

# RV-N55-7 Remote Autonomous Zone Node

RV-N55-7 RAZN

## DC Voltage, Current or Potentiometer Inputs

A Remote Autonomous Zone Node for modern SCADA and Telemetry systems. Analog port with 2 analog voltage or current inputs 4-20 mA capability in a compact, cost-effective package. Connect it to your network, PC, or Cloud. Utilizes wired networks (Ethernet, RS485, or USB) or wireless communication. Many Long Range Wireless options: narrow UHF or VHF channels, LoRa, or license-free ISM band. Excellent for IoT server utilization. Monitor, control, and save all your things with it.



## Product Overview

### SCADA and Telemetry

RAZN is the new wireless SCADA (Supervisory Control and Data Acquisition) system where a central computer communicates to multiple devices over a network. This Remote Zone Node (RAZN) can be wired into a SCADA system, or wired to Programmable Logic Controllers (PLCs) with the system. The RAZN communicates with MODBUS messages.

### High Performance Interfaces

This SCADA product has a number of interface options to connect to controllers or other RAZNs, RTUs, PLCs.

- A. **Ethernet.** Connect to a LAN, the Internet, Cloud, or PC/Server with a 10/100 Ethernet connection. The device can be setup as a TCP client or TCP server.
- B. **Serial Port.** RS-485. RS-232 is also an option.
- C. **Website.** HTML website server built in to use a Web Browser to access statistics, settings, and control I/Os.

### Embedded Wireless Modem Options

The RAZN can have an, M8, M6, or M50 wireless modem module inside. These modules provide proven, rugged, and reliable SCADA communications for Narrowband UHF and VHF systems, and License Free radio bands.

### Differential Analog Inputs

Single-ended measurements can be taken of any line compared to ground, or differential measurements can be taken of any line to any other line. The RAZN's 24-bit ADC can calculate 4-20mA current and voltage with highest resolution in the world.

### 4-20mA Measurement

The ADC in the RAZN has a 24-bit resolution ADC. Put a resistor on a differential input, and it measure voltage and current. Read the 4-20mA and setup internal registers scaled the way you want to read actual information such as Temperature, Pressure, Brightness... Has the option of customizing the input OFFSET (zero) and SPAN (full scale) adjustments that can be set to a percentage of the full scale.

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### Real Time Clock (RTC)

The RAZN has a RTC with a battery backed-up timer, so commands can specify timing, duration, and periodic values that are accurately tracked in real time.

### Timer Operations Actions & Alerts (TOAA)

TOAA events are setup with three parameters (Timer, Operation, and Action) in any way you would like. Specify time and data events trigger and how long they continue to trigger.

### Relay Driver for Alarms and Control

SCADA messages or preset TOAA logic can trigger the MOSFET terminal relay driver output from thresholds and time to autonomously switch a relay as needed.

### Secure Data

The data encryption feature may be enabled on wireless communication. When secure data is enabled, the product will encrypt transmissions with AES128.

### Port A Analog Inputs

Port A has 2 differential analog inputs, Vcc output, reference voltage outputs, and a relay driver.

### Port B 8 Flexible Digital I/Os

Port B has 8 digital terminals that can be set to input or output. The 8 outputs will switch as configured and controlled by the commands. LEDs show digital status.

### Meteorological Instrument Functions

External temperature sensors connect to analog inputs. Rain gauge connects to digital input. Wind speed connect to digital inputs, status, frequency, or pulse counting inputs can be read.

### Long Range Wireless Operation

RAZN transmits I/O signals or serial data and is therefore very versatile. Many RF options, super long-range communication. 1/2W to 5W UHF, VHF; 50mW-1W ISM LoRa. Communicate in the field from 1 to 50 miles.

## General Specifications

Model Number: **RV-N55-XA-MBBP-O**

X: 7: 2 Differ. voltage inputs, Relay driver, 6 FIO.

A: If included; variations of the X version.

