MyDro

Expansion Modules

Installation Manual

OP-464 Pulse Input (2 channel)
OP-653 Digital Input (8 channel Isolated)
OP-465 Analog Input (4 channel)
OP-461 Analog Output (2 channel)

MISSION COMMUNICATIONS

Welcome,

Thank you for choosing Mission Communications for your monitoring and alarm needs! Mission is committed to providing the highest quality in SCADA solutions. All of our products go through a strict testing regimen before leaving our facility to ensure a seamless “out of the box” installation experience.

Mission provides customers with 24-hour access to our technical support team. Additionally, we provide a wide range of information that can be remotely accessed through the web portal. At Mission, it is our goal to provide customers with the latest technology and designs while ensuring great value.

Weekly training webinars are available most Wednesdays at 2p.m., Eastern. We also provide quarterly newsletters and training videos on our website. We encourage you and your staff to take advantage of these resources. Visit www.123mc.com to sign up for the webinar and to find our training videos and newsletter archives. Our technical support staff is available at (877) 993-1911, option 2 for further assistance.

Thank you,
The Mission Team

WARNING: This symbol indicates there is caution or warning to avoid damage to your property or product.

WARNING: Follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes.

NOTE: This symbol indicates that there is something that requires your special attention.

This device complies with part 15 of the FFC Rules. Operation is subject to the following two con ditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Contents

Overview

This family of expansion modules increases the monitoring possibilities of the MyDro Remote Terminal Unit (RTU). The MyDro RTU will automatically recognize the module once it is installed and will publish the readings to the LCD screen and your web portal. Configurable options will be presented on the LCD screen under the “Config” button. Your web portal is used to create alarm notification rules for the new Input/Output (I/O) including alarm delays, analog threshold, and flow (pulse) thresholds.

The MyDro 850 series RTU is recommended for use with digital-in, analog-in, and analog-out expansion modules. Either the MyDro 150 or 850 is appropriate for use with the pulse expansion module.

Setup forms for the modules are available online. You can use the camera of your smartphone to email the form. Please complete and send the form to our technical support team as quickly as possible so reports will be labeled appropriately and the notification system will enunciate call-outs properly.

The ADAM modules provide signal conditioning, isolation, ranging, and analog/digital and digital/analog conversion. Digital communication to the MyDro is based on a unique device ID and cable (RS485, 2 wire plus power). The device ID has been set by Mission at the factory as indicated on the label.

One module of each type can be daisy-chained together on the same data bus. In other words, the MyDro can simultaneously support one of each of the following (see Table 1):

Table 1:
Expansion Module part numbers, function, and power requirements.
Max power* requirement of the Module does not include instrumentation.

	On Main Board	ADAM Expansion Available I/O	Dev ID in Decimal	Max Power*	RTU	ADAM PN
Pulse-In OP-464	0	1–2	30	2W	M150 or M850	4080-DE
Digital-In OP-653	8	D9–D16	10	1W	M850	4051-BE
Analog In OP-485	2	A3–A6	20	1.2W	M850	ADAM-4017+-CE
Analog Out OP-461	0	1–2	40	3W	M850	4024-B1E

Mission has attached labels that reflect our I/O nomenclature. For example, Mission expanded Digital I/O starts with Digital Input (DI) 9 to complement the way expanded digital inputs appear on the web portal. ADVANTECH documentation describes that input as DI 0. Mission does not currently support all features (inputs) of some ADAM modules.

Location

In most cases the included 8' communication cable allows the ADAM module(s) to be mounted on the back panel of the control cabinet and the other end connected to the nearby MyDro.

The ADAM module(s) can be mounted on a DIN rail or directly to a backplate in the control cabinet. Signal cables should be run in conduit if the module is mounted in the Mission Nema 1 or Nema 4 enclosure. No current-carrying (load) wires should be run in the same conduit as signal wires.

The RS485 communication standard (differential balanced line over twisted pair) supports distances up to 4,000'.

Communication Cable

The RJ45 end of the included cable plugs into the RS485 port (left side) of the MyDro. One twisted pair is for communications while the other powers the ADAM module(s). The four conductors terminate on the ADAM modules as follows (see Table 2):

