

# Mako v2

# Technical Data sheet

Industrial WiFi, LoRa Modbus PLC.  
Optimized for remote locations with IoT capabilities



# MV2-T

## Transistor Digital Output

**\$550.00 Ex GST**



# MV2-R

## Relay Digital Output

**\$570.00 Ex GST**

# Hello World

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### Application use

- Remote control & monitoring of assets.
- Agriculture, Farming.
- Mining, resources sector.
- Pump control, irrigation control, bore control.
- Remote communities.
- Water treatment, UV disinfection. Flow meters.
- Tank monitoring and control.
- Survey-data logging, environmental sensors.
- Generators, remote control and monitoring.
- Power stations, remote control and monitoring
- Parks and public areas.
- Mobile plant machines and skids.

Smithtek's Mako V2 PLC is designed to deliver 3 key elements.

- **Reliability**
- **Simplicity**
- **Future proof**

It is an IoT device and ultra fast PLC fused together, the Versatile design allows it to act as a slave or master controller. Embedded with LoRa RF, Wifi, GPS, and its space saving footprint optimizes it for remote location applications. Its IoT connectors allow you to connect it direct to remote control and monitoring services on the internet.

The V-NET configuration software is a drag and drop flow based tool, designed for all levels of technical competency.

Packed with modern communications protocols, IoT connectors, and the traditional PLC tools enhances the user experience and opens the door to a level of creativity not possible before.

The Mako V2 breaks traditional barriers as it steps into the future of control.

