | GND | GND | 8 |

SOFTWARE CONFIGURATION

AVNET IMAGE

- Based on Raspbian
- Enables support for TPM for trusted boot
- IoTConnect Cloud solution
- Option to enable secure boot to ensure only signed boot files can be executed (**IMPORTANT! Once secure boot is enabled, only the AVNET IMAGE can be executed on the Gateway!**)

STANDARD RASPBIAN

- Standard Raspbian can be used
- Requires updated device tree: bcm2710-rpi-custom.dtb & dt-blob.bin files in /boot. Also requires additional / updated drivers to support some features. See the www.element14.com/gateway landing page for details.

/IOTCONNECT

- The Avnet image comes configured with our IoTConnect Cloud solution
- A 30-day free trial is provided
- Please visit the web portal (www.element14.com/gateway) for details on how to continue accessing your device over the cloud beyond the free trial period.

COMPLIANCE



CLASS B

- FCC Class B Compliance (USA)
- IC Class B Compliance (Canada)
- CE Class B Compliance (Europe)
- RCM (Australia / New Zealand)
- WPC (India)
- SRRC (China)
- RoHS/WEEE

Simplified EU Declaration of Conformity

Hereby, Avnet Inc., declares that SmartEdge IIoT Gateway is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: element14.com/gateway

| Frequency Range | RF Output Power |
|-------------------|-----------------|
| 2402MHz - 2480MHz | 0.0051 Watts |
| 2412MHz - 2462MHz | 0.2449 Watts |

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information

Unique Identifier

Trade Name: SmartEdge IIoT Gateway

Model No.: AVTSE-RPI-IIOTG

Responsible Party – U.S. Contact Information

Avnet, Inc.

2211 South 47th Street; Phoenix, AZ USA 85034

Phone: 480-643-2000

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.