Interface Manual

GW Digital Output Module

SignalFire Number: GWAccessory-12DO

The SignalFire Digital Output Module has the following features:

- 12 Digital Outputs, jumper settable open-drain or voltage out mode
- Wide range (10-30VDC) DC power input
- Easy configuration with the SignalFire ToolKit
- Expansion connector to connect second digital or analog output module
- DIN Rail Mount
- Status LEDs
- DB9 connector for ToolKit connection to the Gateway
- Connections for RS-485 Modbus communication with Gateway

Specifications

Power	10-30 VDC (50mA maximum consumption)
Temperature Rating	-40°C to +65°C
Digital Outputs	12 open-drain. Max 42 VDC, 2A continuous @25°C.
Communication	RS-232, RS-485 2-wire

Dimensions
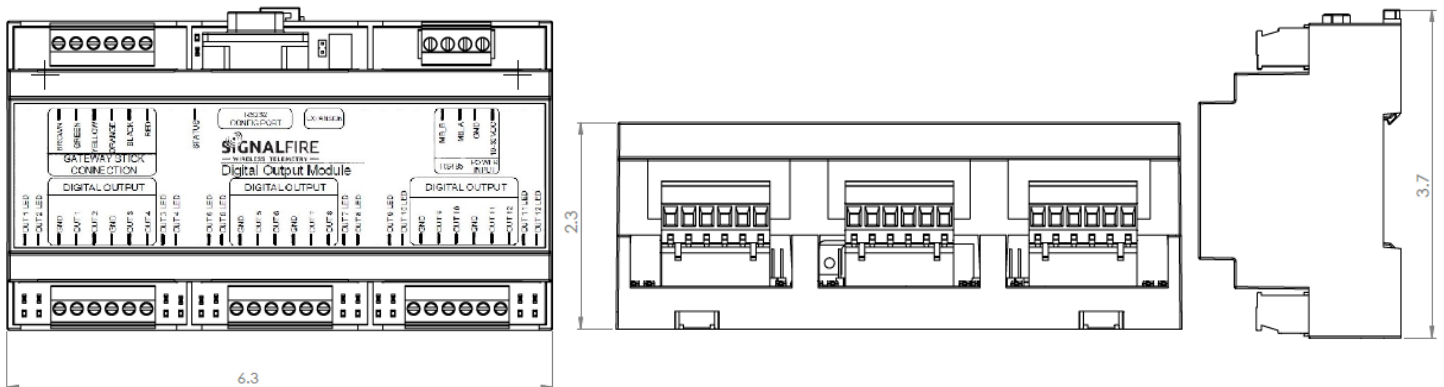
Connections

The module provides screw terminals for connection to a SignalFire Gateway. Connect the 6 wires to the Gateway stick following the labeled colors. For the DIN Gateway only the Black and Orange wires are required to be connected to the Output Module terminals on the Gateway.

Wire Color	Connection
RED	Positive Power (10 to 30 VDC)
BLACK	Ground
GREEN	RS-485
BROWN	RS-485
ORANGE	RS-232 Debug/Programming TX, 9600 Baud
YELLOW	RS-232 Debug/Programming RX, 9600 Baud

Power must be provided by the Power Input screw terminals (10-30VDC). The Module power requirements at 12VDC is a maximum of 17mA plus an average of 25mA for the attached Gateway.

The RS485 terminals provide access to the Gateway for Modbus communication from an RTU.

To connect a second module for additional outputs, use the provided expansion cable and connect the second module to the first. The secondary module must have a jumper installed on the "SLAVE" pins near the expansion connector.

Status LED

The module has a single green LED available for communication diagnostics. In addition, there is a green LED near each output that turns on while the output is energized.

LED	Description
Slow Flash (3 second pause)	System is running and at least one remote node is connected.
Fast Flash (0.5 second pause)	System is running but no remote nodes have connected.
Solid On	No communication with Gateway

System Overview

The Gateway Digital Output Module provides a way to expand the number of digital outputs available locally at a Gateway. The Gateway Stick does not have any native outputs, while the DIN Gateway and DIN Gateway V2 have two integrated open-drain outputs.

With the Digital Output Module, the Gateway will have 12 additional digital outputs per module. The digital outputs can be set to open-drain mode, or voltage output mode. When in voltage output mode, the voltage can be set to use 5V off the Digital Output Module, or use the 10-30VDC used to supply the Digital Output Module's power input terminals. An LED will light when the output is on.

The outputs are configured the same as any relay on the SignalFire network, through the Gateway's Remote Shutdown Settings. The outputs can also be manually toggled for testing through the Digital Output Module window of the Gateway.

