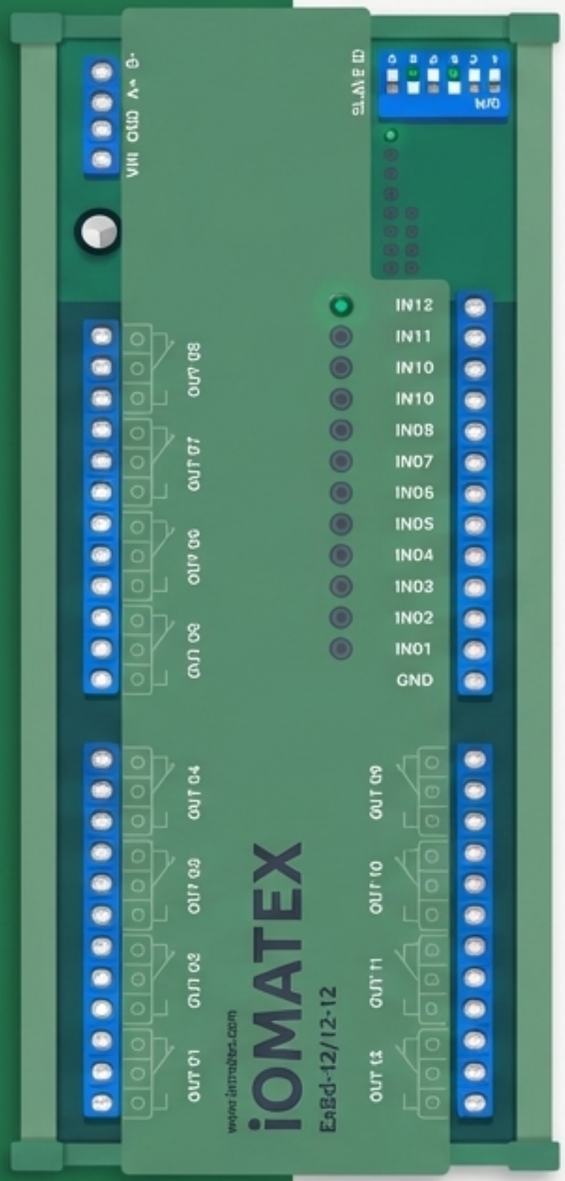


iOMATEX ExBD-12/12-12

Multifunctional Expansion Module: Deployment & Configuration Guide

Core Purpose and Deployment Scope

The iOMATEX ExBD-12/12-12 (24) is an intelligent peripheral controller engineered to expand the iOMATEX platform's capabilities, providing robust data acquisition and control for 12 digital inputs and 12 relay outputs.

Note: Professional equipment, not intended for domestic household use.

Building Automation

Lighting control, HVAC, access control.

Industrial Automation

Equipment control, small-scale sensor acquisition.

Agrotechnology

Irrigation automation, greenhouse climate control.

Security Systems

Fire/burglar alarms, gate/door access, video surveillance.

Prototyping

Industrial device prototypes and test benches.

Hardware Specifications Dashboard

Dimensions

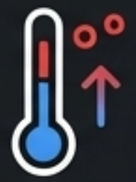
184 × 88 × 42 mm (with housing)