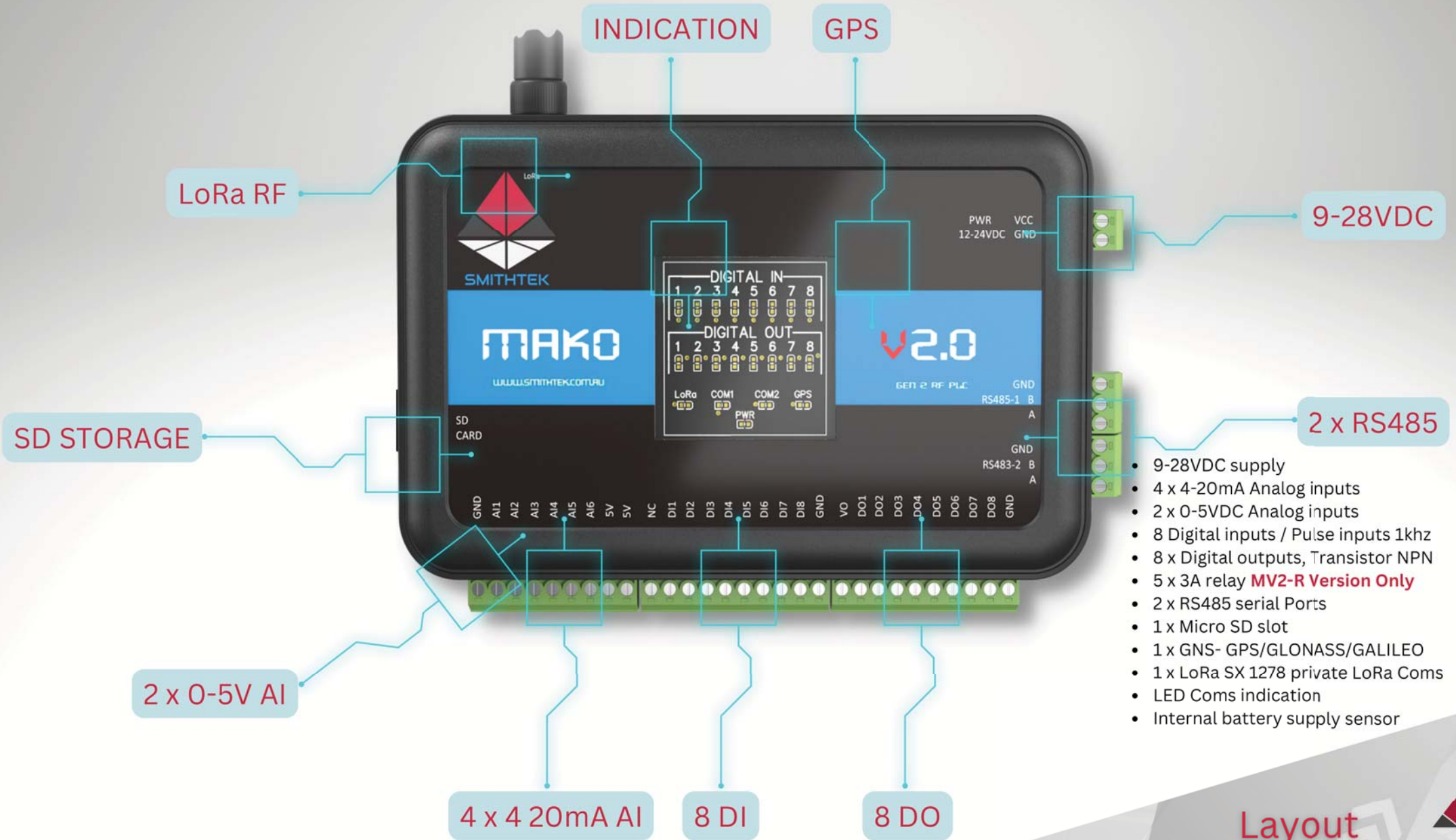
Description



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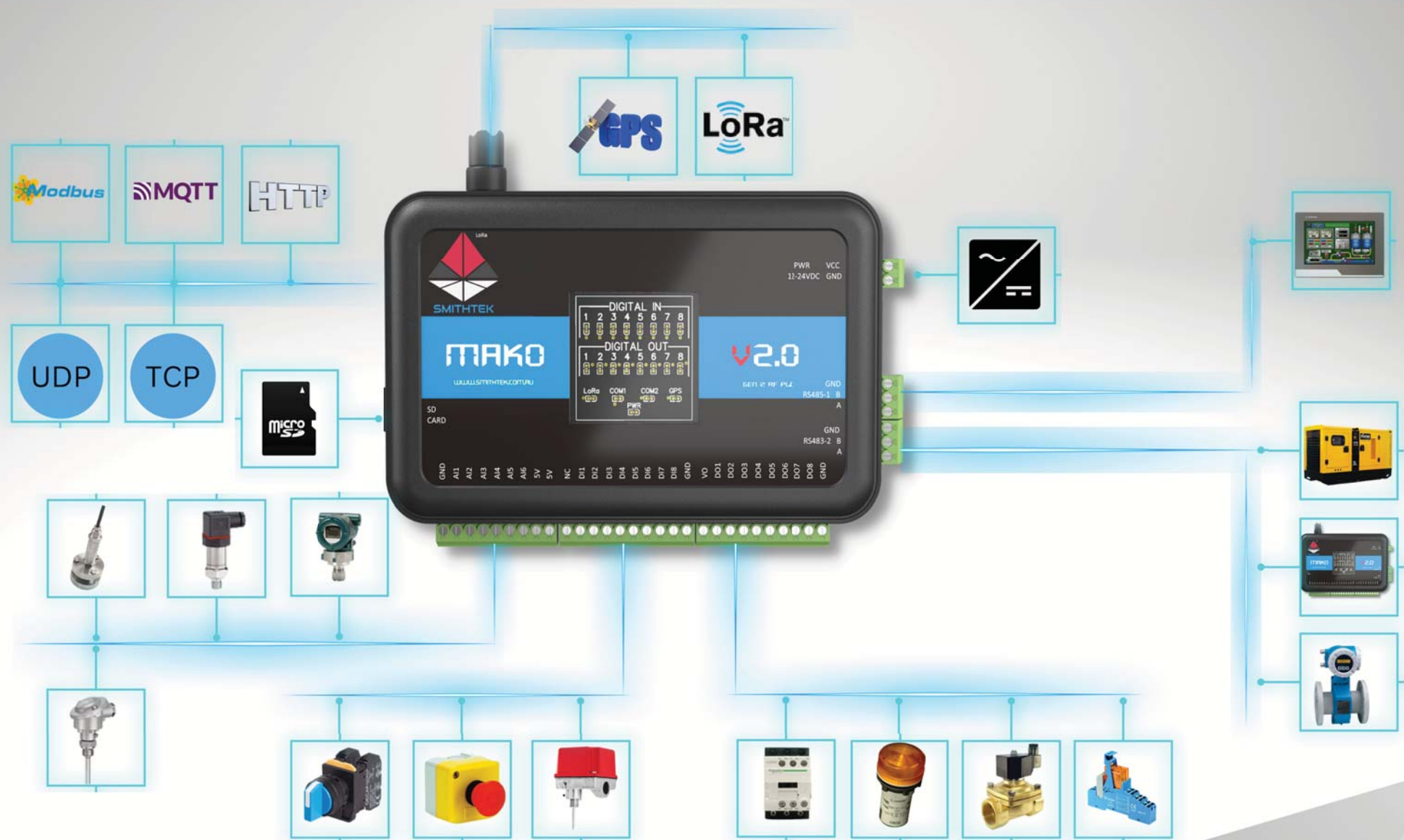


Layout

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Coms Topology



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- 240MHz, dual-core Xtensa® 32-bit LX6 MCU.
- Multi communication ability, LoRa, WIFI, RS485.
- High precision 4 20mA analog inputs.
- Low Power mode.
- LoRa RF, 300 to 1000Mhz range.
- 15KM LOS RF communications over LoRa.
- **Single** device mode, **Mesh** mode, **Master** slave mode
- Micro SD storage for data logging.
- GNS (GPS,GLONASS,Galileo) .
- 8 Digital inputs all assignable to pulse inputs 1 to 1Khz.
- 8 digital outputs NPN transistor type
- 3A Relay version available **5 outputs**
- WiFi- IEEE 802.11, WPA2- AES.
- Modbus RTU/TCP, 2 channels can act as slave or master independently.
- Internal power supply sensing assignable on the V-NET software
- HTTP and HTTPS SSL security.
- MQTT. 3.1 secure
- Advanced data type tools, Json, binary, packets, ASCII,base 64.
- V-NET programmer IDE, Simple, packed with tools to assist simplify programming functions.
- Super small size, tough robust with hardened 35mm din-rail connectors.

## Features



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Device Specs	Voltage Supply	9-28VDC
	Power Max	2.16 Watts
	Load Idle	90mA
	Load Each Relay	23mA
	Operating Temperatures	40 to +85C
	Operating Humidity	0 – 95% RH (NC)
	Dimensions	160/98/34 mm
	Dimensions with Terminals Connected	178/117.5/39.5 mm
	Enclosure Material	ABS (ROHS)
	Programming Communication Method	USB Type A
	Terminals	2.54mm socket connectors WIRE SIZE 2.5MM
	Mounting Option 1	Spring load (35mm Din-rail clips)
	Mounting Option 2	Desktop
LoRa Radio	RF Type	LoRa Modulation
	RF BW	62.5-500kHz
	RF Frequency	169-915MHz
	TX Power	0-20dBm max 100mW
	Encryption	128bit AES
	Antenna Type	SMA Female
	TX Load	18.75mA at 24VDC 0.45W
Wifi	RX Load	4mA at 24VDC 0.095W
	Radio RF	2.4GHz
	Security	WPA, WPA2, WPA3 , AES
	Standards	802.11 b/g/n
	TX Power	0 - 20.5dBm
	TX Load	54mA ave at 24VDC
	Rx Load	18.75mA ave at 24VDC
IO	Digital Input	PNP open collector >6VDC True <6VDC False
	Digital Input	Pulse input 0.1hz to 1kHz Program debounce 0 to >99999mS
	Digital output Relay	3A max 150VDC
	Digital output Transistor	Transistor NPN Max 300mA per output
	4 20mA Analog Input	Single ended 16bit ADC
	0-5VDC Analog Input	Single ended 12bit ADC
	RS485-1	TVS protected with built in 120Ω Terminator
	RS485-2	TVS protected with built in 120Ω Terminator

GNS	Update frequency	1Hz
	Tracking channels	32
	Positioning Precision	2.5M
	Cold start	32 seconds first fix
	Hot start	< 3 seconds from power-up
	System Features	Reads up to six satellite navigation systems and implements joint positioning, navigation.
	Navigation Satellite Systems	BeiDou, GPS, GLONASS, Galileo
	Latitude	(DD) decimal degrees -7 decimal places
	Logtitude	(DD) decimal degrees -7 decimal places
	Course	0-360 degrees
	Speed	Feet per second
	RX load	4.8mA at 24VDC , 0.115W



