

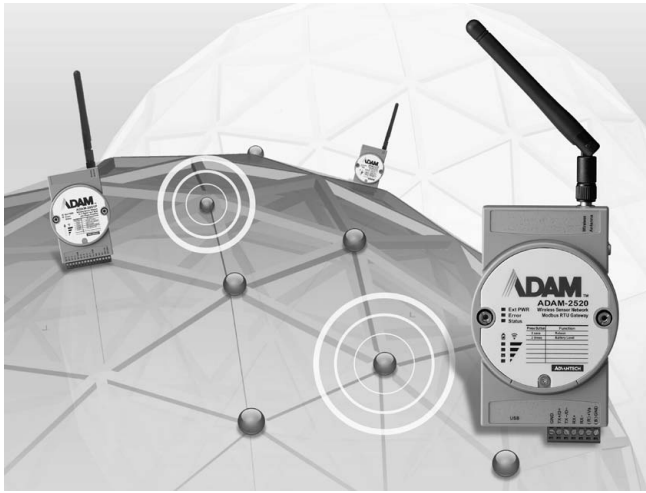
M2M I/O Modules

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To view all of Advantech's M2M I/O Modules, please visit www.advantech.com/products.



M2M I/O Modules Overview



Introduction

The Internet of Things (IoT) is a new design paradigm, rapidly gaining wide global attention from academia, industry, and government. The fundamental concept is to emphasize ubiquitous computing among global networked machines and physical objects, denoted as things, such as sensors, actuators, machine-to-machine (M2M) devices, wireless sensor network (WSN) devices etc..

Machine To Machine (M2M) Technology

Machine To Machine (M2M) technology is now sufficiently mature that large numbers of companies are confident enough in its potential to launch their own projects that include innovation in services and products. The use of M2M technology is particularly well-suited to interaction with a large number of remote, and possibly mobile, devices, usually acting as the interface with an end-user.

Wireless Sensor Networks

The IoT is composed of four layers, an application layer, service layer, network layer and device layer. The application layer is the real application system, the service layer is now defined as cloud computing and the network layer is the wired/wireless network infrastructure. The device layer connects everything to the internet and is the key infrastructure of the IoT. One of the most important technologies is the Wireless Sensor Network, which is the wireless I/O and sensor solution/interface to collect and transmit analog/digital signals to the internet. The WSN is composed of two major parts; the wireless technology is based on IEEE 802.15.4 with many protocols, such as ZigBee, 6LoWPAN, WirelessHART. With different types of I/Os and sensors, signals can be measured in every situation. For instance, bridges can be measured through strain gauges, and buildings can be measured for energy usage. WSN is the next generation of wireless data acquisition solution.

Application Layer



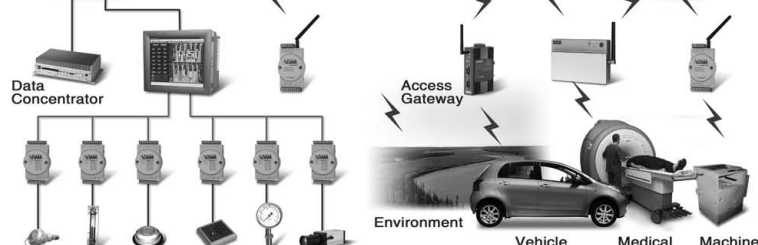
Service Layer



Network Layer



Device Layer



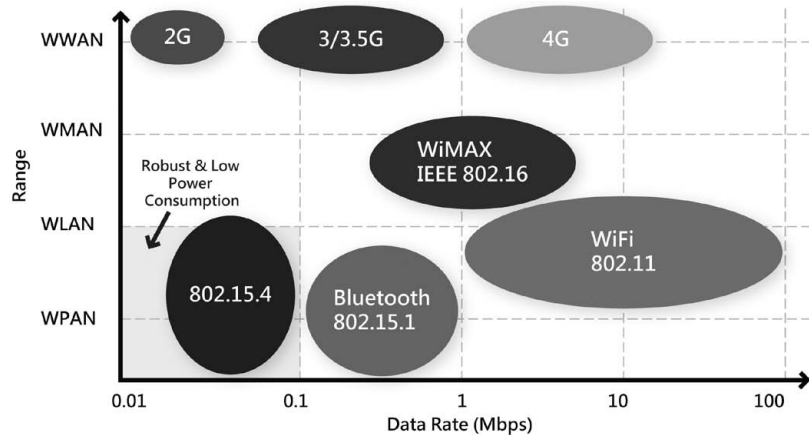
Advantech's IoT-ready Product Development Framework

IEEE 802.15.4

IEEE 802.15.4 is defined and maintain by the IEEE organization. The standard intends to offer fundamental lower network layers of low-rate wireless personal area networks (WPANs) which focuses on low-data rate, low-power consumption ubiquitous wireless communication between devices. IEEE 802.15.4 conforming devices may use one of three possible unlicensed frequency bands for operation:

- 868.0-868.6 MHz: Europe, allows one communication channel.
- 902-928 MHz: North America, up to ten channels, extended to thirty.
- 2400-2483.5 MHz: worldwide use, up to sixteen channels.