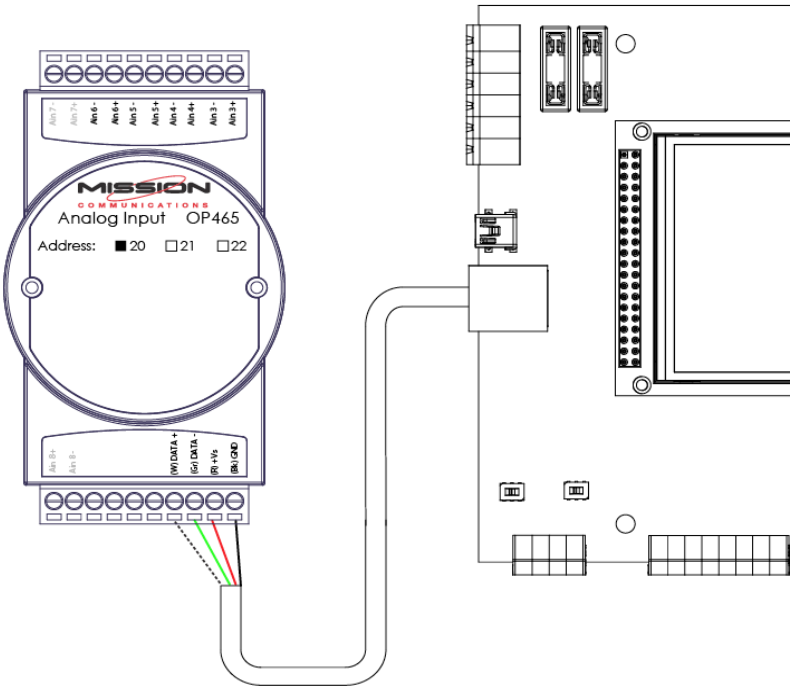
Table 2:
RS485 Connection

Module Pin #	Label	Wire Color
10	GND	Bk—Black
9	+Vs	R—Red
8	DATA -	Gr—Green
7	DATA +	W—White

Single Expansion Module Hookup

Avoid routing the communication cable parallel to other load carrying conductors.

Figure 1:
A single module network powered by communication cable



Wiring Best Practices:

- Do not run signal wires parallel to load wires. If they must cross, do so at a right angle.
- Extend the RS485 cable, rather than the cables running to the instruments, if the remote sensors are a distance away.

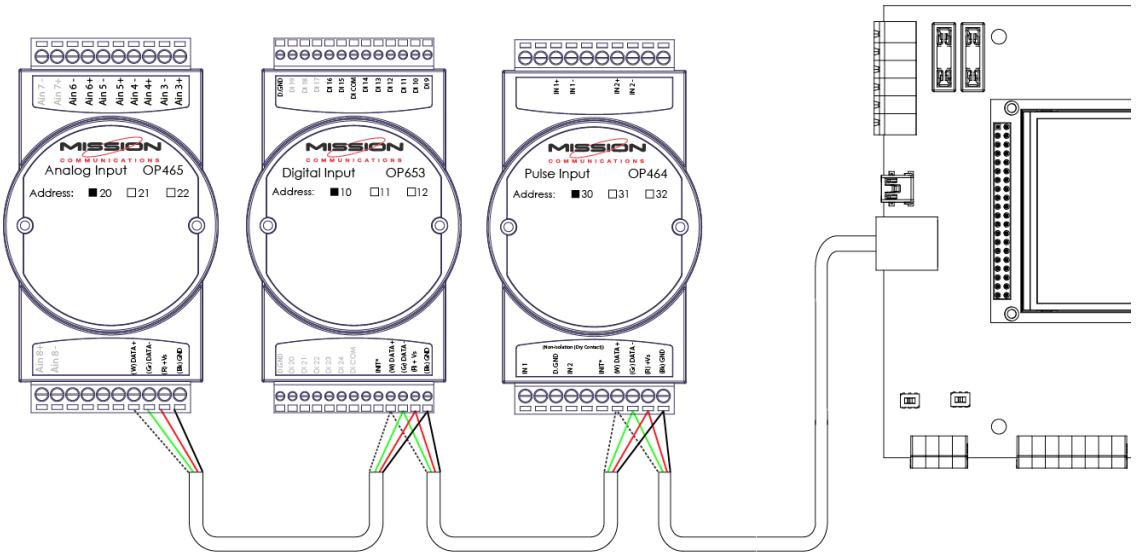
Multiple Module Hookups:

The RS485 standard allows multiple ADAM modules on the same communications bus (see Figure 2).

Generally, several ADAM modules can be powered on the same power bus. Table 1 (pg. 5) shows the power in watts required for each ADAM module. When powered by a healthy battery or AC transformer, the MyDro RTU supplies ~12–16.5VDC, and is fused for 2A. In other words, up to about 24W maximum power is available from the RS485 communications jack.

Transducers should be powered via the AUX out terminal rather than the communication cable since the auxiliary power is software selectable as 24VDC or 12VDC. Higher voltage is generally recommended for analog (4–20mA) with instruments to reduce the chance of voltage starvation in long current loops or those with multiple taps (instruments).