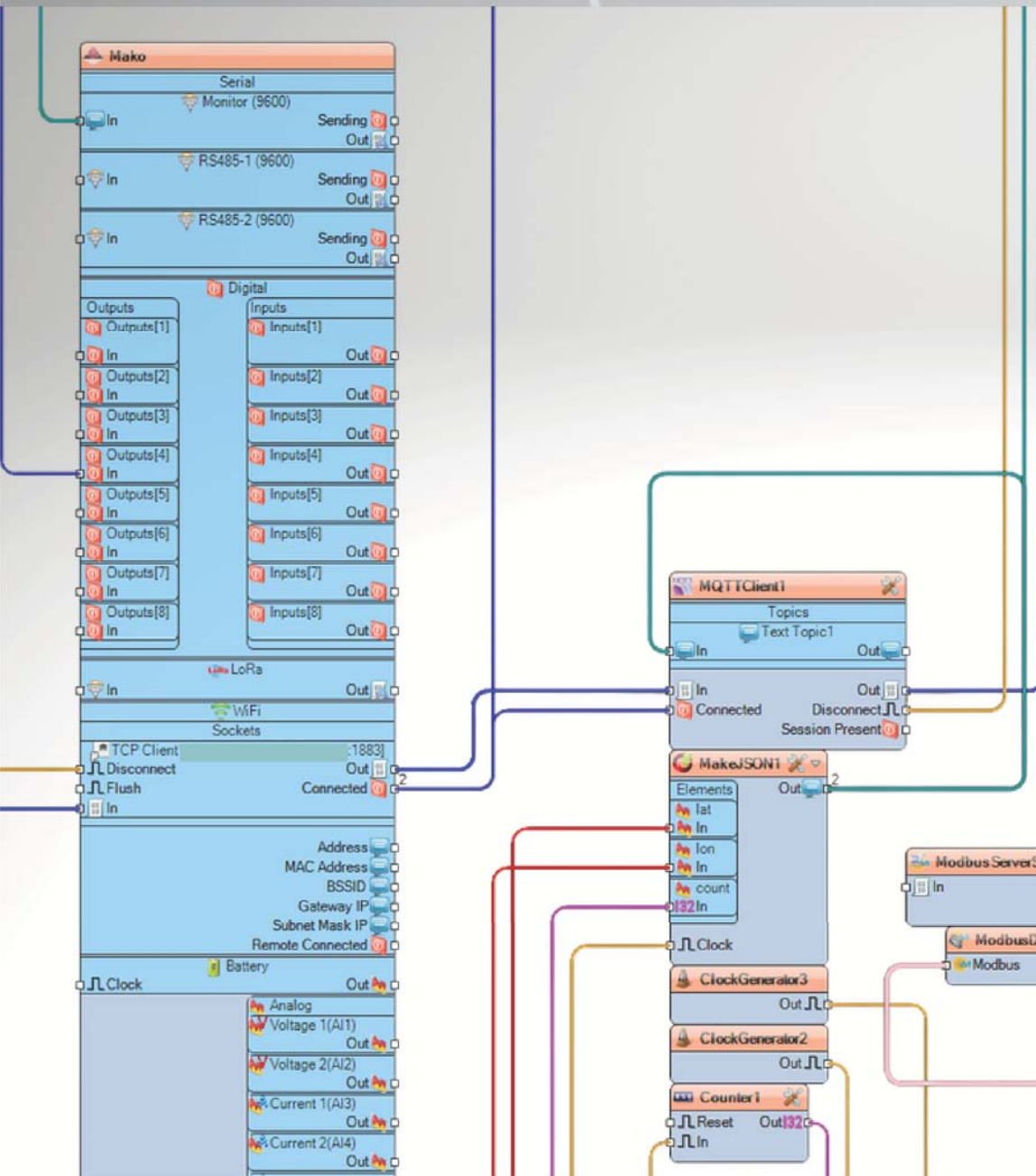
Specs



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PC Requirements	Operating system	Windows 7 with SP1; Recommended: Windows 10
	Minimum CPU or processor speed.	Intel or AMD processor with 32-bit, 64-bit support; Recommended: 1.2 GHz or faster processor
	Minimum GPU or video memory	2GB
	Minimum system memory (RAM)	4GB
	Minimum free storage space.	4 GB of free disk space
Software Specs	V-NET Programmer install file	.EXE
	Installation size	1.3GB
	Current Version	V8

The V-NET software is a drag and drop visual programmer IDE.

It has been designed to minimize workload by consolidating logical functions into already made components.

The Mako board UI on the programmer is interpretive of the physical IO on the Mako device. Each port on the UI interacts with the physical ports. So the digital inputs are in fact the real digital inputs and so on.

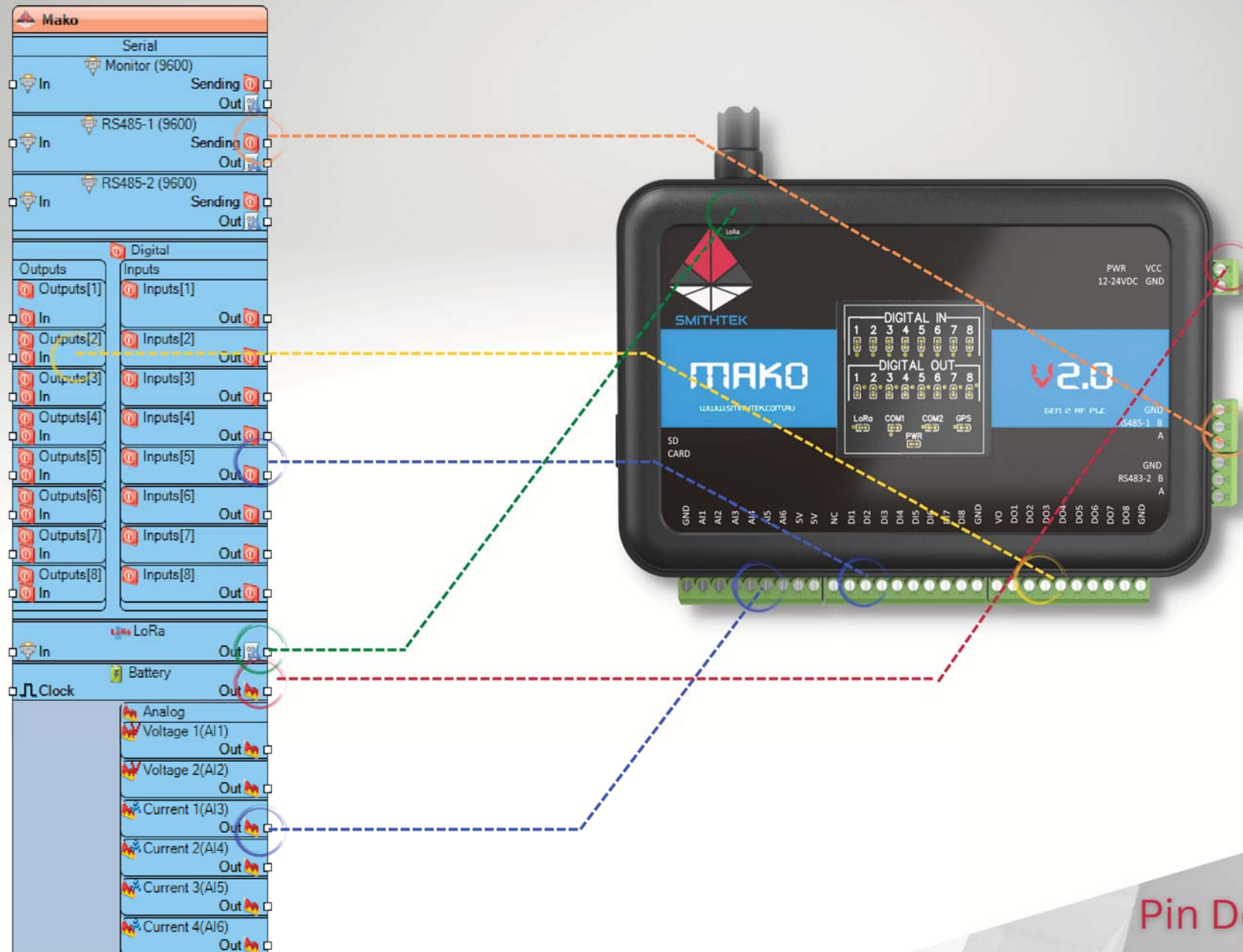
The IDE allows you to wire, fuse, splice, bridge data types from any IO allowing you to really explore your creativity when it comes to making a program. With hundreds of ready made components and lot connectors., you can be up and running in hours not days.