IEEE 802.15.4 defines the Wireless Medium Access Control (MAC) and Physical Layer (PHY) for WPANs only, upper layer stacks can be implemented by users for variety of applications. One example of the known protocols is ZigBee.



Network Topologies

Wireless Sensor Networks (WSN) can be built using a few or a lot of "nodes". Each node can be connected to one or several sensors; the network topology is composed of three typical components, PAN Coordinator/Gateway, Router and End Device (or called End Node), which can be built to Star, Tree and Mesh network topologies.

Three components of a wireless sensor network

PAN Coordinator/Gateway

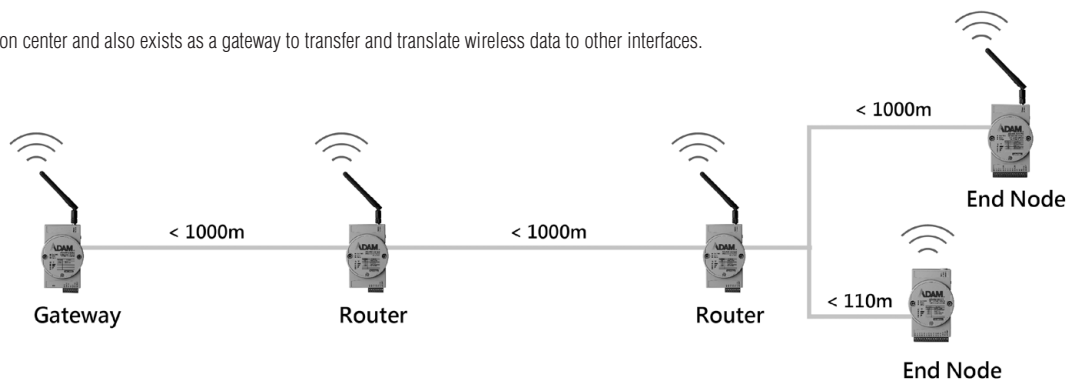
A coordinator is the data collection center and also exists as a gateway to transfer and translate wireless data to other interfaces.

Router

A router enhances the wireless signal and a wireless router is used to select the optimal path for wireless communication between the coordinator and the end nodes.

End Node/Device

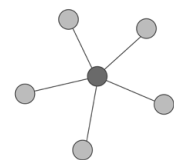
An end node is a wireless remote I/O for data acquisition. Data is acquired from sensors or devices which are then transmitted through it. The end node communicates with the coordinator directly or via a router to a coordinator.



Three Network Topologies

Star Topology

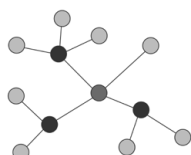
It's the simplest way to construct a network with a gateway and end nodes. The benefit of the topology is that it operates as a low-latency communication network. But has the limitation of low wireless signal coverage.



● WSN End Node
● WSN Gateway

Tree Topology

Using a tree topology, the network can be extended through routers making it flexible enough to locate the end nodes in specified locations. Latency is increased with the number of routers hopping.



● WSN End Node
● WSN Gateway
● WSN Router

Mesh Topology

When routers connect to each other in a mesh topology they have the following benefits.

1. Wide network coverage.
2. Robust routing mechanism with self-healing.
3. Multi-hopping mechanism.

But also the following limitations:

1. More power consumption than the other topologies.
2. Routing path and hop counts affect the latency and performance.



● WSN End Node
● WSN Gateway
● WSN Router

Comparison of Topologies

Topology	Star	Tree	Mesh
Power Consumption	Low	Medium	High
Installation Fee	Low	Medium	High
Network Coverage	Small	Large	Large
Network Capability	Small	Large	Large
Reliability	Low	Low	High