M: Modem version. 5,6,8: M50, M6, M8

BB: Radio band code or nothing if no wireless link internal.

O: Options and Accessories included

DC Voltage to power: 7V - 30V DC.

Power Consumption 1-2.5W plus I/O current.

Maximum Input Voltage: 50V DC.  
(without damage)

Negative Input Voltage: -50V DC.  
(without damage)

Additional Power required. Wireless Links utilized 1-10W,  
varies by radio model utilized.  
Idle, TX, and RX modes vary.

Sleep Modes as low as: 50mW average

Over-Voltage Protection 31-50V input, no damage.

Operating Temperature: -30C to +60C

Humidity 5 to 95% (non-condensing) IEC  
60068-2-30 (Test Db, Damp Heat)

Environmental Air No corrosive gases permitted

Weight 0.40lbs + RF Modem weight.

## Security

Encryption Method..... AES128

Electronic Serial Number..... Silicon ESN

## RF Electrical Specifications

See the appropriate RV-M8, RV-M6, RV-D50 or RV-Z50 data sheet for specific details regarding the wireless performance specifications for the optional radio modems.

## Input / Output Connection Functions

### Terminal A Analog Input Pins

2 different analog inputs

1 Relay Driver open-source MOSFET output

### Terminal B Analog Input Pins

8 Flexible Digital Input / Output pins

## IO Terminals Electrical Specifications

### ADS Analog Delta Signal Input Specifications

ADC Analog Input voltage 0 to 6V, Zin: 10k-20k  $\Omega$ .

0-50V with 102k res in series.

ADC 4-20mA analog Input Internal 120  $\Omega$  resistor to ground.

ADC Accuracy 0.1 to 2.5%

Max. Voltage Range: AVDD and AVSS. -6V to 6V  
default.

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Accuracy vs. Temperature

Input Impedance 1.5 mega ohm or higher

Configurable Gain 0.150 to 100. 0.25% accurate.

Read Time Configurable. 100mS default.

Maximum Inaccuracy 0.2% typical, 0.5%

Linearity Error <0.1%

Sample Duration Time 100mS or average rate.

Input Filter 1000Hz default, 10-1000Hz cfg

## FIO Flexible Digital IO Specifications

IO TTL Digital Input impeded. 1K-2K  $\Omega$ , Pull down Res

IO TTL Digital Output impeded. 100-220  $\Omega$ ,

VIO digital power output 5V, 200mA max. 3.3V option.

## RD Relay Driver Specifications

Max output impedance ON. 1K-2K  $\Omega$ , Pull down Res

Max Current: 3A,

Max voltage: 50V,

Min voltage on the RD: 0.2V,

## Device Electrical Specifications

DC supply Voltage 7.5VDC - 29VDC

Max. power consumption at 24V

Product less RF modem 110mA

RV modem consumption See data sheets for modem power

DC Power Cable 2.5mm X 11mm plug. 6M cable

Raveon part number 4C850-1

## Interface Option Connections

### RS-485 / RS-422 Interface Port

Connector Type Phoenix 5-pin

IO Voltage Levels RS-485

### Ethernet TCP

Connector Type RJ45f, 10/100

IP Address Static, dynamic, port selectable

## Mechanical Specifications

Dimensions Width, Height, Depth .....5.25" X 2.75" 1.25"

**Accessories:** Model Number Code: (x)

(P) AC/DC Power supply 12V. 2A P/N: PS-55-2

(D) DIN Rail Mount

## LEDs

8 LEDs show the status of the 8 Digital Outputs

1 LED shows Power status On/Off

## Remote Autonomous Zone Node (RAZN) Features and Notes

The RAZN makes remote automation and monitoring of your complex processes robust and cohesive by connecting across a variety of communication methods and data protocols.

RAZN IoT features and abundant customization enables the RZV to fit your specific SCADA needs.

Raveon is always interested in adding more features to our products, so please contact sales if you have additional desires. You can start small and grow confident that the RAZN's powerful micro processor can handle complex applications. Designed in 2019, it uses some of the most efficient technology in the industry.

