EcoStruxure™

Autonomous Production Advisor

Gateway 101

PSS 41H-4APA-GW1

Product Specification

December 2020

Schneider Electric™

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Important Safety Instructions

Read these instructions carefully and look at the equipment to become familiar with it before trying to install, operate, service, or maintain it. The following safety messages might appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a "Danger" or "Warning" safety message indicates that an electrical hazard exists that results in personal injury if the instructions are not followed.

This safety alert symbol that lets you know about potential personal injury hazards. Obey all safety messages with this symbol to avoid possible injury or death.

⚠DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

Failure to follow these instructions will result in death or serious injury.

⚠WARNING

WARNING indicates a hazardous situation that, if not avoided, **could result in** death or serious injury.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠CAUTION

CAUTION indicates a hazardous situation that, if not avoided, **could result in** minor or moderate injury.

Failure to follow these instructions can result in injury or equipment damage.

NOTICE

NOTICE is used to address practices not related to physical injury.

Failure to follow these instructions can result in equipment damage.

Please Note

Electrical equipment should only be installed, operated, serviced, and maintained by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Overview

The EcoStruxure™ Autonomous Production Advisor – Gateway 101 is a Dell OEM (Original Equipment Manufacturer) device that enables edge analytics and machine learning model deployment close to industrial assets.

The device is fully managed by the EcoStruxure™ Autonomous Production Advisor (APA) platform, so you can control application deployment and hardware provisioning tasks to manage a fleet of Gateways.

The Gateway 101 is delivered with the Ubuntu 18.04 LTS operating system and a pre-configured software environment that allows you to deploy applications via the APA platform.

Features

- Aggregates, helps secure, analyzes, and relays data from diverse sensors and equipment at the edge of the network
- Runs applications and machine learning models locally at the device level
- Has a small hardware platform footprint and low power consumption
- Mounts with DIN rails
- Operates in a wide temperature range (-30° C to 70° C [-22° F to 158° F])

Power

The supported power sources, isolated to 2.5 kV, are:
- DC
- Power of Ethernet (PoE)

For more information, see Functional Specifications, page 13.

⚡⚠ WARNING
HAZARD OF ELECTRIC SHOCK
Power off the Gateway 101 before you change the power source. You can connect either DC-IN or PoE.
Failure to follow these instructions can result in minor or moderate injury.

Operating Systems

The Gateway 101 supports the Ubuntu Server 18.04 LTS operating system.

Processor

Configuration	Processor	Cache	Number of Cores
Gateway 101	Intel Atom Processor E3805	1 MB L2 cache	2

Memory

Type	DDR3L
Memory Channel	Single
Minimum Memory	2 GB
Maximum System Memory	2 GB

Storage

Storage Type	Supported Capacity
Micro-SD	• 8 GB • 32 GB • 64 GB • 128 GB
eMMC	• 32 GB

External Ports and Connectors

For more information about the locations of ports and connectors, see the *Autonomous Production Advisor – Gateway 101 Installation and Configuration Guide* (B0794AA).

Use the same connector for both the wireless and GPS antenna.

Port	Gateway 101
RS-232/RS-485/RS-422 ports	2
Ethernet port one (with PoE)	1
WLAN or Bluetooth antenna connector	1
GPS antenna connector	1
Mobile broadband antenna connector (3G)	1
Mobile broadband antenna connector (4G LTE)	1
Connector for external enclosure chassis intrusion switch (optional)	1
GPIO	1

Port	Gateway 101
USB 3.0	1
USB 2.0	1

Sensors

	Pressure Sensor	Relative Humidity and Temperature Sensor	Accelerometer
Controller	ST Micro LPS22HB	ST Micro HTS221	ST Micro LNG2DMTR
Type	n/a	n/a	Three-axis "femto" accelerometer
Temperature Range	-40° C to 85° C (-40° F to 185° F)	-40° C to 120° C (-40° F to 248° F)	n/a
Humidity Accuracy	n/a	± 3.5% rH, 20 to 80% rH	n/a
Temperature Accuracy	n/a	± 0.5° C (32.9° F) 15° C to 40° C (59° F to 104° F)	n/a

Security

Version	2.0 only
Manufacturer Part Number	Nuvoton NPCT654JBAYX
External Enclosure Chassis Intrusion Switch	When the chassis is opened, this switch raises an intruder electrical signal to the Gateway 101, triggering an external enclosure chassis intrusion event.