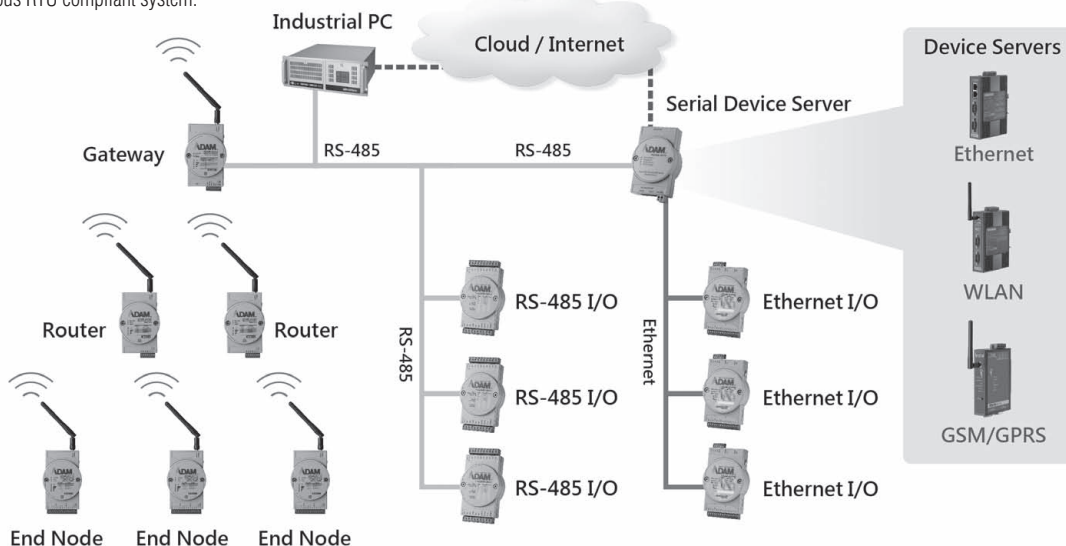
M2M I/O Modules Overview

ADAM-2000 Series

Advantech provides ADAM-2000 series industrial grade Wireless Sensor Network I/O solutions for low-power consumption, cost-efficient and reliable networking for remote monitoring applications. It utilizes IEEE 802.15.4 wireless technology and supports star, tree and mesh topologies. Once the modules are configured, the ADAM-2000 series will automatically construct the most suitable network topology for your control system without further configuration.

The ADAM-2000 series contains several models, including coordinator (gateway), router, analog input, digital input, relay output and sensor modules. To perform as a Wireless Sensor Network, a gateway ADAM-2520Z is essential for collecting data from end nodes. With the Modbus RTU protocol, the ADAM-2000 series can be easily integrated into any SCADA or Modbus RTU compliant system.

- **ADAM-2520Z:** Wireless Modbus RTU Gateway
- **ADAM-2510Z:** Wireless Router Node
- **ADAM-2017Z:** Wireless 6-ch Analog Input Node
- **ADAM-2018Z:** Wireless 6-ch Thermocouple Input Node
- **ADAM-2031Z:** Wireless Temperature & Humidity Sensor Node
- **ADAM-2632Z:** Wireless Temperature & Humidity & CO2 Sensor Node
- **ADAM-2051Z:** Wireless 8-ch Digital Input Node
- **ADAM-2051PZ:** Wireless 8-ch Digital Input Node with Power Amplifier



Features

Advantech's ADAM-2000 Series are wireless I/O devices designed for industrial systems and applications.



2.4GHz IEEE 802.15.4

Global Deployable ISM 2.4GHz IEEE 802.15.4 Standard

The standard has the following benefits.

- With the global deployable ISM 2.4 GHz RF band, the ADAM-2000 series can be installed worldwide.
- Compared to a wired solution, wireless technology makes the network easily extendible and can be installed in almost any location, especially in distributed construction applications.
- Enhances transmission power and high gain antennas can expand network coverage.
- Enlarges highly effective network structure to reduce development costs and maintainable complexity in harsh applications.
- Provides self-forming and self-healing ability to cope with communication failures or node failures conditions.
- Low data rates and low duty cycles make it possible to act as standalone devices with batteries for a long term operation without maintenance.



Industrial Communication and I/O Interfaces

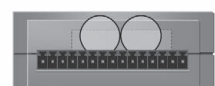
The popular industrial communication protocol Modbus makes the ADAM-2000 series easy to integrate with industrial systems and is also compliant with ADAM-4000 and ADAM-6000 wired solutions. Multiple I/O interface selection provides users plentiful sensor options.



Low-power Consumption

Low Power Consumption Design

The ADAM-2000 series is designed for applications that require long-time operation without maintenance. Therefore power consumption is taken into consideration during its design. The ADAM-2000 series not only follows the IEEE-802.15.4 standard for low-power consumption wireless communication, but also optimizes the peripheral hardware and firmware design to achieve uA-level power consumption. This allows ADAM-2000 input/output and sensor modules to be powered by 2 AA Alkaline batteries.