### Methods to Control the Inputs and Outputs

- Send Commands via Ethernet, Serial port, USB port, Wireless network or connect with Web Browser.
  - Turn on and turn off commands.
  - Reset to defaults if the power is cycled.
- Internal timers and counters setup to manage Outputs
  - Turn off after XX milliseconds.
  - Turn on for XX milliseconds
  - Internal Real Time Clock (battery backed up):
  - Innovative TOAA has a myriad of ways to manage outputs with configurable duration.
- Command protocols (Contact sales to incorporate you protocol).
  - MODBUS RTU
  - HTTP
  - Raveon command mode commands or remote commands using RPR.
  - WMX Wireless Message Exchange commands incorporated into all Raveon data radio modems.
  - To use your custom commands, contact Raveon sales to request new commands added to the RAZN

### Things to use RAZN to do

- Control DC powered lights. Up to 30-40watts.
- Security Alarm System applications.
- Meteorological Instrument Functions to measure weather.
- Control AC powered lights if the low-voltage AC is within spec. Of switch an external AC power relay on and off.
- For Digital output status information, set the FIO digital outputs to turn on/off based on various analog input thresholds. The stat LEDs will also display the status of the analog inputs.
- Smart Cities can use the RAZN to control the things in the city they need to smartly manage.
- To connect things to internet cloud servers or your private servers, the Ethernet or wireless connections can pass the status of switches and sensors to your servers.
- Control valves and pumps. Turn on and off irrigation devices.
- Monitor water sensors, and report their status and report emergency information.
- Monitor analog sensors such as temperature, pressure, current, voltage,...

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## Hardware Connections to the RAZN N55-3

### IO Terminals

The RV-V55-7 interface terminal connector pin-outs are as follows:



**Terminal A** Analog Inputs, Relay Driver, and voltages.

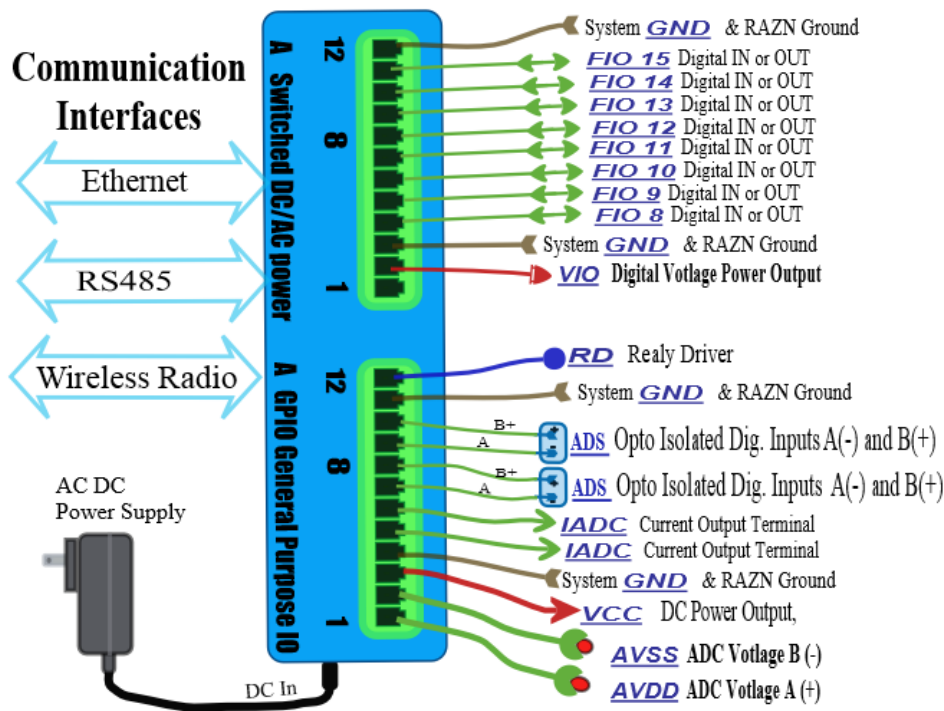
Pin #	1	2	3	4	5	6	7	8	9	10	11	12
Function	<b>AVDD</b>	<b>AVSS</b>	<b>VCC</b>	<b>GND</b>	<b>IADC</b>	<b>IADC</b>	<b>ADS+</b>	<b>ADS-</b>	<b>ADS+</b>	<b>ADS-</b>	<b>GND</b>	<b>RD</b>
IO#					1	2	3	4	5	6		7

