# moduleX

## Expansion I/O Module

- ○ **Expandable** I/O modules
- ○ **Optional din rail mounting**
- ○ **Distribuited** I/O architecture
- ○ **Daisy chain connection** for data exchange
- ○ **Automatic configuration** with hot-swap support
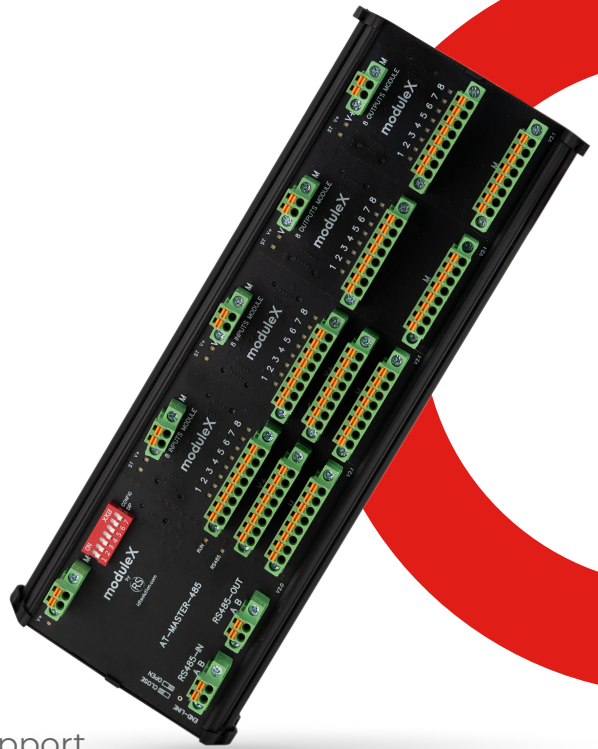
Get it on **XViewer** on the App Store and Google Play!

## Description

**ModuleX** is an expandable I/O platform for industrial application completely designed and developed by the **RedSmart** BU of **IDT to implement a distributed architecture**.

The **core asset of ModuleX** is its possibility to have different clusters delocalized on the automation line or machine, and not necessarily stuck inside a single cabinet. Last but not least, this solution helps reduce both time and costs by enabling direct wiring to sensors and actuators, eliminating the need for distribution blocks.

MX-master485 is the main controller compatible with all PLC with Modbus-RTU capabilities on the market.*
It can manage up to 16 expansion modules forming an I/O cluster. Up to 16 clusters can be connected on the same RS485 bus

4 types of modules are available:

- — **MX-8DI:** 8 Digital Inputs
- — **MX-8DO:** 8 Digital Outputs
- — **MX-4AI**: 4 Analog Inputs
- — **MX-4AOV:** 4 Analog Voltage Outputs

**Xbus** is robust communication protocol to exchange data beetwen a main module and expansion: they can be removed or added at any time even hot-swapped; no software configuration is required, the main detects automatically the expansion devices and maps dinamically the data to Modbus registers.

"**XViewer**" App is a mobile application for iOS and Android to remote monitoring production and sensors' status of ModuleX when connected to an Arduino Opta PLC. The App is integrable into Arduino with the following library:

*https://github.com/idt-redsmart/XViewer-Opta*

# Key feautures

→ **PLUG & PLAY**

No software configuration is required; the main module can be connected through 2 wires to any device with an RS485.

→ **MODULAR**

A cluster consists of 1 main device that can handle up to 16 expansion modules. By adding or removing modules, the main self-configures dynamically, eliminating the need for intervention by an expert technician for reconfiguration.