Overview

WebAccess SCADA Software Support

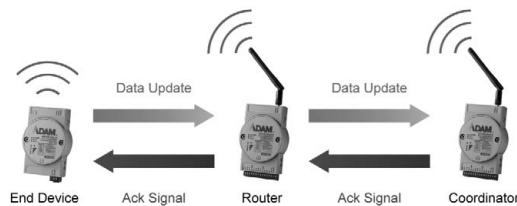
Advantech and Industrial SCADA Software Support

The ADAM-2000 series can be configured through the Adam/Apax .NET Utility. Only a few steps are required, and wireless networks can be built up quickly. Due to the Modbus protocol design, the ADAM-2000 series can support any third-party SCADA software and HMI, including Advantech SCADA software, WebAccess.



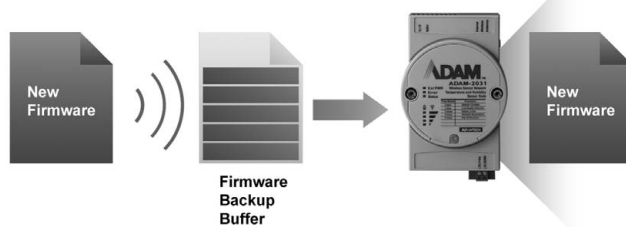
Ensured Data Design

The ADAM-2000 family has an acking mechanism feature to ensure data communicating processes can be successfully transferred between the coordinator and end device before device entering sleep mode.



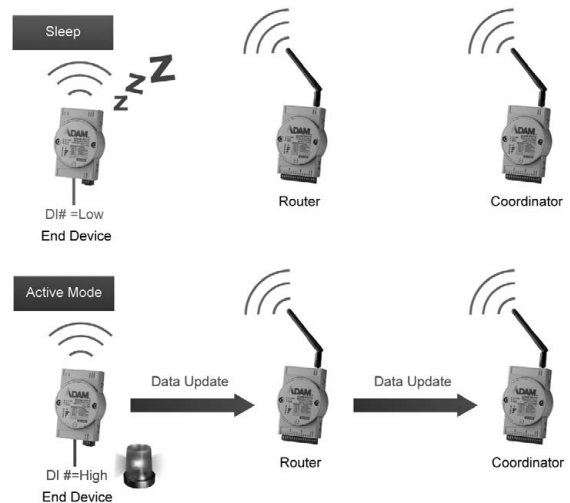
Over The Air (OTA) Firmware Update

The ADAM-2000 modules with strengthened firmware maintenance technique, which integrates a stable backup buffer and secure mechanism allowing wireless module firmware updates during operation.



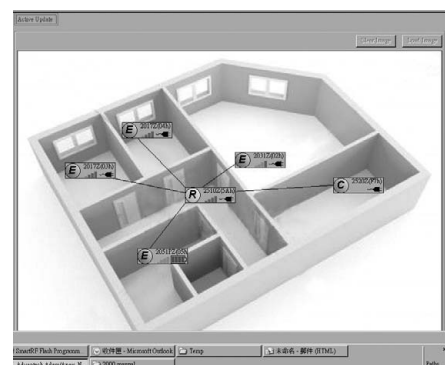
Event Triggering

ADAM-2000 digital input modules are empowered with an Event Triggering function. When receiving DI status change, ADAM-2000 digital input modules will wake up immediately from sleep mode and send I/O data to a coordinator. This avoids the missing of events during operation.



Site Survey Monitoring

The ADAM-2000 modules provide an useful site survey tool in Adam/Apax .Net utility to help users to achieve network setup and major remote maintenance tasks to avoid try and error network processes. The topology monitoring of an ADAM-2000 network adopts an easy place and drag action allowing users to choose the working field image for monitoring backgrounds, and lists the relations among ADAM-2000 modules then illustrated in a single page. Through site survey monitoring, users can comprehensively know each device location, current status, and information in customized background.



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- 3 Energy Automation
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M2M I/O Modules Selection Guide