Subflows allows you to create chunks of logic away from your main program, keeping your session clean and manageable.

The program files can be exported in Json for sharing and collaborating with other awesome people.

Software

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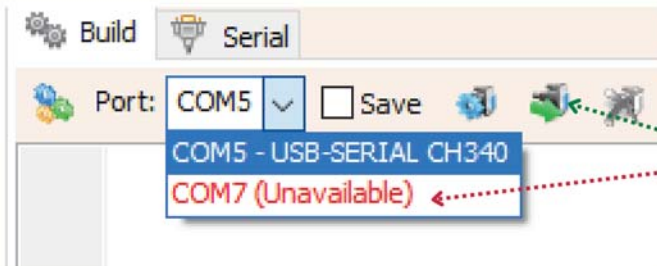


To Program the Mako you need to use the supplied USB-A to USB-A. The Mako is a USB client device. In the future the Mako will also be a USB host and will be able to communicate with other client devices like 4G LTE modules, Modbus and Canbus devices.

The Mako does not need mains DC power supply in order for it to be programmed, However some features like the Battery sense and the relays on the (Relay) version may not operate correctly.

To program the Mako.

- Insert the USB to the Host computer and the Mako
- Select the correct port on V-NET IDE.
- Press the upload button.
- Wait for a minute for it to upload.
- Repeat as many times as you wish.



Program Interface

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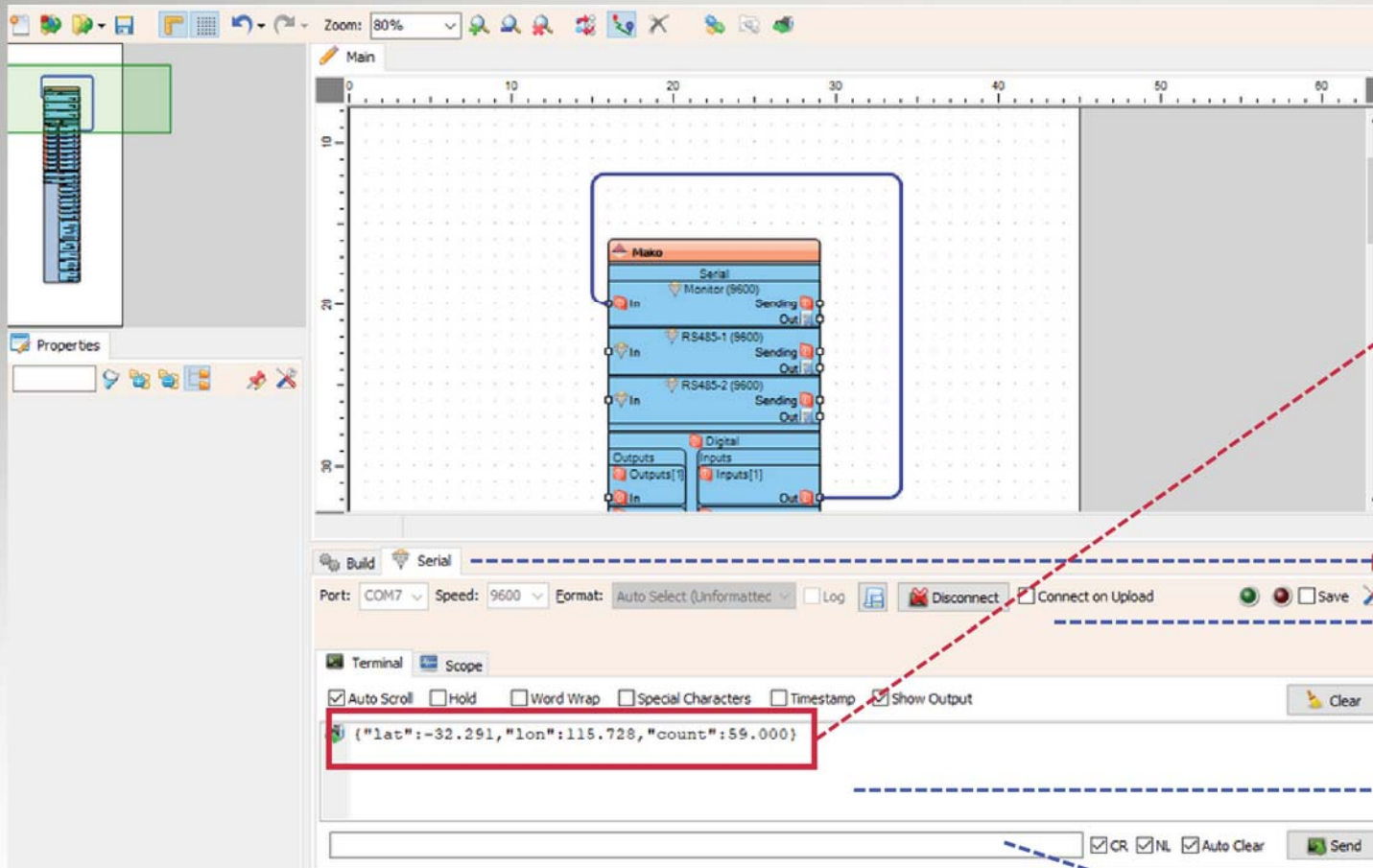
Compliances	CE	WIP
	FCC	WIP
	RCM	WIP
	ROHS	WIP



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The serial monitor window  
Is showing GPS data that has  
been wired to the serial input pin.

**Serial Monitor**

**Connect/Disconnect**

**Serial Monitor display**

**Serial Monitor Send**

**Serial Monitor Send commands**

When programming the Mako using V-NET, there is a serial monitor feature that you can use.

It is a very powerful tool that will not only allow you to monitor your progress but give you an understanding on how each of the components work.

To use the serial monitor you simply wire from any Mako input or component to the serial input pin, respectively you can wire from the serial output pin to the Mako and/or components, and send serial data back from the keyboard, like text, numbers, bool ETC.

The above example shows a digital input wired to the serial monitor input pin. When the digital input changes state the serial monitor window will display True or False.

