



Divelbiss Corporation

Design & Manufacture of off-the-shelf and custom Programmable Logic
Controllers, Electronics & Internet of Things (IOT) Devices
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March 15, 2017

Divelbiss E-News - March 2017

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Keeping the Green in Your Wallet

It's almost that time of year again, Saint Patrick's Day. A joyous band of Leprechauns have been feverously working to prepare a feast of corned beef and cabbage, shepherd's pie and of course green beer to celebrate the life of Saint Patrick. As everyone knows Leprechauns are known to be quite mischievous, so how does Lucky the head Leprechaun make sure all the preparations come off as planned and the entire pot of gold is not squandered in the process?



The preparations for this great day have been in the works since last march. The leprechauns have been running a cattle yard, greenhouses, and of course their brewery to produce green beer to feed and quench the

Make Me Smarter

MODBUS Communications and Troubleshooting

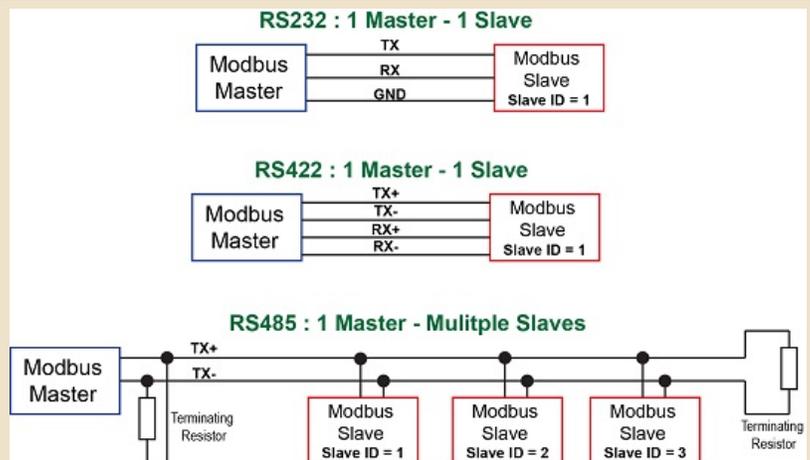
MODBUS is a widely established register based messaging structure or protocol used to communicate between multiple intelligent devices in a master-slave configuration. As MODBUS is a protocol, it operates independently on a hardware communications layer (bus) that can be RS232, RS422, RS485 or Ethernet. Hardware communications layer or bus structures like RS232 and RS422 limit communications to two devices total while RS485 and Ethernet allow multiple devices to be connected and communicate.

MODBUS is a register based system and its registers are divided into different types, including : Input Registers, Coil Registers, Discrete Input Registers and Holding registers. Each type has a different purpose and limitations. Holding registers are used often as they allow the master read/write and the slave read/write capability. Actual application needs dictate the type of registers to use.

thirst of a festive St. Patrick's Day crowd. How is Lucky to keep track of all these operations? He needs to make sure the beef is delicious, there is enough cabbage, carrots and potatoes for the feast, there are plenty of shamrocks to spread the luck around and of course the beer is just the perfect shade of green. After mishaps in the past, Lucky decided to keep an eye on his band mischievous Leprechauns this year with the help of [VersaCloud M2M](#). He outfitted the cattle yard to control/monitor feeding schedules, veterinary visits and the weight of his heard to be sure the cattle were healthy and strong. The greenhouse was automated to control the temperature, humidity, watering and lighting. The brewery is also being monitored and controlled to be sure that the beer is not only the perfect shade of green but is also delicious and refreshing. Using [VersaCloud M2M](#), Lucky is able to relax at the end of the rainbow and monitor all of the St. Patrick's Day preparations through his customized [VersaCloud M2M](#) dashboard. Not only can he see how every one of his operations is running, he can make changes remotely and even receive text messages or emails if something isn't just right. With his new VersaCloud M2M system it is much easier for Lucky to relax and keep an eye on his famous pot of gold.

Thanks to [VersaCloud M2M](#) Lucky hopes this year's St. Patrick's day celebration will be the best yet with no shortage of food, spirits and Good Luck!

Do you want to share in Lucky's good fortune with [VersaCloud M2M](#)?



MODBUS Master

Generally, only one device on the bus can be the master and only the master device controls and initiates communication to other (slave) devices. The master transmits data to and requests data from slave devices. The master communicates using function codes that identify how the master is interacting with the slave device. It is important to refer to the devices documentation to determine which function codes are supported.

MODBUS Slave

Each slave device has a unique ID referred to as the Slave ID. This unique ID allows the master communicate to the slave device on the bus. Slave devices listen for communications from the master with their specific Slave ID and then respond as instructed. The slave communicates via function codes from the master. It is important to refer to the devices documentation to determine which function codes are supported.