Model		ADAM-2510Z	ADAM-2520Z	ADAM-2031Z
Wireless Network	IEEE Standard	IEEE 802.15.4		
	Modulation Type	DSSS (OQPSK)		
	Frequency Band	ISM 2.4 GHz (2.4 GHz ~ 2.4835 GHz)		
	Channels	11 ~ 26		
	Topology	Star / Tree / Mesh		
	Transmit Power	19 ± 1 dBm	19 ± 1 dBm	3 ± 1 dBm
	Receiver Sensitivity	-97 dBm		
	Outdoor Range	1000 m (with 2 dBi Antenna)		110 m
	RF Data Rate	250 Kbps		
	Function	Router	Coordinator	End Device
Network	Interface	-	RS-485/USB	-
	Communication Protocol	-	Modbus RTU	-
Analog Input	Resolution	-	-	-
	Channels	-	-	-
	Sampling Rate	-	-	-
	Voltage Input	-	-	-
	Current Input	-	-	-
Thermocouple Type		-	-	-
Digital Input and Digital Output	Input Channels	-	-	-
	Output Channels	-	-	-
Sensor Input	Temperature	-	-	-20°C ~ 70°C (-4°F ~ 157.9°F)
	Humidity	-	-	0 ~ 100% RH
	CO2	-	-	-
LED Indicator		External PWR/Error/Status/Level Index		
Power Requirement		Power Input: Unregulated 10 ~ 30 V _{DC} Battery Input: 2 x AA Alkaline 3 V _{DC}		
Operating Temperature	External Power	-20°C ~ 70°C (-4°F ~ 157.9°F)		
	Battery Power	0°C ~ 50°C (32°F ~ 122°F)		
Power Consumption	Power Supply	0.8 W @ 24 V _{DC}		0.3 W @ 24 V _{DC}
	USB	-	0.5 W @ 5 V _{DC}	-
	Battery AA * 2	0.3 W @ 3 V _{DC}		420 uW @ 3 V _{DC} (1 minute Tx Interval) 240 uW @ 3 V _{DC} (2 minute Tx Interval) 150 uW @ 3 V _{DC} (5 minute Tx Interval)
Storage Temperature		-40°C ~ 85°C (-40°F ~ 184°F)		
Operation Humidity		20~95% RH		
Storage Humidity		0~95% RH		
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M2M I/O Modules Selection Guide



ADAM-2632Z	ADAM-2017Z	ADAM-2018Z	ADAM-2051Z	ADAM-2051PZ
IEEE 802.15.4				
DSSS (OQPSK)				
ISM 2.4 GHz (2.4 GHz ~ 2.4835 GHz)				
11 - 26				
Star / Tree / Mesh				
19 ± 1 dBm	3 ± 1 dBm	3 ± 1 dBm	3 ± 1 dBm	19 ± 1 dBm
-97 dBm				
1000m		110 m		1000m
250 Kbps				
End Device				
-	-	-	-	-
-	-	-	-	-
-	16-bit		-	-
-	6 Non-Isolation (Differential)		-	-
-	12 samples/second (total)		-	-
-	±150mV,±500mV ±1V,±5V,±10V	±150mV,±500mV,±1V	-	-
-	±20mA,0~20mA,4~20 mA		-	-
-	-	J, K, T, E, R, S, B	-	-
-	-	-	8	8
-	-	-	-	-
-10°C ~ 50°C (14°F ~ 122°F)	-	-	-	-
0~100%PH	-	-	-	-
350 ~ 10,000ppm of CO2	-	-	-	-
External PWR/Error/Status	External PWR/Error/Status/Level Index			
Power Input:Unregulated 10 ~ 30 V _{DC} Battery Input: 2 x AA Alkaline 3 V _{DC}				
-10°C ~ 50°C (14°F ~ 122°F)	-20°C ~ 70°C (-4°F ~ 157.9°F)			
0°C ~ 50°C (32°F ~ 122°F)				
0.3 W @ 24 V _{DC}				
-	-	-	-	-
420 uW @ 3 V _{DC} (1 minute Tx Interval) 240 uW @ 3 V _{DC} (2 minute Tx Interval) 150 uW @ 3 V _{DC} (5 minute Tx Interval)			380 uW @ 3 V _{DC} (1 minute Tx Interval) 220 uW @ 3 V _{DC} (2 minute Tx Interval) 130 uW @ 3 V _{DC} (5 minute Tx Interval)	
-40°C~ 85°C (-40°F ~ 184°F)				
20~95% RH				
0~95% RH				
14-10	14-11	14-11	14-12	14-12

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Energy Automation

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ADAM-2510Z

Wireless Router Node

NEW



R&TTE SRRC FCC CE RoHS

Features

- Easy maintenance and field installation
- Low duty wireless communication
- Smart and simple indicator design
- Extends network range and coverage
- Outdoor range up to 1000 m
- Supports battery input with 2 x AA Alkaline batteries

Specifications

Wireless Communication

- **IEEE Standard** IEEE 802.15.4
- **Modulation Type** DSSS (OQPSK)
- **Frequency Band** ISM 2.4 GHz (2.4 GHz ~ 2.4835 GHz)
- **Channels** 11 - 26
- **RF Data Rate** 250 Kbps
- **Transmit Power** Typ. 19 ± 1 dBm
- **Receiver Sensitivity** -97 dBm
- **Topology** Star / Tree / Mesh
- **Outdoor Range** 1000 m (with 2 dBi Antenna)
- **Function** Router

General

- **Connectors** 1 x plug-in terminal block (#14 ~ 22 AWG)
- **Power Input** Unregulated 10 ~ 30 V_{DC}
- **Battery Input** 2 x AA Alkaline
- **Power Consumption** 0.8 W @ 24 V_{DC}
0.3 W @ 3 V_{DC} (Battery AA * 2)