Configuration

To begin configuration, open the SignalFire Toolkit. The SignalFire Toolkit application can be downloaded at www.signal-fire.com/customer. After installation, launch the software and the main toolkit window will open:


Select the COM port associated with the GW and click "Auto-Detect Device on COM Port." This will open the Gateway configuration window, where all device settings can be configured.

The module requires only simple configuration using the SignalFire ToolKit to map remote data to a given output.

The following instructions require the Gateway to be at least firmware version 8.27, and the ToolKit to be at least version 2.2.18.00.

Remote Shutdown Settings
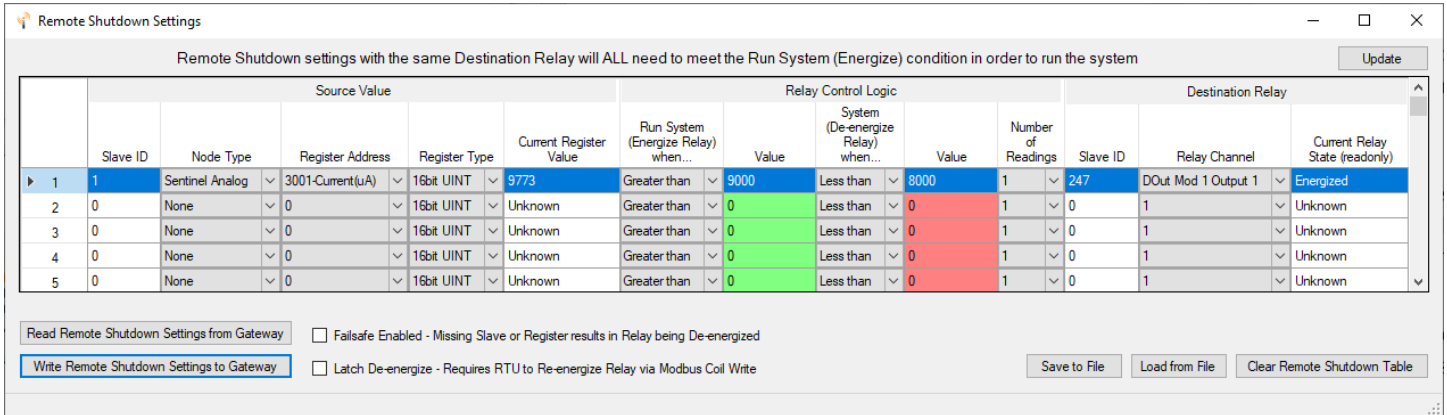
In the Gateway configuration window, select 'Settings > Remote Shutdown Settings' on the top toolbar. This will open the configuration window below.

For each output, define one or more rules to toggle the digital output. Configure each rule left to right, starting with the source node that you would like to control the output, then the logic for toggling on and off, and then the intended output. To use the outputs on the Digital Output module the "Destination Slave ID" must be configured to the Gateway's Slave ID which is 247 by default.

For example, in the configuration window above, Output 1 on Digital Output Module 1 will turn on when slave ID 1's analog input is above 9000uA (9mA), and turns off when the analog input drops below 8000uA (8mA). The 1000uA difference is to prevent the output from repeatedly turning on and off if the analog input is in the 9000uA range.

When an output is defined by multiple sources, it will only turn on if all its Energize conditions are met. However, once it turns on, it will turn off if any one of its De-Energize conditions are met. In other words, the Energize conditions are Boolean AND logic, while the De-Energize conditions are Boolean OR logic.

After editing any of the rules, click on the 'Write Output Settings to Gateway' to store the changes in the gateway.

If the Digital Output Module loses the wired communication with the Gateway, it will automatically turn off all outputs after 5 minutes. For more information on the Remote Shutdown Window, please see the Gateway manual.

Manual Control and Override

The outputs of the Digital Output Module can be controlled manually for testing purposes. In the Gateway configuration window, go to "Settings" and click "Digital Output Module".

Any output can be switched on or off individually from here to test their operation. Note that by default, any RSD settings present will take higher priority. If there is a rule in the RSD Settings keeping output 2 on, toggling it off will result in the RSD Settings immediately turning it back on.