Weight

~318 g

Power

12 V or 24 V DC (regulated)



Thermal Tolerance

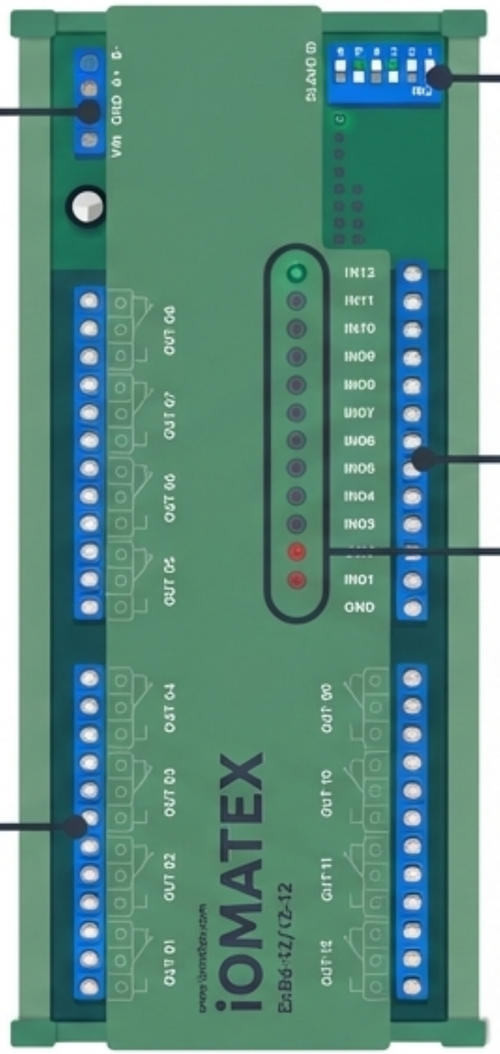
-20°C to +60°C operating range

Humidity Limits

Max 80% (non-condensing)

Safety Protocol: Installation and commissioning must be performed exclusively by qualified personnel in accordance with electrical safety standards.

Controller Anatomy and Interfaces



Power & Bus

`VIN, GND, A+, B-`

Provides DC power and RS-485 communication line.

Slave ID

6-position DIP switch configures the Modbus RTU hardware address on the network.

Input Interface

`IN01 - IN12 & GND`

Terminals for 12 optically isolated NPN discrete inputs.

Output Interface

`OUT01 - OUT12`

Terminals for 12 relay outputs (NO/COM/NC).

Status Indicators

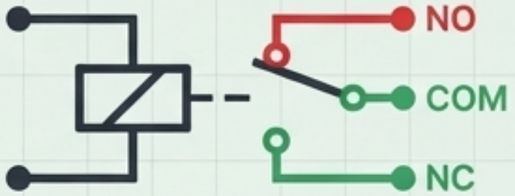
LED arrays mapping real-time activity for both inputs and outputs.

I/O Architecture Matrix: Inputs vs. Outputs

Discrete Inputs

- Capacity: 12 Channels (`IN1-IN12`).
- Type: Optically isolated, NPN.

Logic Rule: "Dry Contact" operation. The circuit is completed by connecting the specific input terminal (INx) directly to the module's common GND terminal.