Common Specifications

Environment

- **Operating Temperature**
 - External Power -20°C ~ 70°C (-4°F ~ 157.9°F)
 - Battery Power 0°C ~ 50°C (32°F ~ 122°F)
- **Storage Temperature** -40°C ~ 85°C (-40°F ~ 184°F)
- **Operating Humidity** 20~95% RH
- **Storage Humidity** 0~95% RH

Ordering Information

- **ADAM-2510Z** Wireless Router Node

ADAM-2520Z

Wireless Modbus RTU Gateway

NEW



R&TTE SRRC FCC CE RoHS

Specifications

Wireless Communication

- **IEEE Standard** IEEE 802.15.4
- **Modulation Type** DSSS (OQPSK)
- **Frequency Band** ISM 2.4 GHz (2.4 GHz ~ 2.4835 GHz)
- **Channels** 11 - 26
- **RF Data Rate** 250 Kbps
- **Transmit Power** Typ. 19 ± 1 dBm
- **Receiver Sensitivity** -97 dBm
- **Topology** Star / Tree / Mesh
- **Outdoor Range** 1000 m (with 2 dBi Antenna)
- **Network Capacity** 32 nodes (Routers & End Devices)*
*Based on user's configuration
- **Range Extenders** Maximum 5 Hops
- **Function** Coordinator

General

- **Connectors** 1 x plug-in terminal block (#14 ~ 22 AWG)
1x USB-type A connector (type A to B cable provided)
- **Protocol** Modbus RTU
- **Power Input** Unregulated 10 ~ 30 V_{DC}
- **Battery Input** 2 x AA Alkaline
- **Power Consumption** 0.8 W @ 24 V_{DC}
0.5 W @ 5 V_{DC} (USB)
0.3 W @ 3 V_{DC} (Battery AA * 2)

Features

- 2.4 GHz IEEE 802.15.4 compliant RF
- Provides RS-422/485 and USB interfaces
- Multiple power input design
- Outdoor range up to 1000 m
- Supports battery input with 2 x AA Alkaline batteries

Common Specifications

Environment

- **Operating Temperature**
External Power -20°C ~ 70°C (-4°F ~ 157.9°F)
Battery Power 0°C ~ 50°C (32°F ~ 122°F)
- **Storage Temperature** -40°C ~ 85°C (-40°F ~ 184°F)
- **Operating Humidity** 20~95% RH
- **Storage Humidity** 0~95% RH

Ordering Information

- **ADAM-2520Z** Wireless Modbus RTU Gateway

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DAQ Boards

ADAM-2031Z

ADAM-2632Z

Wireless Temperature & Humidity Sensor Node

Wireless Temperature & Humidity & CO2 Sensor Node

NEW



ADAM-2031Z

R&TTE SRRC FCC CE RoHS

Specifications

Temperature Sensor Input

- Operating Range -20°C ~ 70°C (-4°F ~ 157.9°F)
- Resolution 0.02°C (0.04°F)
- Accuracy ±1.0°C (33.8°F) (±0.5°C @ 0 ~ +35°C)
- Repeatability ±0.1°C (0.4°F)
- Response Rate ±1°C/min.
- Long Term Drift < 0.04°C/Year (0.07°F/Year)

Humidity Sensor Input

- Operating Range 0 ~ 100% RH
- Resolution 0.15% RH
- Accuracy ±3.0% RH
- Repeatability ±0.1% RH
- Response Time 8 seconds (Achieving 63% of a step function)
- Long Term Drift 0.5% RH/Year

Ordering Information

- ADAM-2031Z Wireless Temperature & Humidity Sensor Node

NEW



ADAM-2632Z

R&TTE SRRC FCC CE RoHS

Specifications

Temperature Sensor Input

- Operating Range -10°C ~ 50°C (14°F ~ 122°F)
- Resolution 0.02°C (0.04°F)
- Accuracy ±0.3°C
- Response Time 5 ~ 30s
- Long Term Drift < 0.04°C/yr

Humidity Sensor Input

- Operating Range 0 ~ 100% RH
- Resolution 0.15% RH
- Accuracy ±3.0% RH
- Repeatability ±0.1% RH
- Response Time 8 seconds (Achieving 63% of a step function)
- Long Term Drift 0.5% RH/Year

CO2 Sensor Input

- Resolution 12 Bit (CC2530 ADC, ENOB)
- Conversion / Response Time 132μs (CC2530 ADC) / 1.5 ~ 2.5 min
- Operating Range 350 ~ 10,000ppm of CO2
- Operating Cond. -10°C ~ +50°C, 5 ~ 95%RH