Communications Specifications

Wireless LAN

WLAN Standards Supported	802.11b, 802.11g, or 802.11n
802.11b Data Rates Supported	54, 48, 36, 24, 18, 12, 9, and 6 Mbps
802.11g Data Rates Supported	54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, and 1 Mbps
802.11n Data Rates Supported	MCS0 to MCS7, with and without Short GI
Encryption	WEP 64-bit and 128-bit, TKIP, AES-CCMP 128-bit

Wireless WAN

Card	**Region**
DW5515–3G	Mexico (also supported in all other countries)
DW5815–4G LTE	AT&T (USA and Canada) and Verizon (USA)
DW5818–LTE, HSPA+	EMEA
DW5819–LTE, HSPA+	Asia Pacific

DW5515 Card

Network	HSPA+/WCMDA
Frequency Bands	• HSPA+/WCMDA band: 1, 2, 5, 6, 8, 19 • EDGE/GPRS frequency: 850, 900, 1800, 1900 MHz
Downlink Speed	<21 Mbps
Uplink Speed	<5.76 Mbps
Fallback Network	EDGE/GPRS
Fallback Speed	• Downlink: <236.8 Kbps • Uplink: <118.4 Kbps
SIM	All

DW5815 Card

Network	LTE/HSPA+
Frequency Bands	• LTE band: 2, 4, 5, 13, 17 • HSPA+/WCMDA band: 2, 5
Downlink Speed	<150 Mbps
Uplink Speed	<50 Mbps
Fallback Network	HSPA+/WCDMA
Fallback Speed	• Downlink: <42 Mbps • Uplink: <5.76 Mbps
SIM	AT&T and Verizon

DW5819 Card

Network	LTE/HSPA+
Frequency Bands	• LTE FDD band: 1, 3, 5, 7, 8, 18, 19, 21, 28 • LTE TDD band: 38, 39, 40, 41 • HSPA+/WCDMA band: 1, 5, 6, 8, 9, 19
Downlink Speed	• LTE FDD <300 Mbps (Cat 6) • LTE TDD <222 Mbps
Uplink Speed	• LTE FDD <50 Mbps • LTE TDD <26 Mbps
Fallback Network	HSPA+/WCDMA
Fallback Speed	• Downlink: <42 Mbps • Uplink: <5.76 Mbps
SIM	All

WWAN Providers and Options

Depending on available network coverage, the Gateway 101 selects the most favorable configuration and automatically switches between LTE and 3G networks. Measurements from network-signaling messages between the Gateway 101 and the WWAN provider determine this switchover process.

WWAN Card	Provider	2G Bands	3G Bands	LTE Bands
DW5515 Sierra Wireless AirPrime HL8548	HSPA+	EDGE/GPRS frequency: 850, 900, 1800, 1900 Mhz	HSPA B1, B2, B5, B6, B8, B19	Not supported
DW5815 Sierra Wireless AirPrime HL7588	AT&T (USA) and Verizon (USA)	Not applicable	B5 (850), B2 (1900)	B17 (700), B13 (700), B5 (850), B4 (1700), B2 (1900)
DW5818 Sierra Wireless AirPrime MC7455	LTE/HSPA +/WCDMA networks	Not applicable	HSPA+/WCDMA Band 1, 2, 3, 4, 5, 8	LTE FDD Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 20, 25, 26, 29, 30 LTE TDD Band 41
DW5819 Sierra Wireless AirPrime MC7430	LTE/HSPA +/WCDMA networks	Not applicable	HSPA+/WCDMA Band 1, 5, 6, 8, 9, 19	LTE FDD Band 1, 3, 5, 7, 8, 18, 19, 21, 28 LTE TDD Band 38, 39, 40, 41

Global Navigation Satellite System (GNSS)

GNSS Specifications

GNSS Chip in Gateway 101	Supported GNSS Systems
u-blox UBX-M8030	Concurrent reception of up to three GNSS systems: GPS (Global Positioning System)/Galileo with BeiDou or GLONASS.