The RSD Settings can be temporarily overridden by clicking on the "Temporary Override" button. During this period, toggling the outputs manually will override any existing RSD settings that may conflict with setting that output. This override will time out after 5 minutes as a safeguard.
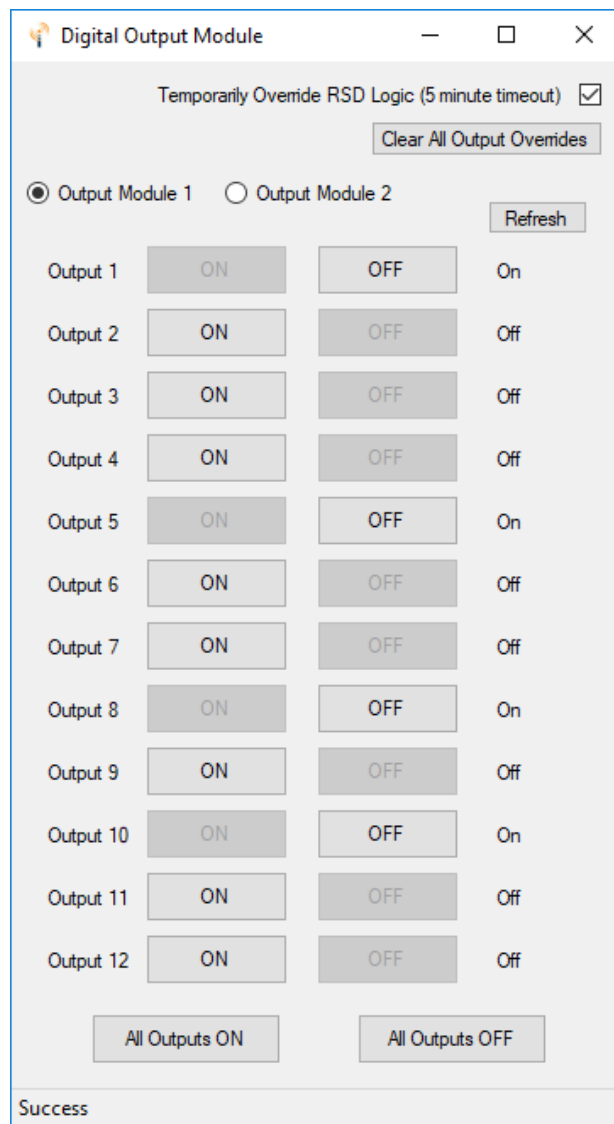
Wiring Outputs

The outputs can be configured in two ways, **open-drain** or **voltage-out** mode. Configuration of these output modes is done through jumpers inside the Digital Output Module. To access these jumpers, use a small flat-head screwdriver to wedge the top off using the tabs on the side.

In open-drain mode, the output is floating when off, and is shorted to GND when on. To set an output to open-drain mode, simply remove the jumper from the pins marked for that output.

In voltage-out mode, the output is a set voltage when off, and is shorted to GND when on. To set an output to voltage-out mode, simply place a jumper on to the pins marked for that output. The output voltage is set by the pins labeled "PULLUP VOLTAGE SOURCE". To output 5V, put the jumper on the lower two pins marked "5V". To output the supply voltage wired into the Digital Output Module's power input (10-30VDC), put the jumper on the upper two pins marked "SUPPLY".

Do not place 10-30VDC directly on the digital outputs, or it may damage the system.