Ordering Information

- ADAM-2632Z Wireless Temperature & Humidity & CO2 Sensor Node

Common Specifications

Wireless Communication

- IEEE Standard IEEE 802.15.4
- Modulation Type DSSS (OQPSK)
- Frequency Band ISM 2.4 GHz (2.4 GHz ~ 2.4835 GHz)
- Channels 11 ~ 26
- RF Data Rate 250 Kbps
- Transmit Power ADAM-2031Z: Typ. 3 ± 1 dBm
ADAM-2632Z: Typ. 19 ± 1 dBm
- Receiver Sensitivity -97 dBm
- Topology Star / Tree / Mesh
- Outdoor Range ADAM-2031Z: 110 m
ADAM-2632Z: 1000 m
- Function End Device

General

- Connectors 1 x plug-in terminal block (#14 ~ 22 AWG)
- Power Input Unregulated 10 ~ 30 V_{DC}
- Battery Input 2 x AA Alkaline
- Power Consumption 0.3 W @ 24 V_{DC}
Battery AA * 2
420 uW @ 3 V_{DC} (1 minute Tx Interval)
240 uW @ 3 V_{DC} (2 minute Tx Interval)
150 uW @ 3 V_{DC} (5 minute Tx Interval)

Environment

- Operating Temperature External Power ADAM-2031Z : -20°C ~ 70°C (-4°F ~ 157.9°F)
ADAM-2632Z : -10°C ~ 50°C (14°F ~ 122°F)
Battery Power 0°C ~ 50°C (32°F ~ 122°F)
- Storage Temperature -40°C ~ 85°C (-40°F ~ 184°F)
- Operating Humidity 20~95% RH
- Storage Humidity 0~95% RH

ADAM-2017Z

ADAM-2018Z

Wireless 6-ch Analog Input Node

Wireless 6-ch Thermocouple Input Node

NEW



ADAM-2017Z

R&TTE SRRC FCC CE RoHS

Specifications

Analog Input

- Channels: 6 Non-Isolation (Differential)
- Input Max Voltage: $\pm 15V$
- Common Mode Volts: $10 V_{DC}$
- Input Impedance: $>10 M\Omega$ (Voltage), 120Ω (Current)
- Input Type: mV, V, mA
- Input Range: $\pm 150mV, \pm 500mV, \pm 1V, \pm 5V, \pm 10V, \pm 20mA, 0\sim 20mA, 4\sim 20 mA$
- Accuracy: $\pm 0.1\%$ or better (Voltage) or $\pm 0.2\%$ or better (Current) at $25^{\circ}C$
- Span Drift: $\pm 25 ppm/^{\circ}C$
- Zero Drift: $\pm 6 \mu V/^{\circ}C$
- Resolution: 16-bit
- Sampling Rate: 12 samples/second (total)
- CMR @ 50/60 Hz: 100 dB
- NMR @ 50/60 Hz: 65 dB

Ordering Information

- ADAM-2017Z: Wireless 6-ch Analog Input Node

NEW



ADAM-2018Z

R&TTE SRRC FCC CE RoHS

Specifications

Analog Input

- Channels: 6 Non-Isolation (Differential)
- Input Max Voltage: $\pm 1V$
- Common Mode Volts: $10 V_{DC}$
- Input Impedance: $>10 M\Omega$ (Voltage), 54Ω (Current)
- Input Type: V, mV, mA (Configure Different Range for Each Channel)
- T/C Types and Temperature Ranges

Type	Range
J	$-210^{\circ}C \sim 1200^{\circ}C$
K	$-270^{\circ}C \sim 1372^{\circ}C$
T	$-270^{\circ}C \sim 400^{\circ}C$
E	$-270^{\circ}C \sim 1000^{\circ}C$
R	$-50^{\circ}C \sim 1768^{\circ}C$
S	$-50^{\circ}C \sim 1768^{\circ}C$
B	$200^{\circ}C \sim 1820^{\circ}C$

- Input Range: Voltage Range: $\pm 150mV, \pm 500mV, \pm 1V$
Current Range: $\pm 20mA, 0\sim 20mA, 4\sim 20 mA$
Thermocouple Range: J, K, T, E, R, S, B
- Accuracy: $\pm 0.1\%$ or better (Voltage) at $25^{\circ}C$
 $\pm 0.2\%$ or better (Current) at $25^{\circ}C$
 $\pm 2^{\circ}C$ or better (Thermocouple) at $25^{\circ}C$
- Span Drift: $\pm 30 ppm/^{\circ}C$
- Zero Drift: $\pm 6 \mu V/^{\circ}C$
- Resolution: 16-bit
- Sampling Rate: 12 samples/second (total)
- CMR @ 50/60 Hz: 100 dB
- NMR @ 50/60 Hz: 65 dB