**Terminal B** Configurable FIO pins: 8

Pin #	1	2	3	4	5	6	7	8	9	10	11	12
Function	NC	<b>VIO</b>	<b>GND</b>	<b>FIO</b>	<b>FIO</b>	<b>FIO</b>	<b>FIO</b>	<b>FIO</b>	<b>FIO</b>	<b>FIO</b>	<b>FIO</b>	<b>GND</b>
IO#				8	9	10	11	12	13	14	15	

Pin # is the Terminal Port Pin Number. IO# is the software reference and register code for this port.

### RAZN RV-N55-7 Terminal Interfaces

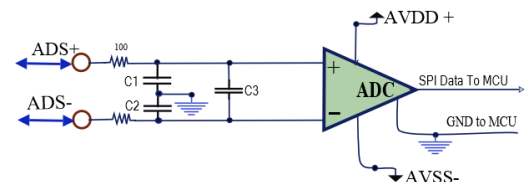


### Description of the Terminal Port's Input and Output Features

#### ADS Analog Inputs

This product's Port A 12 pin connector has two different analog inputs, that are differential. The also can be used as single input voltage readers.

The positive input is on **ADS+** and a more negativ einput is on **ADS-**. A resistor can be jumpred between **ADS+** and **ADS-** to read



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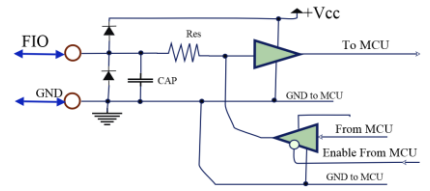
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4-20mA or any other type of current. A 10mΩ resistor can be used to read 0-100A if desired. Readings can be setup to be averaged.

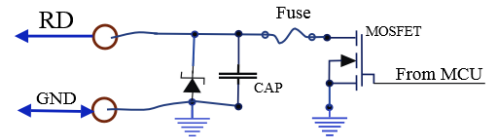
### FIO Flexible Digital Inputs and Outputs

This product's 12 pin Port B connector number has 8 **FIO** digital IOs, that can be configured as either input or output. There are two ground pins and the VIO pin 11 is the digital voltage power supply voltage output. IO mode is set as TTL in(A) or TTL out (B). Diodes are on the FIO pin to protect the electronics.



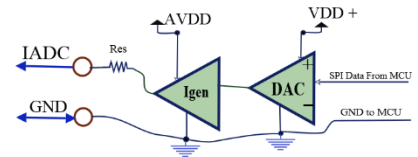
### RD Relay Driver

There is one relay driver. The **RD** is a MOSFET output to connect a relay or some other electrical device to Ground. Connecting to ground can turn some things on. Protection Diode is on the RD terminal. Cap to ground on RD: 10nF.






### IADC Current Output

The RAZN will output current out this pin, to drive a sensor or resistor. The level of output current is configurable, and an ADS or AI terminals can be used to measure the voltage on the thing connected to this **IADC** current output terminal.



## Connectors and Accessories From Raveon to Plug into the Terminal Ports

		
Modtronix TB12P-F350-R4	Phoenix Contact: MC 1,5/12-ST-3,81 - 1803675	Phoenix Contact: MC 1,5/12-STZ4-3,81 - 1768978
Raveon Part # RT-CN-550	Raveon Part # RT-CN-551	Raveon Part # RT-CN-552

FYI these mate to is a Phoenix: MC 1,5/12-G-3,81 - 1803374 used on this RAZN enclosure.