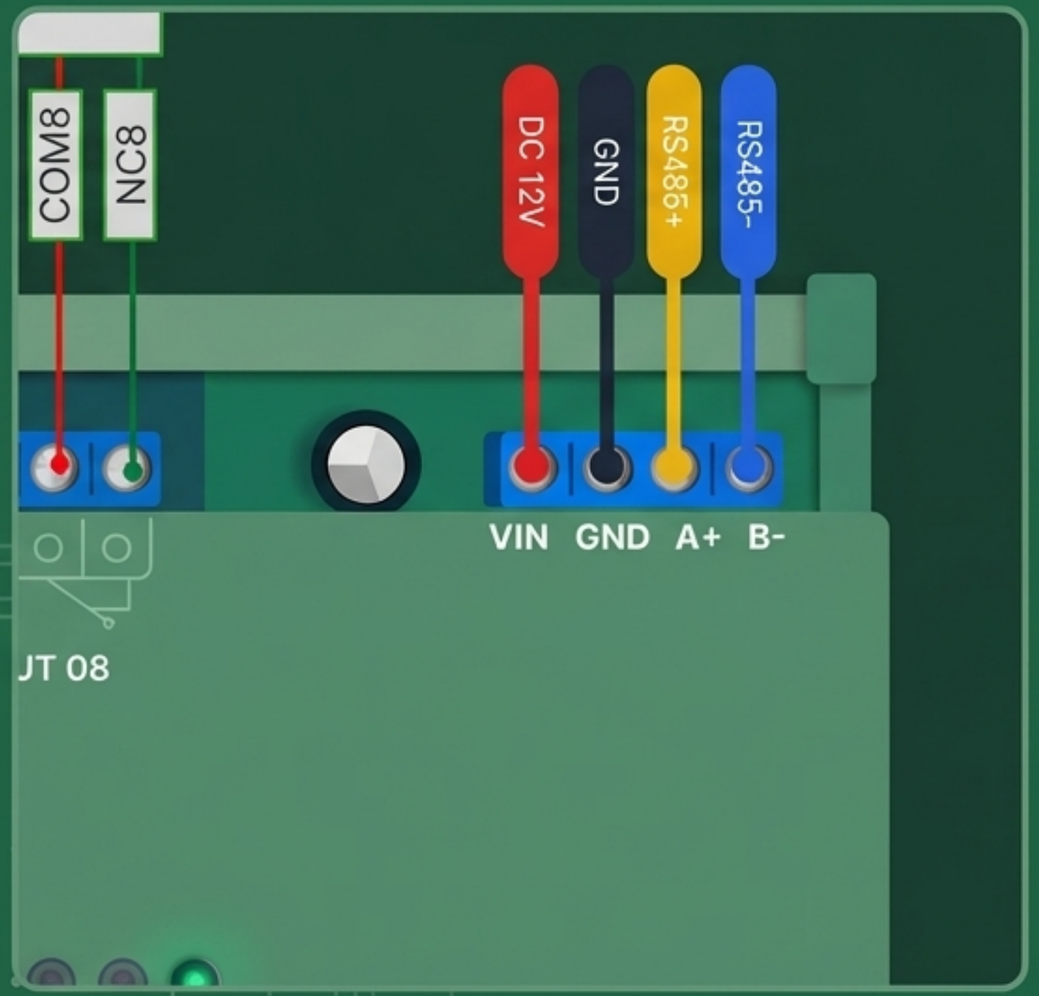


Relay Outputs

- Capacity: 12 Channels (`OUT1-OUT12`).
- Terminal Structure: 3 pins per channel: NO (Normally Open), COM (Common), NC (Normally Closed).

Logic Rule: Supports 7 distinct control modes including 'open', 'close', 'momentary', 'self-latching', 'interlocking', 'delay', and 'inter-channel interlock'.