Supported GNSS Constellations

GNSS Constellation	Description
GPS	Receives and tracks GPS L1 C/A signals at 1575.42 MHz.
GLONASS	Receives and tracks GLONASS L1 signals at 1602 MHz + k*562.5 kHz, where k is the satellite's frequency channel number ($k = -7,..., 5, 6$). The GLONASS satellite system is an alternative to GPS.
BeiDou	Receives and tracks BeiDou B1I signals at 1561.098 MHz. The ability to receive and track BeiDou signals with another constellation results in higher coverage, improved reliability, and greater accuracy. BeiDou coverage is only available in China. Global coverage is scheduled for 2020.
Galileo	Receives and tracks Galileo E1-B/C signals centered on the GPS L1 frequency band. GPS and Galileo signals can be processed with either BeiDou or GLONASS signals, enhancing coverage, reliability, and accuracy.

Bluetooth

Bluetooth Standard Supported	Dual-mode Bluetooth 4.0 BLE
Bluetooth Classic	Version 2.1+EDR
Bluetooth Data Rates Supported	Up to 3 Mbps
Bluetooth Low Energy	Yes
Encryption	128-bit

COM Ports

Connector Type	2x5 terminal block
Data Rate	• Up to 1 Mbps in RS-232 • 12 Mbps in RS-422/RS-485

RS-232/RS-422/RS-485

Bus Type	USB 2.0
Connectors	2 x 2x5 terminal blocks (JVE/23N6963-10D00B-15G-2.9)
Power Consumption	20 mA at +3.3 V
Communication Controller	XR21V1412 (controller), SP339E (transceiver)
Data Bits	7, 8, 9
Data Signals	• RS-232: DCD, RXD TXD, DTR, GND, DSR, RTS, CTS, RI • RS-422: TXD+, TXD-, RXD+, RXD-, GND • RS-485: Data+, Data-, GND
FIFO (First In First Out)	• 128 bytes (TX) • 384 bytes (RX)
Flow Control	Hardware (RTS/CTS or DTR/DSR), Software (Xon/Xoff)
Parity	None, Odd, Even, Mark, and Space
Speed/Baudrate	• Up to 1 Mbps in RS-232 • 12 Mbps in RS-422/RS-485
Stop Bits	1, 2
Isolation Protection	Not applicable
ESD Protection	Transceiver 6100-4-2 ± 15 kV (Air), ±8 kV (Contact)
EFT Protection	Not applicable
Surge Protection	Not applicable

General Purpose Input/Output (GPIO)

General Information

Connector Part Number	Anytek KE161351A010G This part number is subject to change. For more information, see http://www.anytek.com.tw.
Temperature Range	-40° C to 115° C (-40° F to 239° F)

GPI Configuration

Logic High	3.5 V to 5 V
Logic Low	0 V to 1.5 V
Input Resistance	1 kΩ between connector and controller
Interrupt Source	Not applicable
Isolation Voltage	1 kV DC, controller to rest of system

GPO Configuration

Output	Open-drain or push-pull 1.6 mA per channel
Supply Voltage	5 V DC
Isolation Voltage	1 kV DC, controller to rest of system No V_{DD} pin on connector

GPIO Specifications

Name	Default Setting	Default Internal Pull-up and Pull-down
GPI0~7	85 kΩ pull-down	Not applicable
GPO0~7	85 kΩ pull-down	Open-drain or push-pull output pin

GPIO Electrical Specifications

Voltage/Current	Minimum	Maximum
Input Low Voltage (V_{il})	n/a	1.5 V
Input High Voltage (V_{ih})	3.5 V	n/a
Output Low Voltage (V_{ol})	n/a	0.4 V
Output High Voltage (V_{oh})	4.8 V	n/a
Output Sink/Source Current	n/a	1.6 mA

NOTICE

ELECTROSTATIC DISCHARGE (ESD) HAZARD

The GPIO is ESD-sensitive. We recommend using an insulated GPIO connector that prevents direct ESD exposure to the I/O pins.