Figure 2:
A multiple module network powered by communication cable

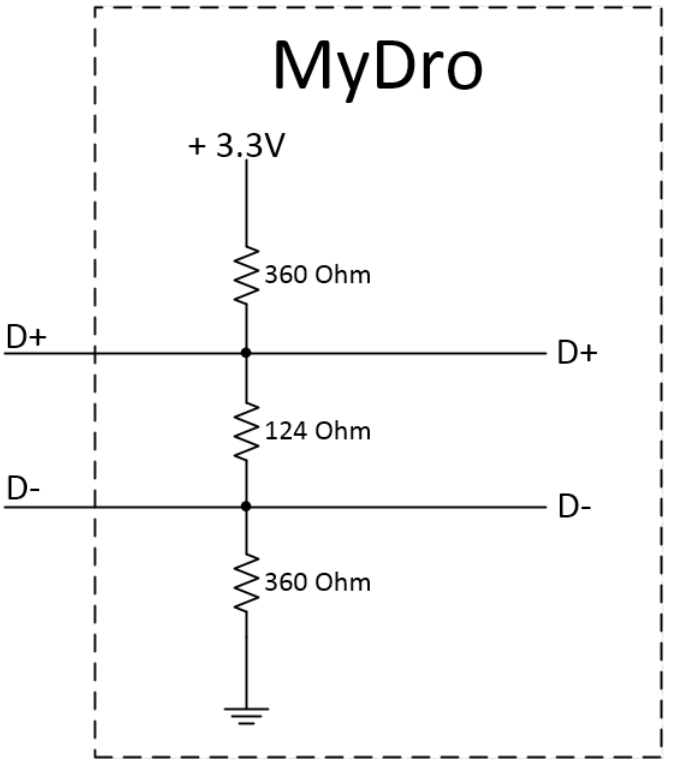


Long Cable Runs, Terminating Resistor

Generally, terminating resistors on the communication bus are not required because instruments and the expansion module are relatively close to the RTU. Long cable runs of 50' or more to an expansion module may require additional consideration.

The RS485 specification recommends, but does not specifically dictate, that the characteristic impedance of the twisted data cable be 120Ω (see Figure 4). The value of the terminating resistor is ideally the same value as the characteristic impedance of the cable (~120Ω).

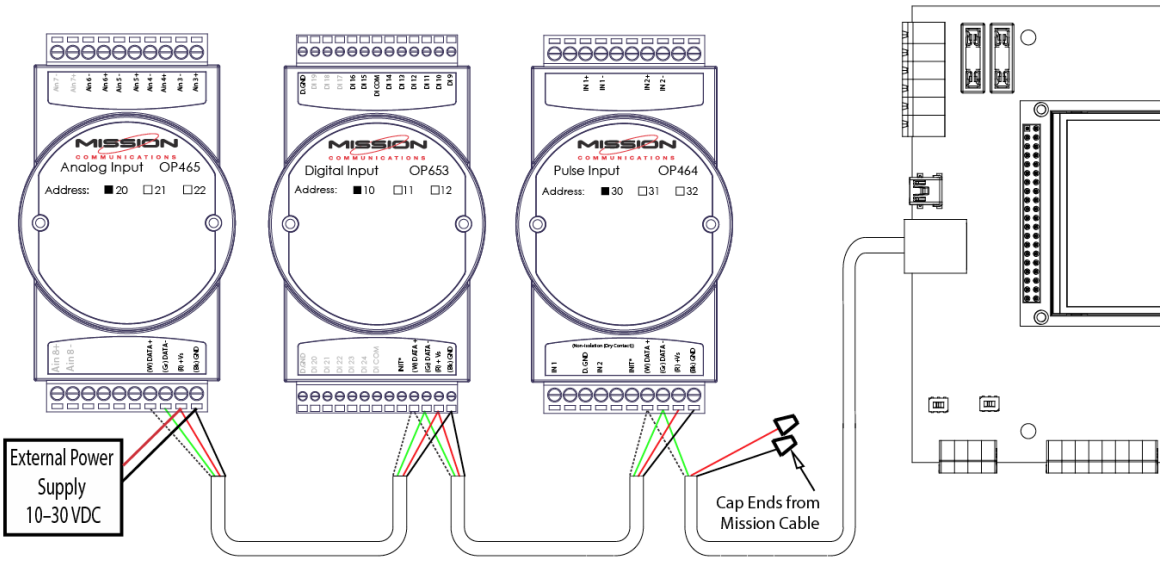
Figure 4:
RS485 impedance characteristic internal to the MyDro



The voltage drop associated with a long cable run should be considered. The ADAM module requires 10–30VDC (see Figure 3). The voltage drop caused by a long cable run can be addressed with heavier conductors or a power supply that is closer to the ADAM module.