**Serial Monitor**

# Mako V2

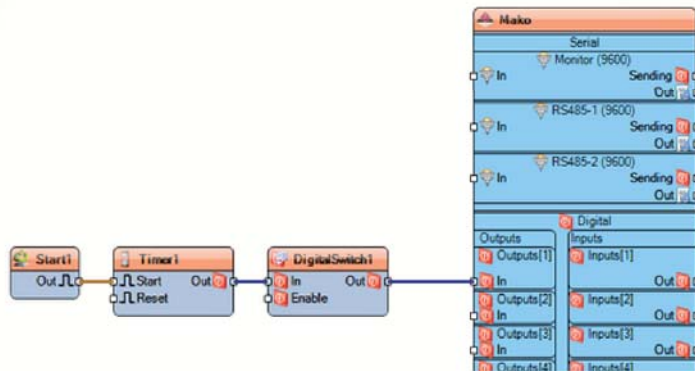
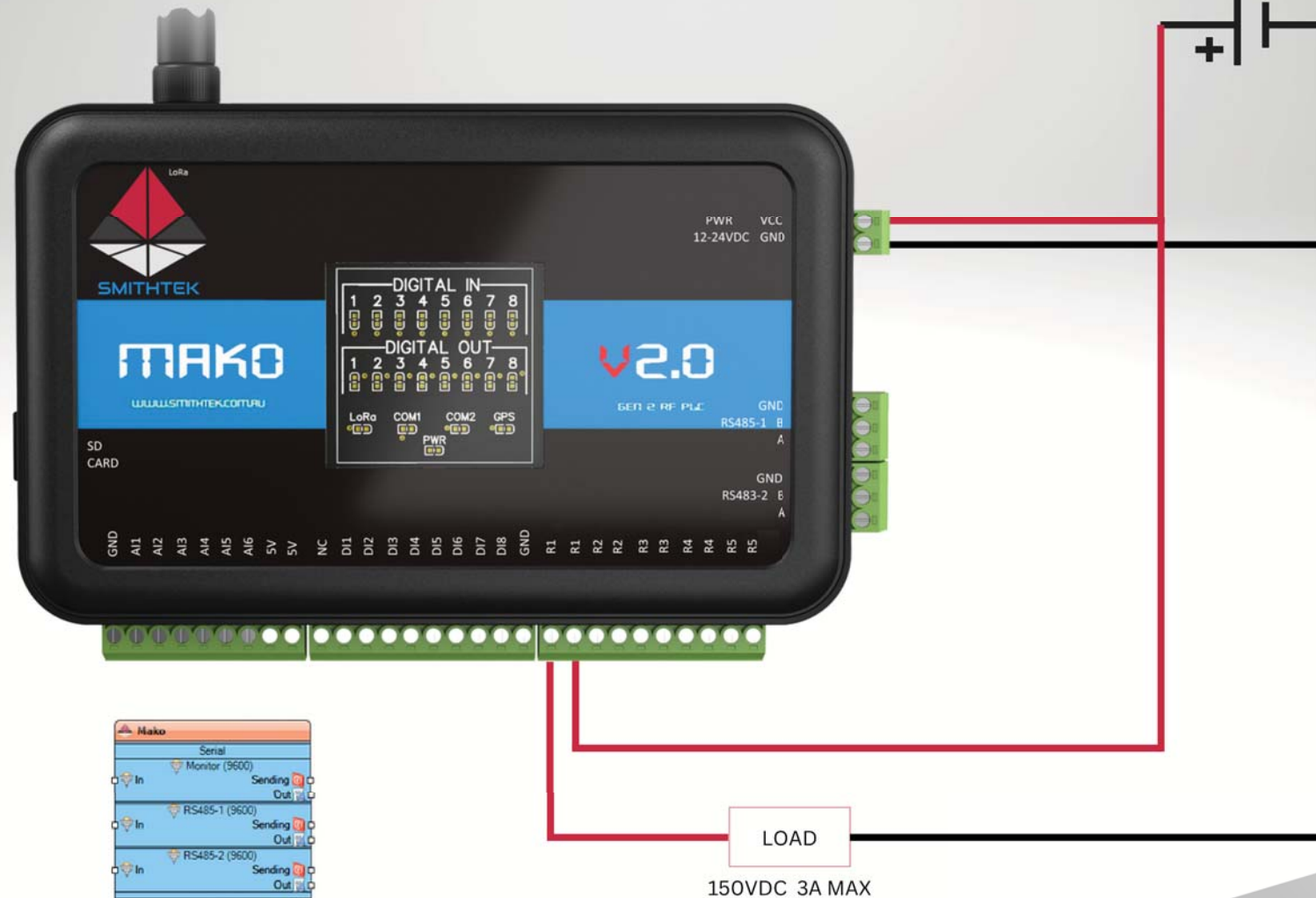
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### Relay Output

DO1,DO2,DO3,DO4,DO5  
DO6-Not used LED Only  
DO7-Not used LED Only  
DO8-Not used LED Only