Physical Layer: Power & Communication Bus



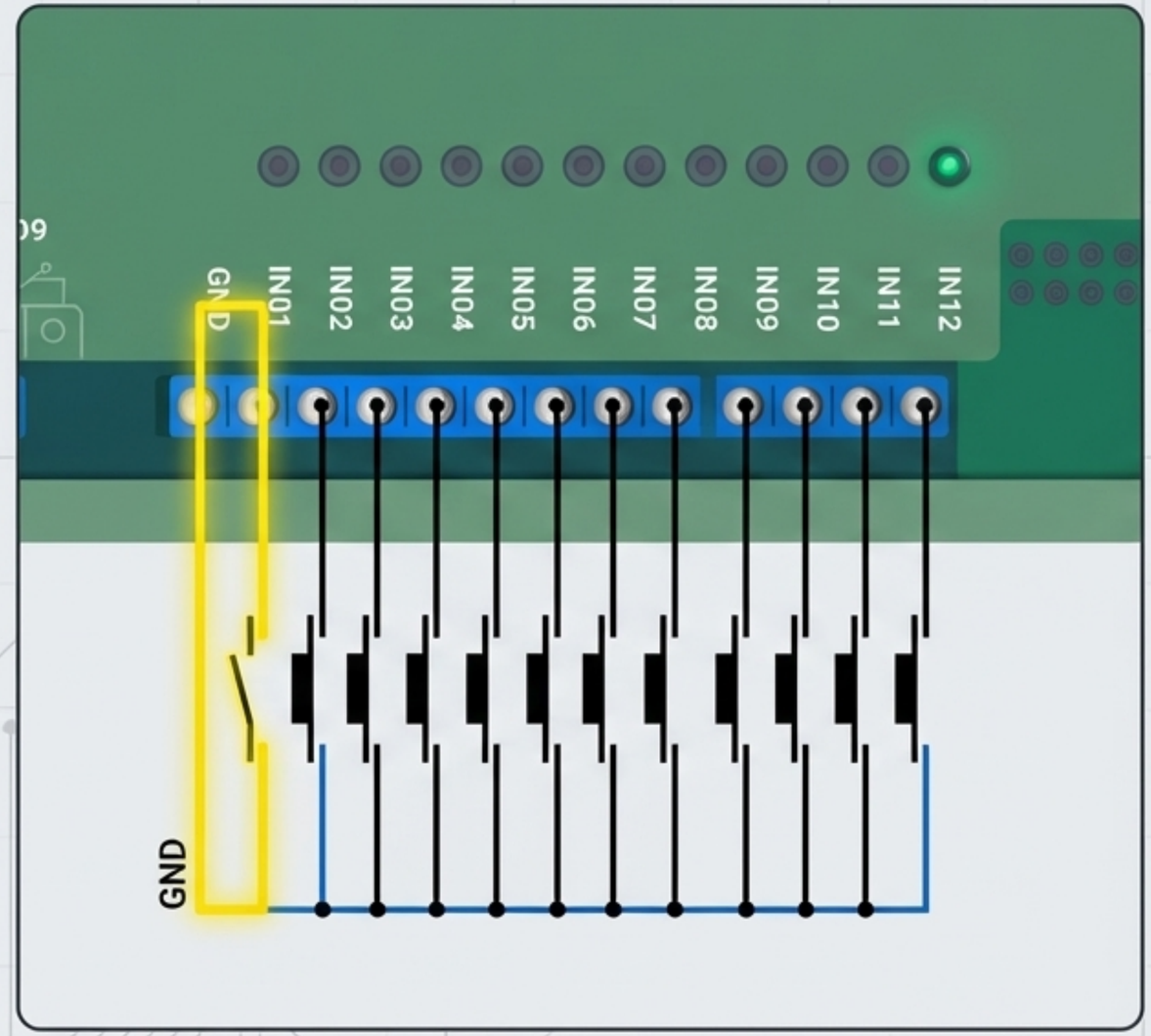
01 Connect regulated 12V or 24V DC supply to +VIN and GND.

02 Connect RS485 network to A+ and B- terminals.

Crucial Engineering Note

Network Topology dictates a linear bus (daisy-chain), not a star topology. The use of a 120 Ω termination resistor at both ends of the RS485 line is highly recommended.

Physical Layer: Discrete Input Wiring (NPN)



Wiring Rules

- Inputs operate on negative logic (NPN).
- No external voltage should be applied to the IN terminals.
- Wire one side of the dry contact (switch, sensor relay) to the `INx` terminal.
- Wire the returning side of the contact to the shared module `GND`.