Precautions should be taken to reduce interference (induced voltages) that increase with length. It is recommended to use a shielded twisted pair wire installed in a conduit with no other noisy conductors.

Figure 3:
A multiple module network powered by external power supply.
Cap the power ends (red, black) of the communication cable to avoid a short



Firmware

Technical Support can advise whether your MyDro firmware is appropriate.

Pulse Input (PN OP-464)

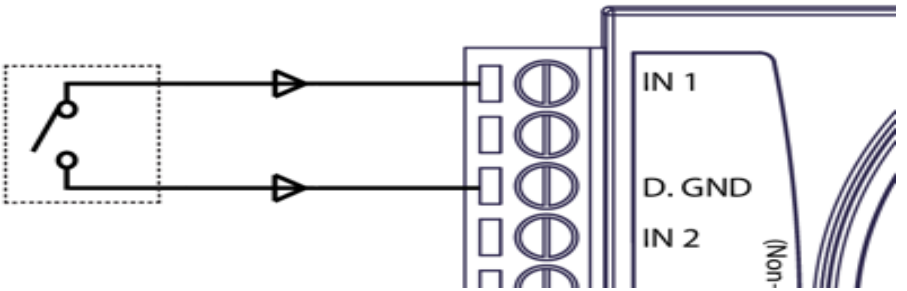
The pulse input module is a two-channel counter input. It is generally used with rain-tipping buckets and pulse flow meters.

Changes to pulse readings are reported every 15 minutes and two minutes for the MyDro 150 and 850, respectively.

The minimum pulse width is set by firmware to be 16ms (8ms high and 8ms low). Input Impedance is 50 MΩ. The module consumes 2W.

Dry Inputs
The dry inputs (no voltage) for channel 1 connect to terminal IN 1 and terminal D.GND. Likewise, channel 2 inputs connect to terminal IN 2 and terminal D.GND (see Figure 5).

Figure 5:
Dry contact input (rain-tipping bucket, pulse-based flow meter) for channel 1



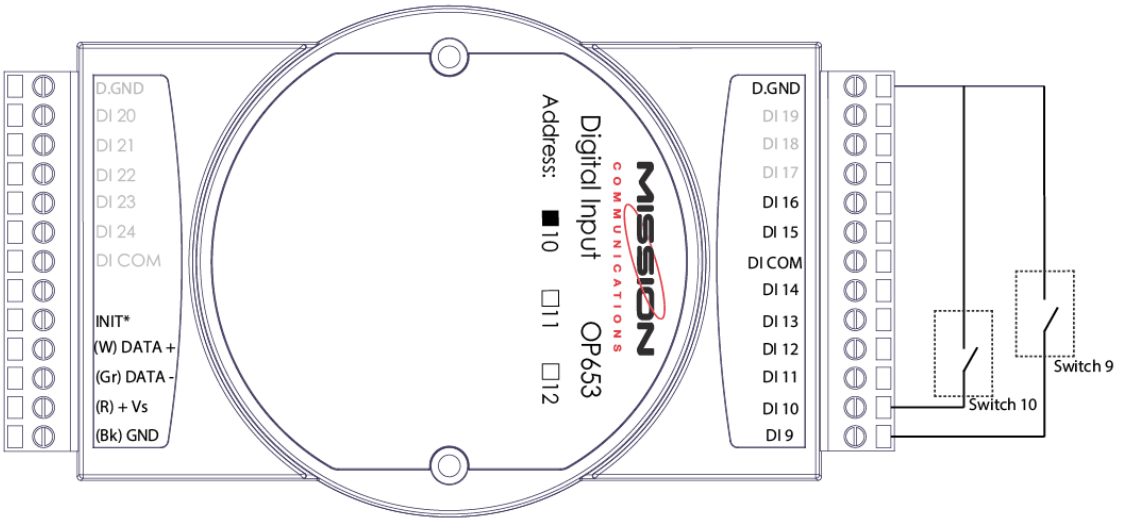
Digital In (PN OP-653)

Eight Digital Inputs can be added to the MyDro (for a total of 16) with the Digital Expansion Module (see Figure 6). These inputs are logically treated as alarm inputs, meaning that changes in state are reported in real-time. They cannot be configured as Pump Start/Runtime accumulators.

End-of-line resistors are not supported by the Digital Expansion Module.

The status of expanded inputs (9–16) can be read from LEDs on the ADAM module as well as the MyDro LCD screen.