9-28VDC >500mA



Wiring Examples



# Mako V2

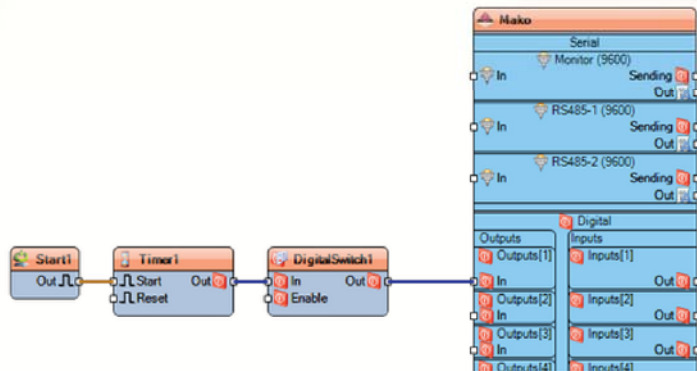
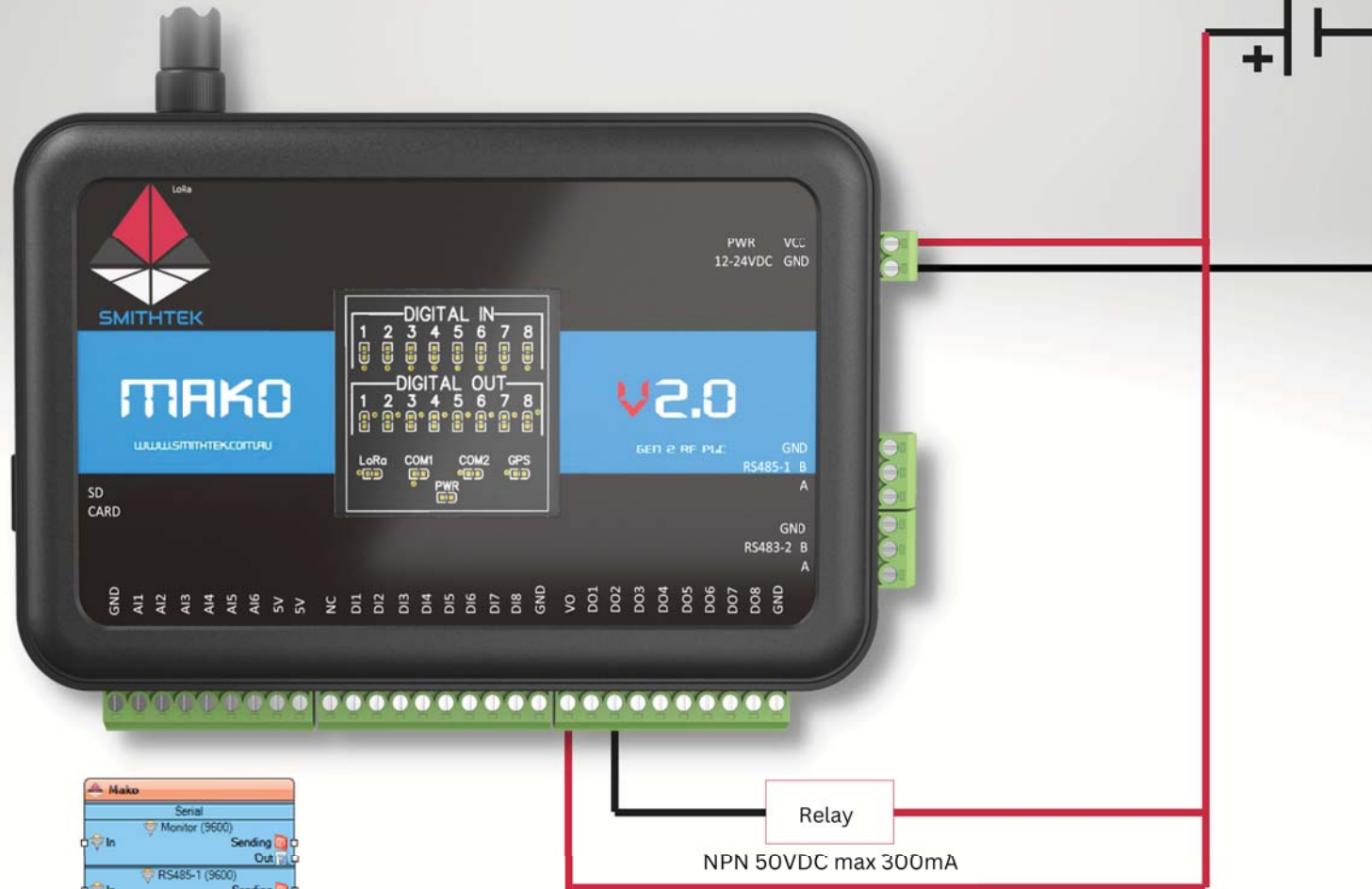
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### Transistor output

DO1,DO2,DO3,DO4,DO5,DO6,DO7,DO8

9-28VDC >500mA



Wiring Examples

# Mako v2

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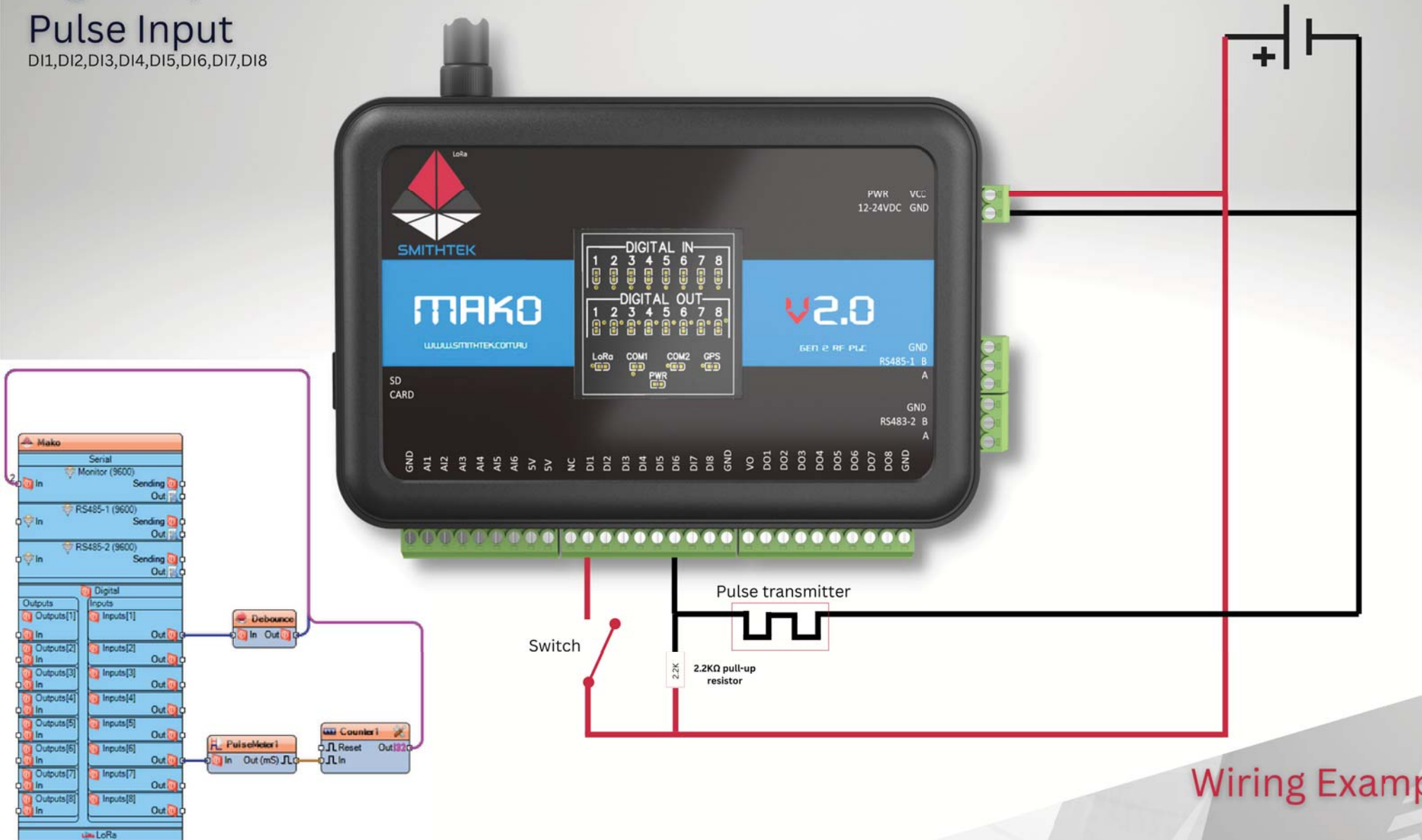
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## Digital Input