Failure to follow these instructions can result in equipment damage.

Functional Specifications

Power Consumption (From DC or PoE)

Maximum Power Consumption	12.9 W
System Idle	0.2 W Operating system is active, but no applications are running.
Processor Full Load	8.1 W Operating system active with 100% processor utilization and 2D/3D load.
System Full Load	12.9 W Operating system active with 100% processor utilization and simultaneous access to I/O devices.

DC Parameters

Supported Input Voltage	12/24 Vdc vehicle power system (12 ... 57 Vdc wide DC input, ISO 7637-2 & SAE J1113 compliant). Supports vehicle cold-crank down to 6 Vdc.
Rated DC Input for Marine Environments	12–48 Vdc
Maximum Input Current	1.08 A at 12 Vdc / 0.23 A at 57 Vdc
Minimum DC Supply Power Requirement	13 W
Power Management	System power-on, standby, and hibernate management through optional ignition input.
Supported Wake Up Events	• Alarm (real-time clock) • WLAN and LAN (Windows OS only) • USB • Ignition and Direct Ignition (DI)
Power Protection	System power protection. For example, vehicle battery protection through optional ignition input. Ignition input provides an option to turn off the device or put it into a low-power mode (depending on the OS) whenever the vehicle ignition is turned off. This helps prevent vehicle battery draining.
Recommended Power Supply	17 W (20% derating) with consideration of voltage derating under high environmental temperature.

PoE Parameters

Compatibility	• IEEE 802.3 • IEEE 802.3u • IEEE802.3ab • IEEE802.3x • IEEE 802.3af Complies with Alternative A of IEEE 802.3af standard for maximum 15.4 W, with power up to 48 Vdc over existing Ethernet infrastructure. No modifications are required. Standard IEEE 802.3 Ethernet interface provided for 100BASE-TX and 10BASE-T applications (802.3, 802.3u, 802.3ab, and 802.3x) 9014-bytes jumbo frame support.
Number of Ports	One Fast Ethernet Media Access Control (MAC) port and one physical layer (PHY) port.
Speed	10/100 Mbps (supports Wake on LAN and WLAN)
Connector	8-pin RJ45
Protection	Built-in 2.25 kV isolation protection on LAN ports and ESD IEC61000-4-2 ±30 kV
Power Input	12.95 W minimum according to Alternative A of IEEE 802.3af-2003 (standard)
Supported Input Voltage	48 Vdc
Supported Input Current	0.27 A

Ignition Parameters

Parameter	Minimum Voltage	Maximum Voltage	Default
High-level input voltage (V_{IH})	9 Vdc	32 Vdc	12 Vdc
Low-level input voltage (V_{IL})	0 Vdc	1.2 Vdc	0 Vdc

Coin Cell Battery Parameters

Type	BR-2032
Manufacturer	Panasonic Corporation
Nominal Voltage	3 Vdc
Nominal Capacity	200 mAh