Ordering Information

- ADAM-2018Z: Wireless 6-ch Thermocouple Input Node

Common Specifications

Wireless Communication

- IEEE Standard: IEEE 802.15.4
- Modulation Type: DSSS (OQPSK)
- Frequency Band ISM: 2.4 GHz (2.4 GHz ~ 2.4835 GHz)
- Channels: 11 ~ 26
- RF Data Rate: 250 Kbps
- Transmit Power Typ.: $3 \pm 1 dBm$
- Receiver Sensitivity: $-97 dBm$
- Topology: Star / Tree / Mesh
- Outdoor Range: 110 m
- Function: End Device

General

- Connectors: 1 x plug-in terminal block (#14 ~ 22 AWG)
- Power Input: Unregulated $10 \sim 30 V_{DC}$
- Battery Input: 2 x AA Alkaline
- Power Consumption: $0.3 W @ 24 V_{DC}$
Battery AA * 2
 $420 uW @ 3 V_{DC}$ (1 minute Tx Interval)
 $240 uW @ 3 V_{DC}$ (2 minute Tx Interval)
 $150 uW @ 3 V_{DC}$ (5 minute Tx Interval)

Environment

- Operating Temperature: External Power $-20^{\circ}C \sim 70^{\circ}C$ ($-4^{\circ}F \sim 157.9^{\circ}F$)
Battery Power $0^{\circ}C \sim 50^{\circ}C$ ($32^{\circ}F \sim 122^{\circ}F$)
- Storage Temperature: $-40^{\circ}C \sim 85^{\circ}C$ ($-40^{\circ}F \sim 184^{\circ}F$)
- Operating Humidity: 20~95% RH
- Storage Humidity: 0~95% RH

- 1 Motion Control
- 2 Hazardous Location
- 3 Energy Automation
- 4 Building Automation Systems
- 5 Automation Software
- 6 Operator Panels
- 7 Automation Panel PCs
- 8 Industrial Monitors
- 9 Industrial Ethernet
- 10 Device Servers & Gateways
- 11 Serial Communication Cards
- 12 Embedded Auto. Computers
- 13 PACs
- 14 M2M I/O
- 15 Distributed Nano Controllers
- 16 RS-485 I/O
- 17 Ethernet I/O
- 18 DAQ Boards

ADAM-2051Z

ADAM-2051PZ

Wireless 8-ch Digital Input Node

Wireless 8-ch Digital Input Node with Power Amplifier

NEW



ADAM-2051Z

R&TTE SRRC FCC CE RoHS

NEW



ADAM-2051PZ

R&TTE SRRC FCC CE RoHS

Specifications

Digital Input

- Channels 8
- Input Resistance 10 Kohm
- Input Level Logic Level 0 0~0.8 V_{max}
Logic Level 1 2.0 V_{min}~5.0 V_{max}
Supports wet and dry contacts

Ordering Information

- ADAM-2051Z Wireless 8-ch Digital Input Node

Specifications

Digital Input

- Channels 8
- Input Resistance 10 Kohm
- Input Level Logic Level 0 0~0.8 V_{max}
Logic Level 1 2.0 V_{min}~5.0 V_{max}
Supports wet and dry contacts

Ordering Information

- ADAM-2051PZ Wireless 8-ch Digital Input Node with Power Amplifier

Common Specifications

Wireless Communication

- IEEE Standard IEEE 802.15.4
- Modulation Type DSSS (OQPSK)
- Frequency Band ISM 2.4 GHz
(2.4 GHz ~ 2.4835 GHz)
- Channels 11 ~ 26
- RF Data Rate 250 Kbps
- Transmit Power Typ. ADAM-2051Z: Typ. 3 ± 1 dBm
ADAM-2051PZ: Typ. 19 ± 1 dBm
- Receiver Sensitivity -97 dBm
- Topology Star / Tree / Mesh
- Outdoor Range ADAM-2051Z: 110 m
ADAM-2051PZ: 1000 m
- Function End Device

General

- Connectors 1 x plug-in terminal block (#14 ~ 22 AWG)
- Power Input Unregulated 10 ~ 30 V_{DC}
- Battery Input 2 x AA Alkaline
- Power Consumption 0.3 W @ 24 V_{DC}
Battery AA * 2
380 uW @ 3 V_{DC} (1 minute Tx Interval)
220 uW @ 3 V_{DC} (2 minute Tx Interval)
130 uW @ 3 V_{DC} (5 minute Tx Interval)

Environment

- Operating Temperature External Power -20°C ~ 70°C (-4°F ~ 157.9°F)
Battery Power 0°C ~ 50°C (32°F ~ 122°F)
- Storage Temperature -40°C ~ 85°C (-40°F ~ 184°F)
- Operating Humidity 20~95% RH
- Storage Humidity 0~95% RH