→ **DISTRIBUITED**

The RS485 bus can be extended from each main module, reaching up to 16 distributed clusters within a facility. This allows for up to 2048 digital I/O signals.
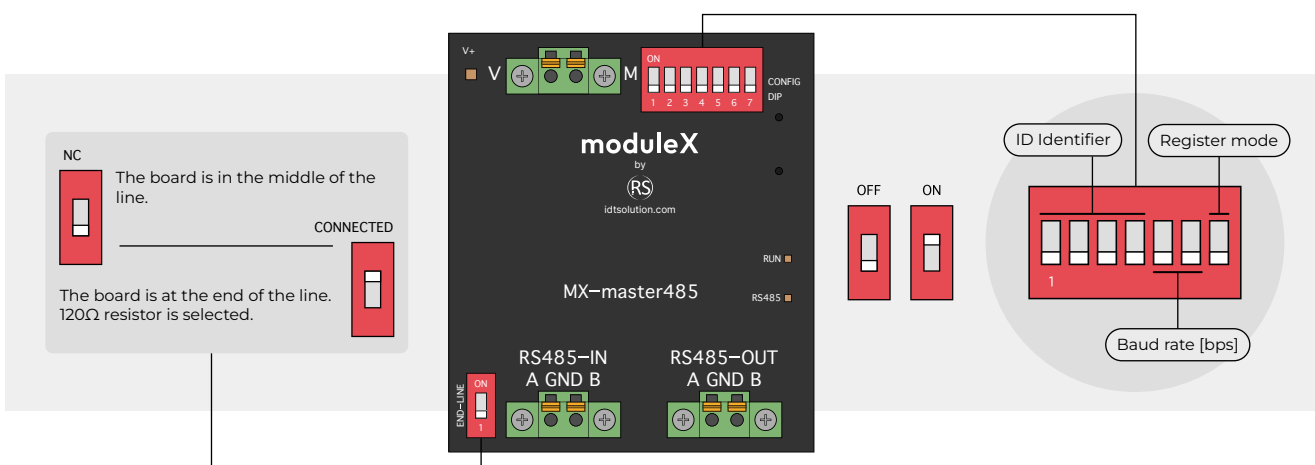
→ **SIMPLIFIED WIRING**

In a traditional electrical panel, I/O modules or PLCs are wired to distribution terminals, to which sensors and actuators are then connected. Our modules eliminate this step for installers by providing power distribution terminals for direct wiring. This results in significant space, time, and cost savings.

→ **SPEED**
Each cluster achieves a refresh rate of 10 mSec.

# Technical specifications

| MAIN MODULE | |
|---|---|
| Power supply | 24VDC +/- 10% max 0.5A |
| Dimensions | 72x63mm |
| Xbus | Up to 16 slaves, 10msec refresh rate |
| Protocol | Modbus-RTU slave up to 115200bps, configurable address |
| Connection | Easy with push-in spring terminals, bus extension with IN-OUT terminals |
| Configuration | Modbus ID, RS485 speed, register mode, and line terminator can be changed using dip switches |

## DIGITAL AND ANALOG I/O MODULES

| | Technical specifications | DIGITAL | ANALOG |
|---|---|---|---|
| **INPUT** | | MX-8DI | MX-4AI |
| | Logic power supply | 5Vdc (from Xbus) | 5Vdc (from Xbus) |
| | Secondary power supply | 24VDC +/- 10% max 2A | 24VDC +/- 10% max 2A |
| | Dimensions | 72x45mm | 72x45mm |
| | Inputs | 8 isolated digital channels (sec. power supply required) | 4 isolated analog channels Operating mode configurable via dip switch: 0-10V/0-20mA (sec. power supply required) |
| **OUTPUT** | | MX-8DO | MX-4AOV |
| | Logic power supply | 5VDC (from Xbus) | 5VDC (from Xbus) |
| | Secondary power supply | 24VDC +/- 10% max 6A | 24VDC +/- 10% max 0.5A |
| | Dimensions | 72x45mm | 72x45mm |
| | Outputs | 8 digital channels, up to 0.7A per channel, isolated (sec. power supply required) | 4 isolated analog channels (sec. power supply channels) |
| | Voltage output | – | 0-10V, max 25mA |

## Example of configuration
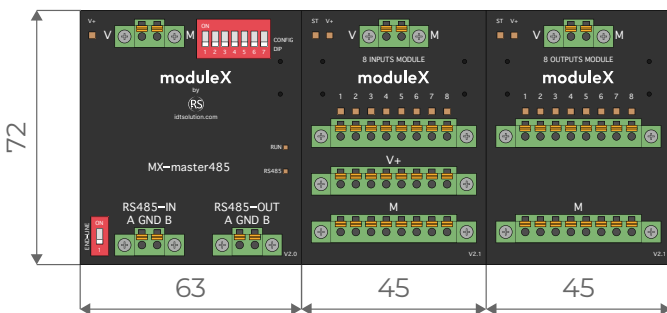


**MAIN MODULE + 8DI + 8DO**

**Power supply:** 24VDC+/- 10%

**Dimensions (with DIN case):** 137x90x55 galvanically isolated voltage groups

**8 digital inputs**, galvanically isolated

**8 digital outputs**, 0.7 amperes per channel

**Protocol:** Modbus RTU (slave)

## Time savings with respect to standard solutions

| ACTIVITY | TIME SAVING % | WHY |
|---|---|---|
| Wiring | 50% | Direct wiring: no additional blocks needed |
| Maintenance | 20% | Easy troubleshooting thanks to the on-board diagnostics led and easy replacement |
| Configuration | 30% | Plug & Play solution: no software configuration needed |