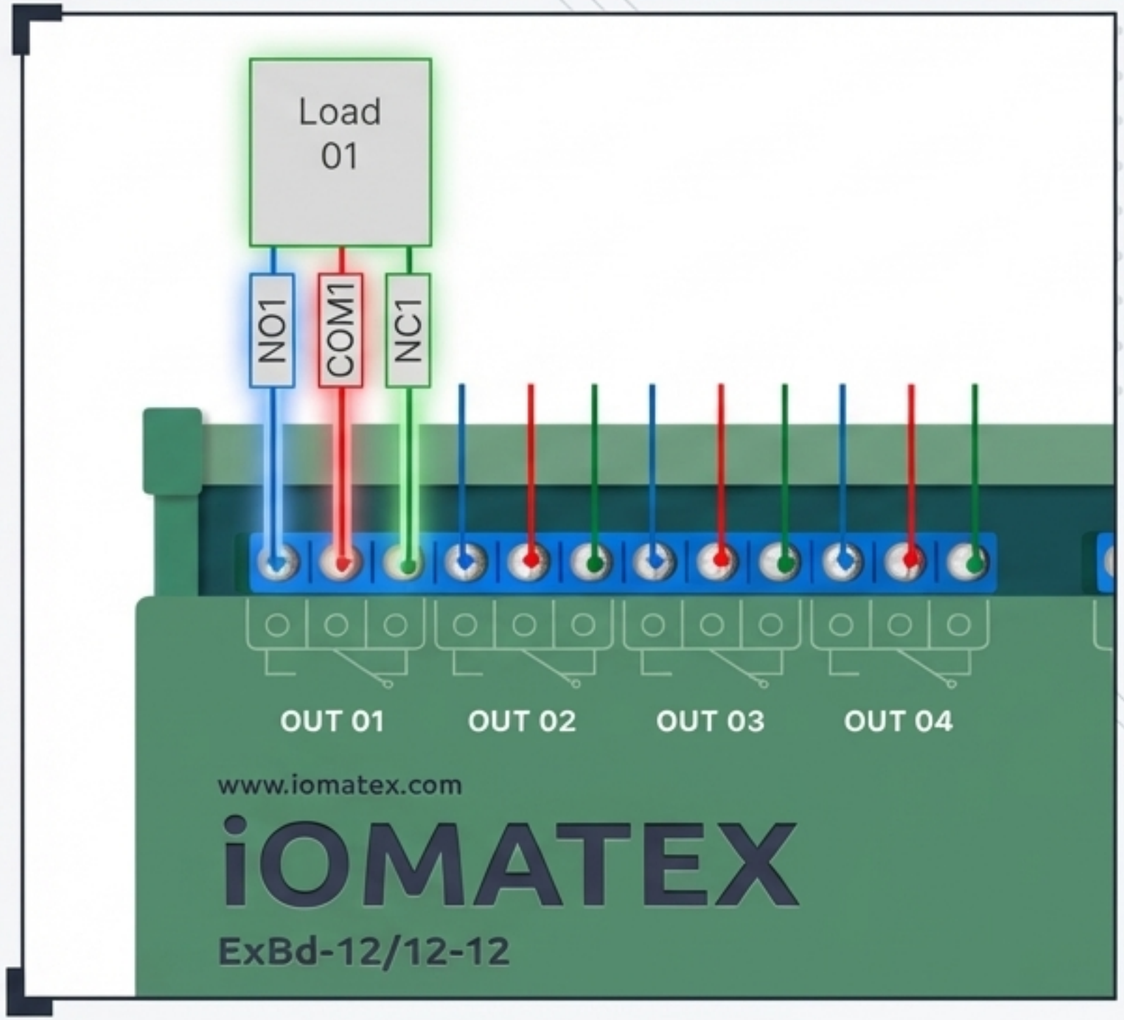
Physical Layer: Relay Output Wiring

Wiring Rules

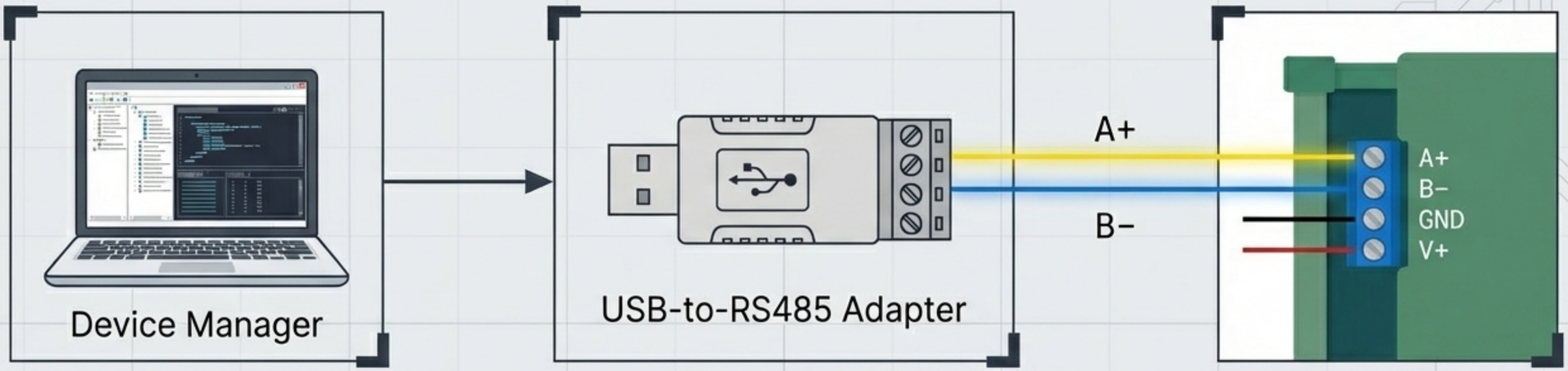
The module acts as a switch, it does not supply power to the load directly.