Environmental Specifications

	Operating	Non-Operating
Temperature Range (System)[a]	• With 0.7 m/s airflow: -30° C to 75° C (-22° F to 167° F) • Without airflow: -30° C to 70° C (-22° F to 158° F)	With a maximum temperature gradation of 15° C (59° F) per hour: • With 0.7 m/s airflow: -30° C to 75° C (-22° F to 167° F) • Without airflow: -30° C to 70° C (-22° F to 158° F)
Temperature Range (with Components)[a]	• Operating (SD card): -40° C to 85° C (-40° F to 185° F) • Operating (eMMC): -40° C to 85° C (-40° F to 185° F)	n/a
Maximum Relative Humidity	10% to 90% with a maximum temperature gradation of 15° C (59° F) per hour	5% to 95% with a maximum temperature gradation of 20° C (68° F) per hour
Maximum Vibration	• 5 Hz with 0.0002 G^2/Hz • 350 Hz with 0.0002 G^2/Hz Operational values are based on the 0.26 Grms profile. These values are tested for all operational orientations and are retrieved from 2 minutes per test orientation with IO meter. All screws on the Gateway 101 are embedded with a Nylock seal to resist vibration and loosening.	• 10 Hz with 0.003 G^2/Hz • 20 Hz with 0.01 G^2/Hz • 250 Hz with 0.01 G^2/Hz Non-operational values are based on the 1.54 Grms profile. These values are tested for all non-operational orientations and are retrieved every 60 minutes per test orientation with IO meter.
Long-life Vibration	0.79 Grms The values are tested for all operational orientations and are retrieved every 5 hours per test orientation with IO meter.	n/a
Maximum Shock	Half sine shock All operational orientations; 40 G ± 5% with pulse duration of 2 msec ± 10% (equivalent to 20 in/sec [51 cm/sec])	Half sine shock Tested on all six sides; 160 G ± 5% with pulse duration of 2 msec ± 10% (equivalent to 50 in/sec [127 cm/sec])
Maximum Altitude	-15.20 m to 5,000 m (-50 ft to 16,404 ft) The maximum temperature is derated 1°C/305 m (33.8° F/1,000 ft) above sea level altitude.	-15.20 m to 10,668 m (-50 ft to 35,000 ft)
Pollution Degree	2	
BFR/PVC Free	No	
Agency Certifications	• Ingress protection rating: IP50 • Water and dust ingress: IEC 60529	
(a) The ambient temperature is based on the free-air environment, system mounting, and workload. For optimal air circulation, we recommend 63.50 mm (2.50 in) of space around the Gateway 101. The maximum operating temperature may vary depending on factors such as air flow, system mounting, and software applications. For optimal thermal distribution when mounted, verify that the Gateway 101 is installed as instructed in the supplied documentation.		

NOTICE

HAZARD OF EQUIPMENT DEGRADATION OR DAMAGE

Ensure that the maximum operating temperature of a Gateway 101 placed inside an enclosure is 70º C (158° F) or less. Continuous operation of the Gateway 101 at temperatures exceeding 70º C (158° F) may result in an increased failure rate and a reduction of the product life.

Failure to follow these instructions can result in equipment damage.

NOTE: Internal heating of the Gateway 101 electronics, other electronics, and the lack of ventilation inside an enclosure can cause the operating temperature of the Gateway 101 to be greater than the outside ambient temperature.

NOTICE

HAZARD OF EQUIPMENT DEGRADATION OR DAMAGE

Install the Gateway 101 in an area that is not exposed to direct sunlight. For outdoors and rugged environments, install the Gateway 101 in an external enclosure (sold separately).

Failure to follow these instructions can result in equipment damage.

NOTE: The Gateway 101 underwent, and complies with, salt fog testing, according to Mil-Std-810G Method 509.5, Procedure 1.

Physical Specifications

Gateway 101

	Gateway 101	Gateway 101 with Packaging[a]
Height	125 mm (4.92 in)	262 mm (10.32 in)
Width	125 mm (4.92 in)	139 mm (5.47 in)
Depth	51 mm (2.0 in)	241 mm (9.49 in)
Weight	1 kg (2.20 lb)	1.71 kg (3.77 lb)
Volume	0.8 L	n/a
(a) The packaging weight includes the total weight of the Gateway 101 and four antennas. Antennas are included in the accessory box shipped with the Gateway 101.		

Mounting

	DIN Mount[a]	Perpendicular Mount[a]
Height	125 mm (4.92 in)	125 mm (4.92 in)
Width	125 mm (4.92 in)	143.5 mm (5.65 in)
Depth	59.2 mm (2.33 in)	55.5 mm (2.18 in)
(a) Mounting dimensions include the dimensions of the Gateway 101 and various mounting options. Each mounting option is sold separately.		

Related Documents

Document Number	Description
B0794AA	*Autonomous Production Advisor – Gateway 101 Installation and Configuration Guide*
B0794AB	*Autonomous Production Advisor – Platform User's Guide*
B0794AD	*Autonomous Production Advisor – Rod Pump Analytics Application User's Guide*

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