In the example below, jumpers are placed on the first four outputs, and the lower two pull-up pins next to "5V". This will make the first four outputs 5V when off, and the other eight floating when off. Any output that is on will short its input to GND under all cases.
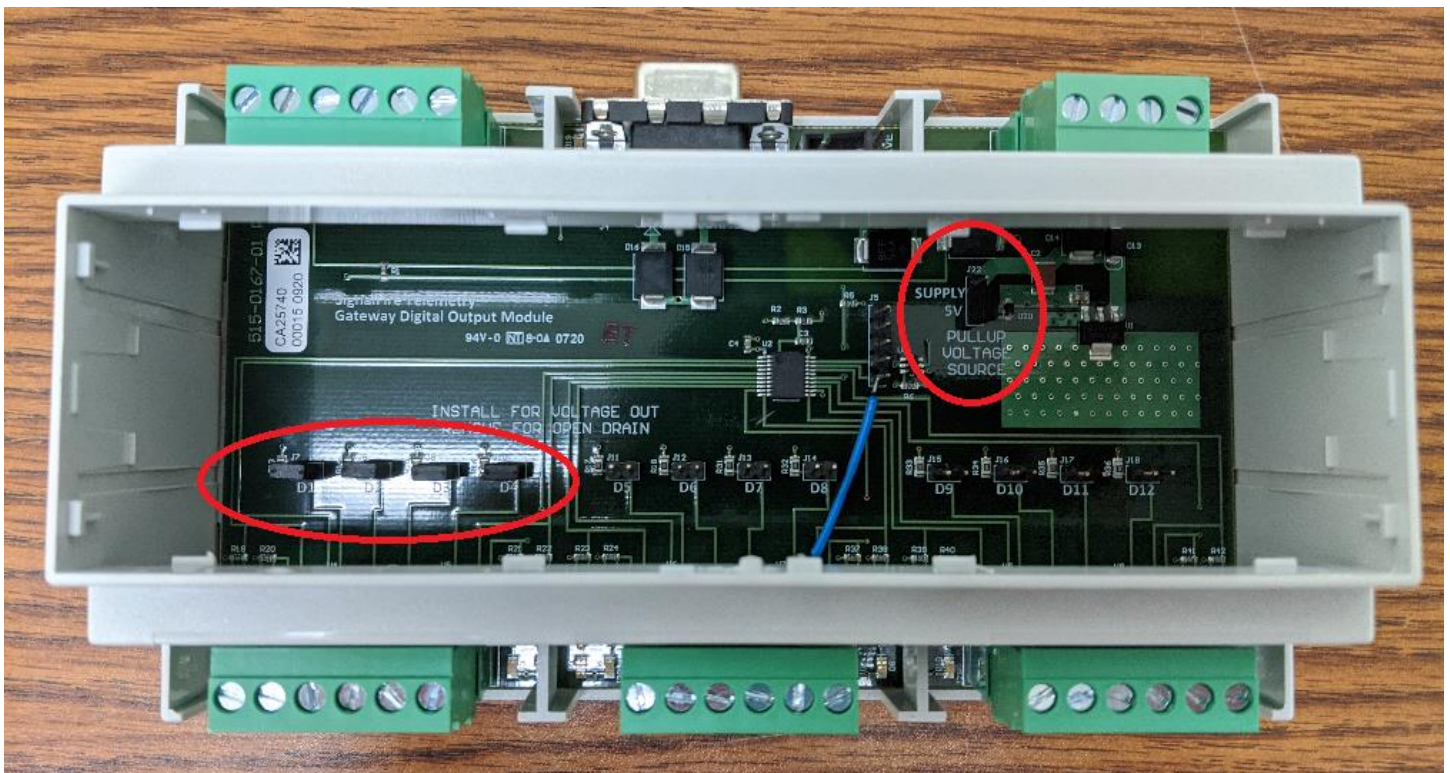
The output schematic depends on whether the jumper is placed for open-drain or voltage output mode. The transistor's on-resistance is 165mΩ.
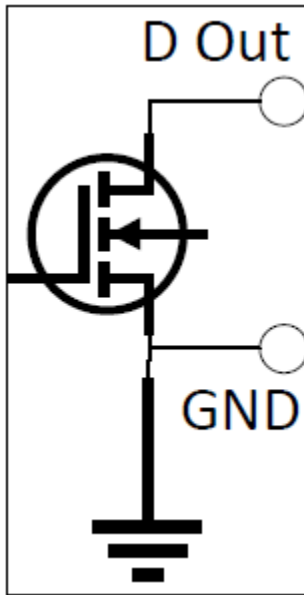
Open-Drain Mode
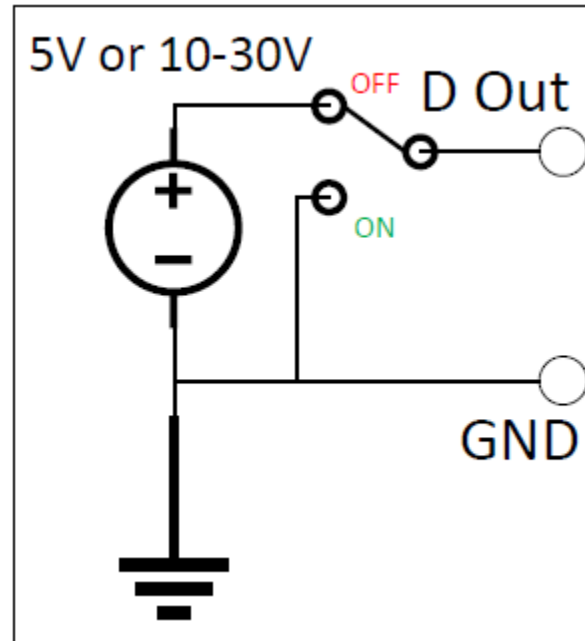
Voltage-Out Mode, 5V or Supply

Revision	Date	Changes/Updates
1.0	5/36/2020	Initial Draft