Figure 6:
Dry Contact Wiring Diagram
Logic level 1: close to GND, Logic level 0: open



Analog In (PN OP-465)

The analog in expansion module adds four analog inputs to the two that are on the main board.

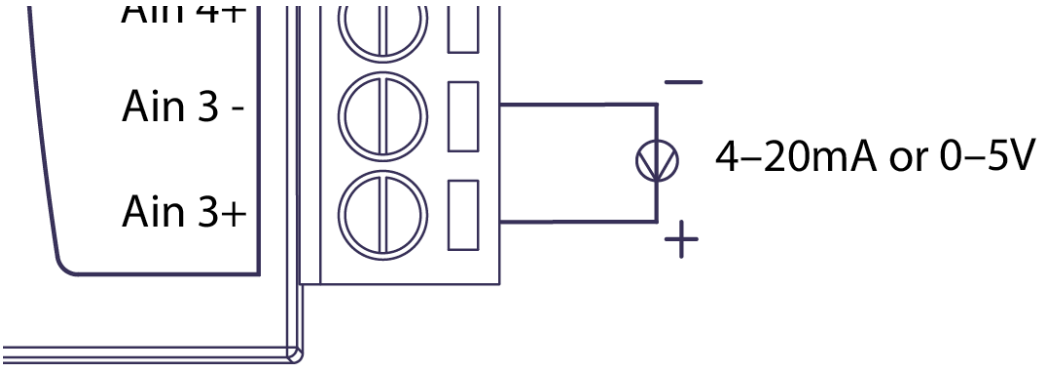
Analog values are reported every two minutes with the M850. Analog expansion is not supported with the MyDro 150 series RTU.

The module supports 4–20mA current inputs or 0–5 Volt inputs (see Table 3 and Figure 7). Selection between these inputs requires the configuration of a jumper inside the ADAM module as well as a software switch selection on the MyDro configuration screen.

Table 3:
Jumper settings for 4–20mA or 0–5V

JP0-JP7		4–20mA Input Range			
		0–5V Input Range			
Mapping to Channel		Ain 3	Ain 4	Ain 5	Ain 6
		JP0	JP1	JP2	JP3

Figure 7:
4–20mA current loop on Channel 3, where + is the signal from the transducer

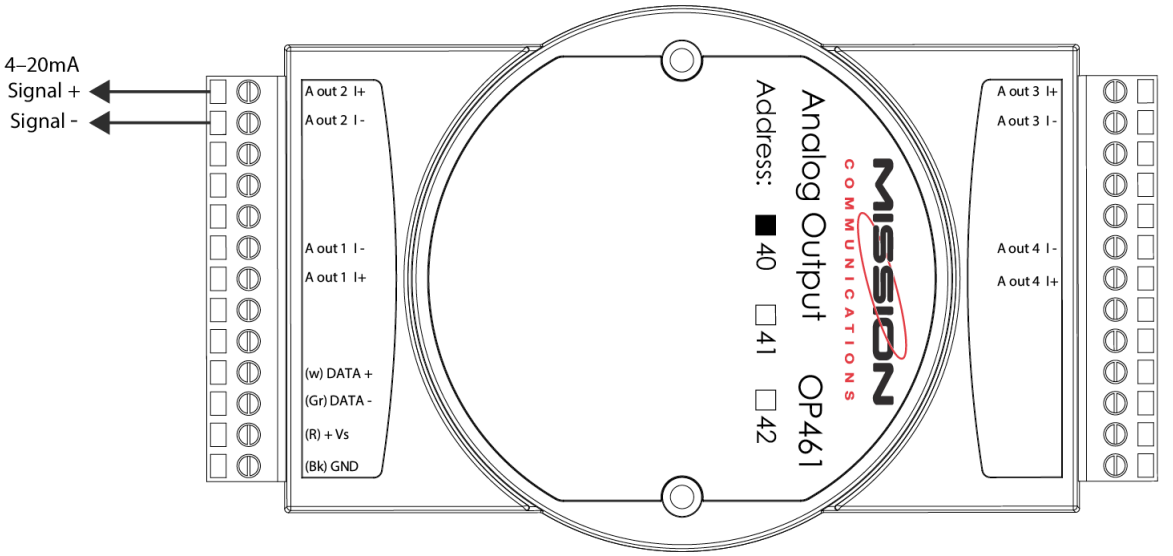


Analog Output Module (PN OP-461)

The analog output module adds 4–20mA output channels. Two current loop output channels are supported at this time (see Figure 8).

The output impedance of the analog output module is 0.5Ω. The maximum current load resistance is 500Ω.

Figure 8:
Analog Output Current Loop on Output Channel 2



Installation Notes

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