## Connecting Communication to the RAZN

The RAZN has Multiple Communication Interfaces comprised of:

**Ethernet TCP/IP** Connect an Ethernet Cable, or Wi-Fi adaptor, or Web Browser to the RAZN.

**RS-485 Serial** Connect an RS-485 serial cable to a RAZN or dozens of RAZNs.

**Long Range RF** The RAZN can have Raveon's RV-M6, or RV-M7 data radio modem installed inside for ultra long range RF data 5-50 miles.

**LoRa RF** The RAZN can have Raveon's RV-M50 LoRa data radio modem installed inside for long range license-free RF data 1-10 miles.

The RAZN's Timer, Operation, Actions and Alerts (TOAA) functions are run *Autonomously*. RTUs require Master controllers and modern RTUs often use IoT Cloud servers. The RAZN can use Master

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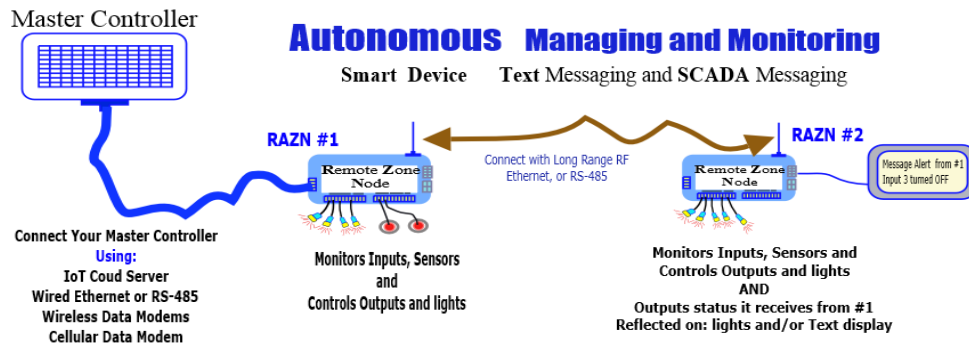
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controllers, Cloud IoT servers, and local PCs, and local servers, but the RAZN will also execute these TOAA features even when nothing is connected to it.



## SCADA and Telemetry Operations: RTU, PLC, and RAZN

### The RAZN performs many basic RTU tasks:

1. RTUs report changes an input/output to the Controller
2. RTUs respond to commands from the Controller.
3. RTUs monitor and record changes to inputs.
4. RTUs change output state as commanded, and when proper time comes to change.
5. Analog and digital inputs may be configured to report changes in text messages as they occur without being polled by the Controller (report by exception).

### Addressing and Accessing RAZNs in many ways:

1. Ethernet: TCP addresses and RTU ID terminal code. (millions)
2. RS485/422: RTU ID terminal code (hundreds)
3. Wireless over the air: 16 bit ID for the radio, and 8 bit RTU terminal ID. (millions)

When a RAZN is connected using wireless, Ethernet, or USB, SCADA or MODBUS messages that come in to it not for the particular RAZN, it can pass them out the RS485/422 port or radio modem to other RAZNs that is wired to its RS485 connection or on the same radio network.

## Text Messaging, Sending Status, Sending Alert Messages

The RAXN can be configured to send text messages.

Every RAZN can send out its status to remote areas using: wirelessly/Ethernet/wired.

Lights/Alarms/LEDs/Output pins and can display Text messages or get MODBUS SCADA messages...

The Text is written the way you want it. Text can include registers and parameter numbers into the text, such as voltage, current measurements.

Current and Voltage measured can be scaled the way you want, so the number looks correct in text. For example, a 4-20mS temperature sensor can show up in text as -30C to +60C or -22F to 140F.