## Pulse Input

DI1,DI2,DI3,DI4,DI5,DI6,DI7,DI8

9-28VDC >500mA



## Wiring Examples



# Mako V2

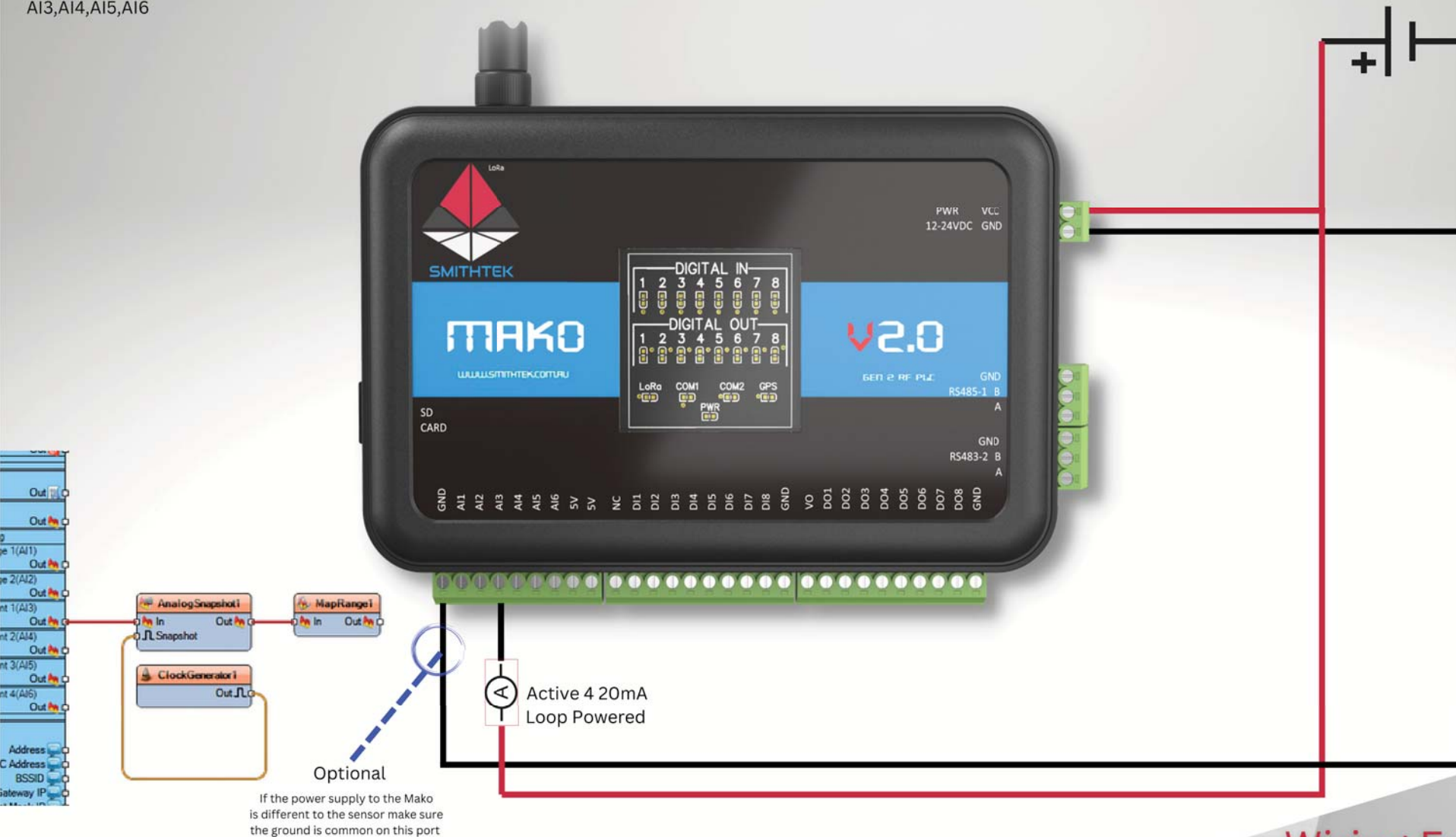
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### 4 20mA input

AI3,AI4,AI5,AI6

9-28VDC >500mA



Wiring Examples

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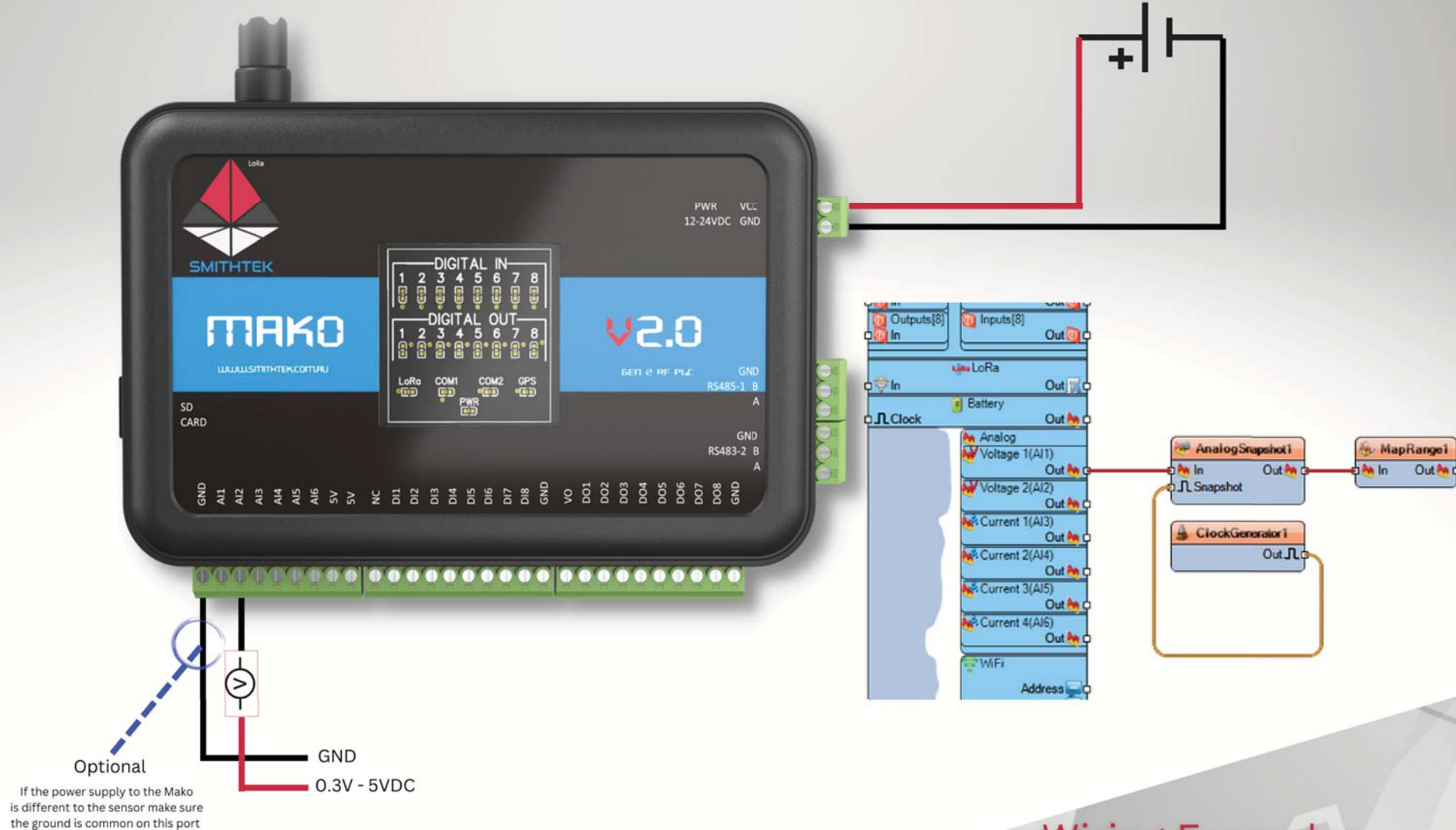
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### 0-5VDC input

