

# 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 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\*
- \*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
  - Green indicates valid power
  - Red flashing indicates disk activity by default, but configurable
- User LED
  - Controlled from user code

### 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


## EXTERNAL CONNECTIONS

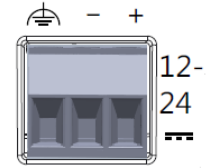


## DC-INPUT

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

### CAN Terminal Block Connections

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



## DUAL ETHERNET PORTS

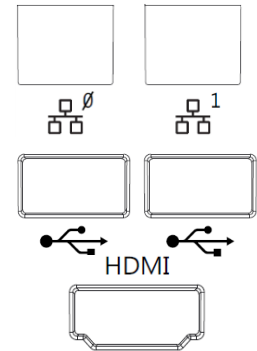
- 10/100 Base-T
- Link / Activity LEDs

## DUAL USB PORTS

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

## DISPLAY CONNECTOR

- HDMI / DVI Compatible

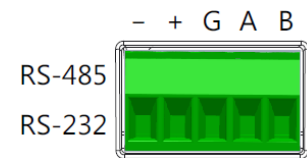


## ISOLATED RS-485 / RS-422 / RS232

- 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

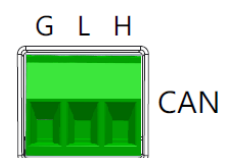


## ISOLATED CANBUS

- 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



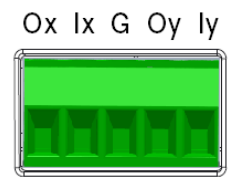
L	CANL
H	CANH

### 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](http://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](http://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 / IC / CE Class B Compliance
- 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](http://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.