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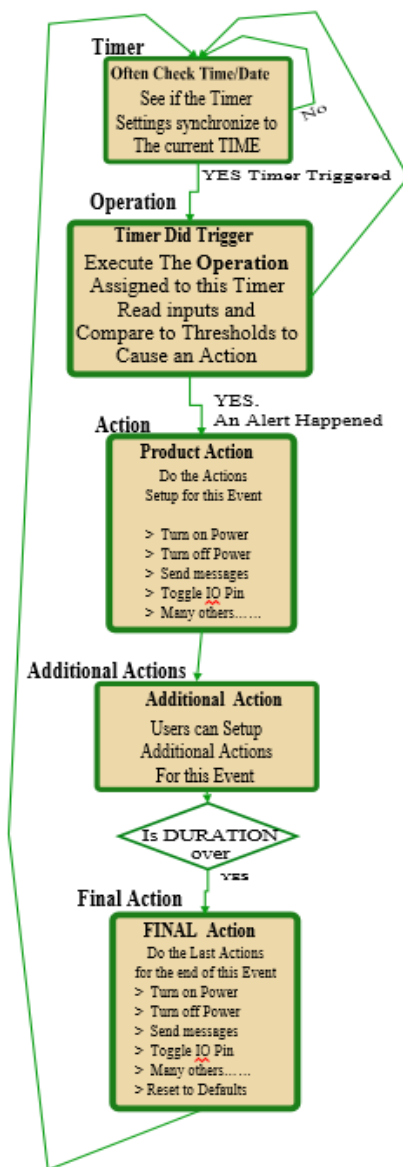
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## Timer Operations Actions and Alerts (TOAA) System Overview

TOAA Events are setup the way you want with three-four parameters (Timer, Operation, and Actions and Alert messages). The timer is accurate and can precisely specify at a day, hour, minute, and second to activate. A TOAA action can send a text message, text message with data information, and a SCADA message to another RAZN or RTU.

Timer Operations in the RAZN are the most flexible and efficient for any device in this industry. No need to use PCs, APPs, server, protocols, IoT, or whatever. PCs, APPs, server, protocols, IoT can manage the RAZN and its TOAA timer, but the Timer Operations works perfect and reliable without the need for connection to any other device.

## TOAA Event Logic



### The TOAA has 4 events in the Timer Event Logic it handles.

1. A **Real Time Clock Triggers** the event. It can trigger daily, hourly, weekly, monthly or once per year or once. How it triggers and how often the Event occurs, is how you set it up.
2. The RAZN **Operation** happens with timer triggers. Operation can read voltage, digital inputs, buttons, counters, temperature, pulse rates, or dozens of other things to read.
3. The data read in the Operation causes and **ACTION**. Operation will either cause and Alert or be set aside. If the Alert condition occurs, an **ACTION** will take place. Actions can be assigned to output data, set or clear output pins, turn voltages on or off, or whatever telemetry action you would like to happen. Communication **Alert ACTIONS** can also be outbound text messages, serial data, SCADA messages, or email notifications. 1 to 4 Actions take place per alert.
4. A **FINAL ACTION** may take place, after the amount of time you setup, another Final action can take place. The final action can be to reset the previous action, turn something off or on, or whatever action you want at the end of this event.