MODBUS Troubleshooting

Most MODBUS communications problems can be corrected by evaluating the basics of the configurations of the hardware network and the MODBUS configuration.

For Hardware Bus:

1. Verify the same communications bus (RS232, RS485, etc) between the master and slave devices.
2. Are there any wiring issues (mis-wired connections, loose connections)?
3. Verify the same communications settings between the devices (baud rate, start bits, stop bits, parity).
4. Are bus terminating resistors installed if required?

For MODBUS:

1. Verify there is only ONE master on the bus.

2. Verify each Slave has a unique slave ID address programmed.
3. Verify the Master is attempting to communicate to the slave ID that is programmed into the slave device.
4. Verify the Master and Slave are compatible (support the appropriate function codes).
5. Verify the proper register numbers and types are configured on the slave devices and the master is reading/writing those same register numbers.

Working For You - Remote Gas Monitoring System

Sometimes invisible odorless gas goes undetected and unreported. In critical applications where Carbon Monoxide is present it is imperative that the operators know if a concentration is out of range. Thousands of workers die each year from inhalation of toxic gases. With the right system in place most of these deaths are avoidable. Which is why we recently interfaced the Divelbiss VersaGateway model: [VCG-E-C-X](#) with a hazardous gas detector at a Bosch Rexroth Plant. Using the Modbus registers on the gas detector we were able to poll data from the registers and upload them to our [VersaCloud M2M](#) solutions dashboard. This provided 24 hour monitoring with text message and email alerts as well as the history of alarm events at the site. In the event of an alarm, the right people are notified and the Safety Manager, Bryan King, can sleep well knowing that there is no gas lurking in the night.



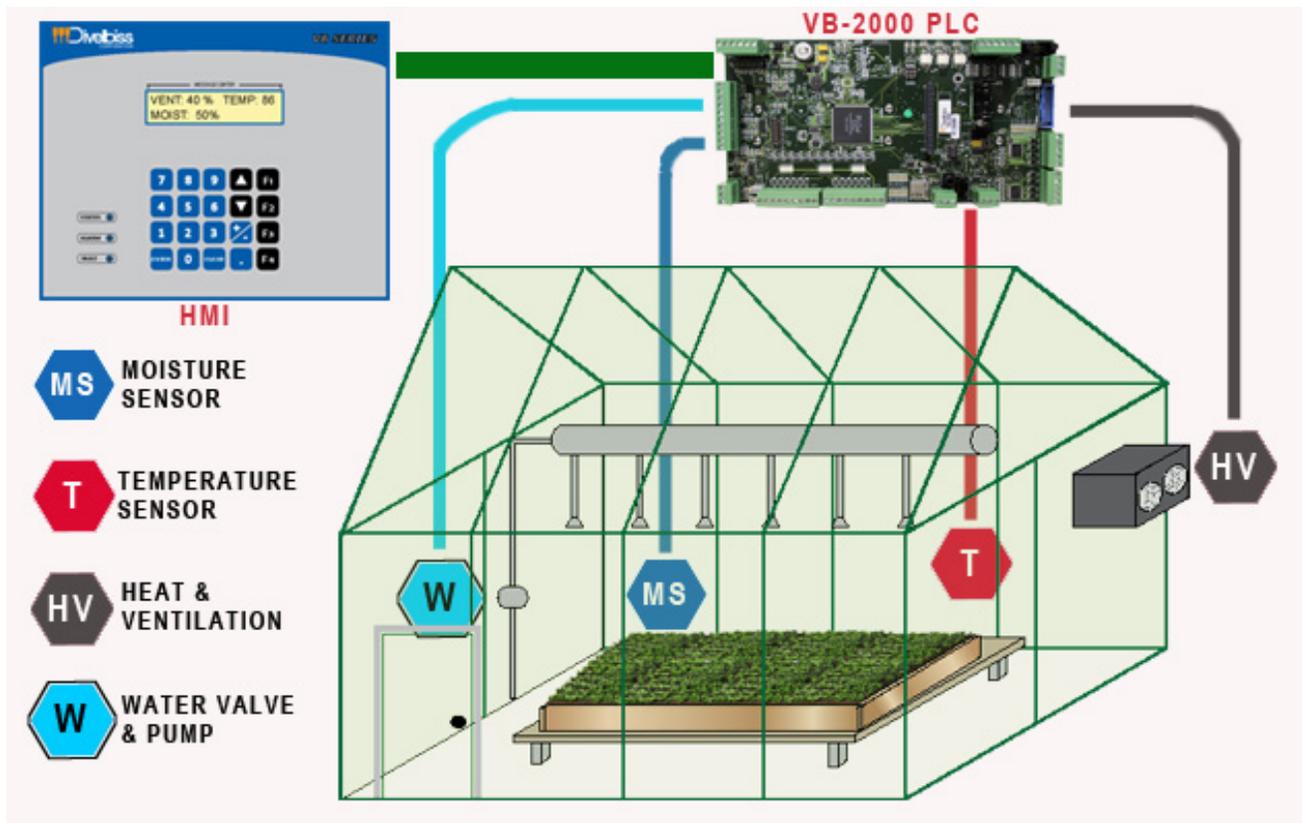
- "I just wanted to take a moment to say thanks for all the work you guys put into helping us find a solution to our Alarm System Dialer issue/s. I really appreciate your high level of customer service as we worked through all of this. Your products, customer and technical service we experienced in this project were exemplary, above and beyond!"