AI1 & AI2

9-28VDC >500mA



Wiring Examples



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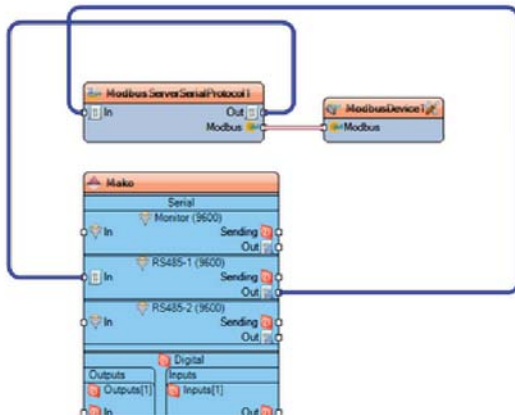
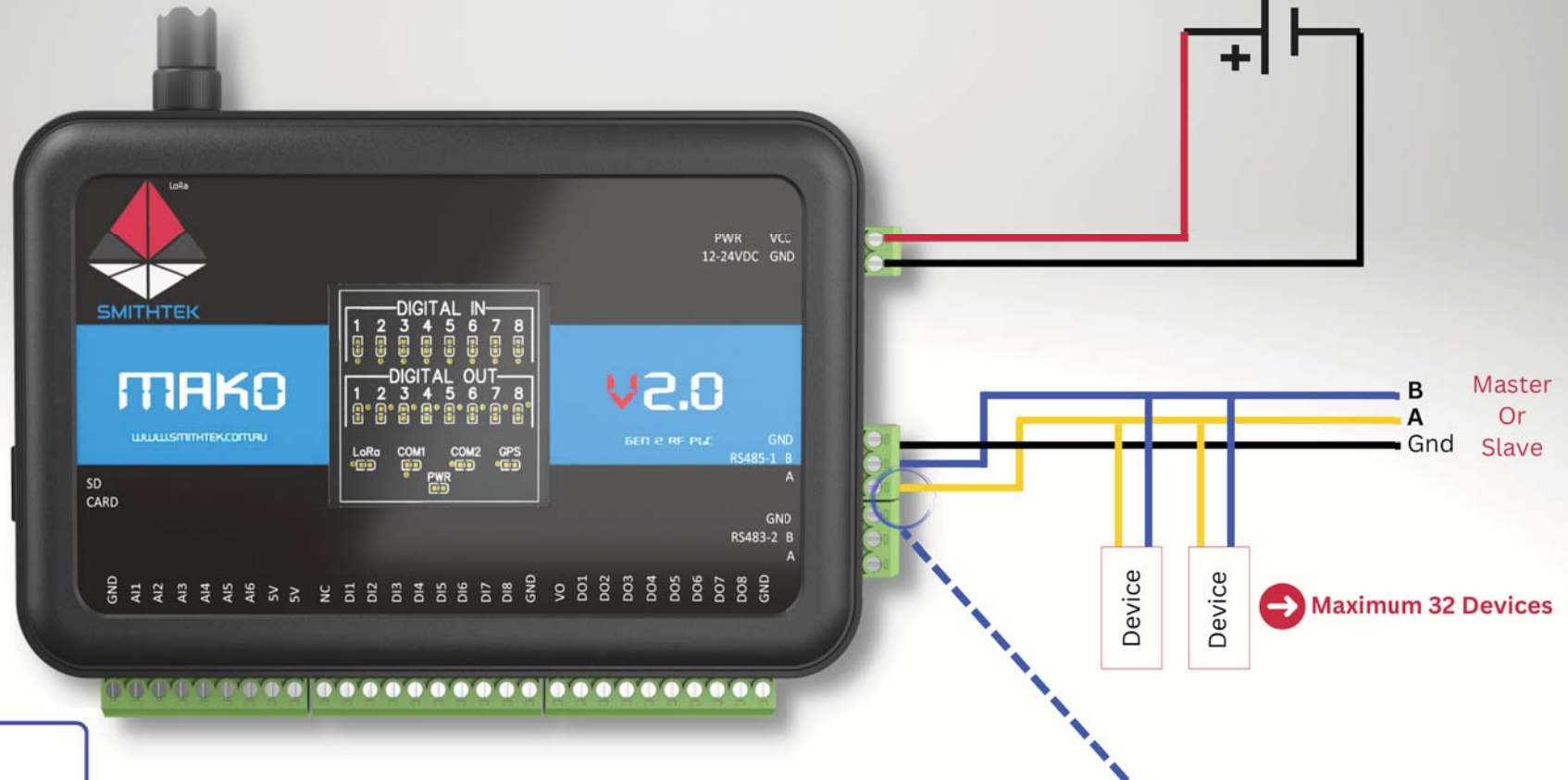
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### RS485

RS485-1  
RS485-2

9-28VDC >500mA



Both RS485 ports have built in 120Ω termination resistors.  
Depending on the serial protocol used both ports can act as either a **slave** or **master** device

## Wiring Examples

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## Our Mission

Smithtek is a Western Australian company that specializes in Industrial Internet of Things IIoT solutions.

We help businesses transcend into the fast-growing technological era of industry 4.0, by delivering IoT solutions tailored to their specific requirements.

We utilize modern plug-and-play telemetry PLC devices, HMI Scada systems, and state-of-the-art RF technologies to advance the connectivity of devices both internally and externally.

Our goal is to make industrial automation simple, so that you can focus on what's important - your business.

### CONTACT US

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About





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## Warranty

The manufacturer warrants this product to be free from defects in workmanship and materials, under normal use and conditions, for a period of **one (1) year** from the original invoice date.

Shipping and handling fees are to be paid for by the customer.

The manufacturer agrees, during the warranty period, to repair, refurbished and or replace the defected product without charge (except for a fee for shipping, handling, packing, return postage, and insurance which will be incurred by the customer).

Such repair or replacement is subject to verification of the defect or malfunction and proof of purchase as confirmed by showing the model number on original dated sales receipt.

### WARRANTY LIMITATIONS

This warranty does not include:

- Aesthetic dilapidation. Scratches and marks.
- Damage resulting from misuse, negligence, accidents or shipping damage.
- Normal wear and tear.
- Dissatisfaction due to buyers remorse.
- Any condition resulting from incorrect or inadequate maintenance or care.

Support Contact:

[www.smithtek.com.au/support](http://www.smithtek.com.au/support)



Warranty



## **FCC Statement**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.