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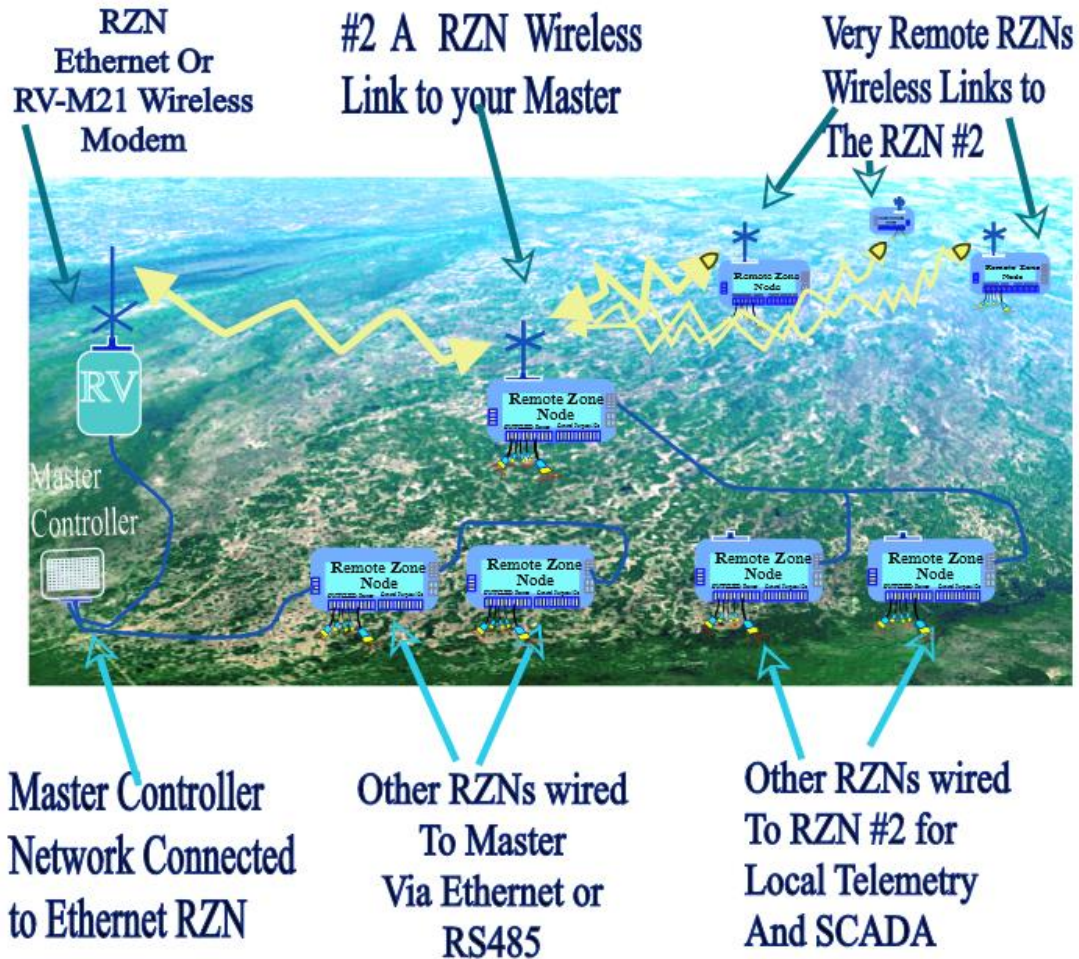
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**Cover Large Areas with Wireless Modems in the RAZN. They Mesh together if you want.**



This device must be operated as supplied by Raveon Technologies. Any changes or modifications made to the device without the written consent of Raveon Technologies may void the user's authority to operate the device.

End user products that utilize this RAZN on licensed RF frequencies, must be installed by experienced radio and antenna personnel. Please contact Raveon for end user antenna recommendations.

**Get extra features or different parameters.**

Raveon provides products to customers, and is an efficient high-tech company in California. If there is any parameter such as terminal voltage limits you would like in a different way, or a feature you would like added, please contact Raveon Tech Support team. Raveon often customizes a product to meet our customers' needs. Here are examples of things we can easily do for you on this RAZN.



1. Change the differential input voltage range. *The internal positive and negative supplies can be configured very large or small in any way.*

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2. **Add an Internal current resistor.** *On the voltage input pins inside is a non-place resistor location for use in 4-20 or any other current measuring mode. Easy drip in a a resistor.*
3. **Set Digital I/O Voltage level.** *The Digital IO DC power can be changed to 1.5, 3.0, 5.0 or whatever you want.*
4. **Input Filter.** *The analog input has a noise filter on it to get rid of RF and noise greater than 1000Hz. It can be configured to filter out AC 60Hz noise or other frequencies as needed.*
5. **Add Operations.** *Software is created here at Raveon, and adding new features, protocols, registers... are easy to add.*

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