- Bryan King - FniP/HSE

Application - Greenhouse Control and Monitoring

Automated greenhouse control system using Divelbiss Versatile Base (VB-2000) Programmable Logic Controller (PLC) and Operator Interface (HMI).

Greenhouse operation utilizing a Versatile Base Programmable Logic Controller (PLC) , model [VB-2000](#) automatically monitors temperature and moisture and controls heating, ventilation and water source.



Additionally, the [VB-2000](#) is [VersaCloud M2M](#) enabled which allows remote monitoring and control of this greenhouse through a customizable dashboard.

[See the full text.](#)

Product Highlight - VersaGateway Family

Communication Gateways



Communications Gateways:

[VersaCloud M2M](#) enabled IIOT gateways provide an interface and network / communications translation from other controllers and devices using standard communications and networks including Modbus TCP over Ethernet and Wi-Fi, Modbus Master/Slave over serial and CAN networks including SAEJ1939 and NMEA 2000. The gateways program with ladder diagram, function block and structured text programming using Divelbiss EZ LADDER® Toolkit.

The HEC-Gateway series of Programmable Communications Harsh Environment Gateway for Local Device and Network Interfacing, Remote Monitoring, Reporting and Control with Cellular Data Connectivity and Wi-Fi Connectivity. Includes 1 Digital Input, 1 Digital Output, 2 Analog Inputs, 2 Serial Ports (RS232) and 1 CAN port (SAE J1939/NMEA 2000). Supports Modbus and is [VersaCloud M2M](#) and GPS Enabled.

- [HEC-GW-C-W](#) Harsh Environment (HEC) Programmable Gateway with Wi-Fi Connectivity and Cellular Data Modem. .
- [HEC-GW-C-X](#) Harsh Environment (HEC) Programmable Gateway with Cellular Data Modem
- [HEC-GW-X-W](#) Harsh Environment (HEC) Programmable Gateway with Wi-Fi connectivity.

The VersaGateway Series of Programmable Communications Gateway for Local Device and Network Interfacing, Remote Monitoring, Reporting and Control with Wi-Fi, Ethernet, Cellular Modem and GPS. Includes 2 Serial Ports (RS232/RS485) and 2 CAN ports (SAE J1939/NMEA 2000). Supports Modbus and is [VersaCloud M2M](#) and GPS Enabled.

- [VCG-W-X-X](#) VersaGateway Programmable Gateway with Wi-Fi Connectivity.
- [VCG-W-X-G](#) VersaGateway Programmable Gateway with Wi-Fi Connectivity and GPS.
- [VCG-W-C-X](#) VersaGateway Programmable Gateway with Wi-Fi Connectivity and Cellular Data Modem.
- [VCG-W-C-G](#) VersaGateway Programmable Gateway with Wi-Fi Connectivity, Cellular Data Modem and GPS.
- [VCG-E-X-X](#) VersaGateway Programmable Gateway with Ethernet Port.
- [VCG-E-X-G](#) VersaGateway Programmable Gateway with Ethernet Port and GPS.
- [VCG-E-C-X](#) VersaGateway Programmable Gateway with Ethernet Port and Cellular Data Modem.
- [VCG-E-C-G](#) VersaGateway Programmable Gateway with Ethernet Port, Cellular Data Modem and GPS.

Saint Patrick's Day Fun Facts

- Saint Patrick was actually born somewhere in Great Britain not Ireland.
- Saint Patrick's real name was Maewyn Succat.
- The first Saint Patrick's day parade was in Boston in 1737.
- There are 33.7 million Americans of Irish ancestry which is almost nine times the population of Ireland.
- According to legend
 - Saint Patrick drove all the Snakes from Ireland.
 - If you look away from a Leprechaun he will disappear (with his pot of gold)
 - If you kiss the Blarney Stone you will get the "gift of gab" and be able to persuade people to do whatever you want.

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