Connect the external load power supply line to **COM** (Common).

Connect the load device to **NO** (Normally Open) for **default-off operation**, or **NC** (Normally Closed) for **default-on** operation.



The Digital Handshake: PC Integration



Connection Protocol

- Plug adapter into USB and identify the assigned `COM port` in Device Manager.
- Connect adapter `A+` wire to module `A+` terminal.
- Connect adapter `B-` wire to module `B-` terminal.

Logical Setup Stage 1: **Serial Port Verification**

1. **Initialize:** Launch Serial Port Tester and navigate to Port -> Settings.
2. **Configure Parameters:**

```
Port Number: [User COM Port]
Baud Rate: 9600 (Factory Default)
Data Bits: 8
Parity: None
Stop Bits: 1
Flow Control: None
```

3. **Activate:** Click OK, navigate to Port -> Open (COMx).

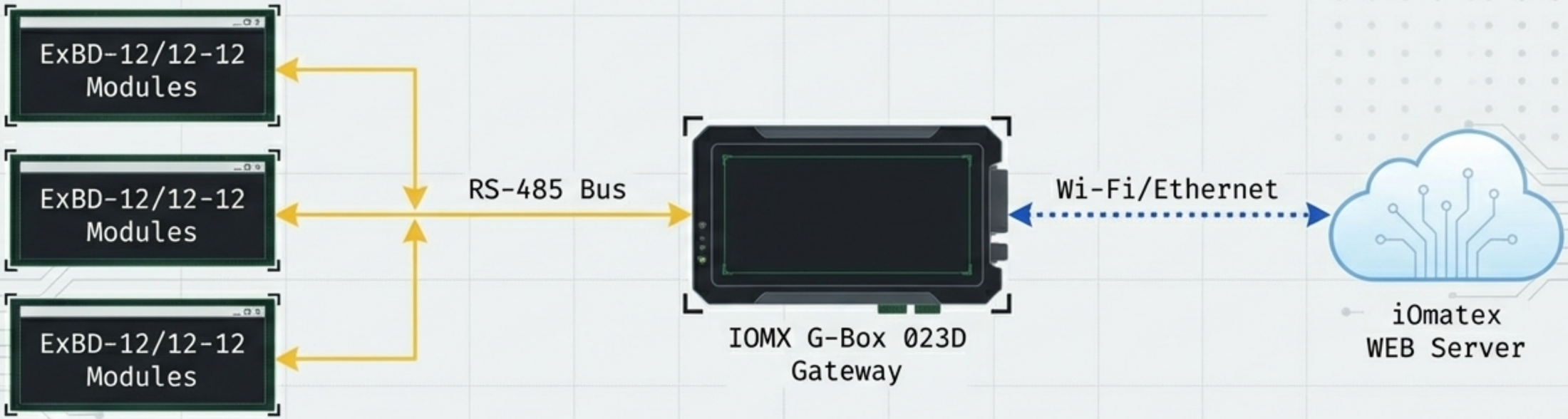
Format Note: Module utilizes Modbus RTU protocol. Data transmission must be configured to HEX format.

Logical Setup Stage 2: Modbus Polling

Connection Setup (Press F3)	
Connection:	`Serial Port`
Mode:	`RTU`
Parameters:	`9600, 8, None, 1`

Read/Write Definition (Press F2)	
Slave ID:	Set to match the physical DIP switches on the module.
Function:	`06 Write Single Register` (Command required to actuate relays).
Address:	Start at `1`.
Quantity:	`1`.

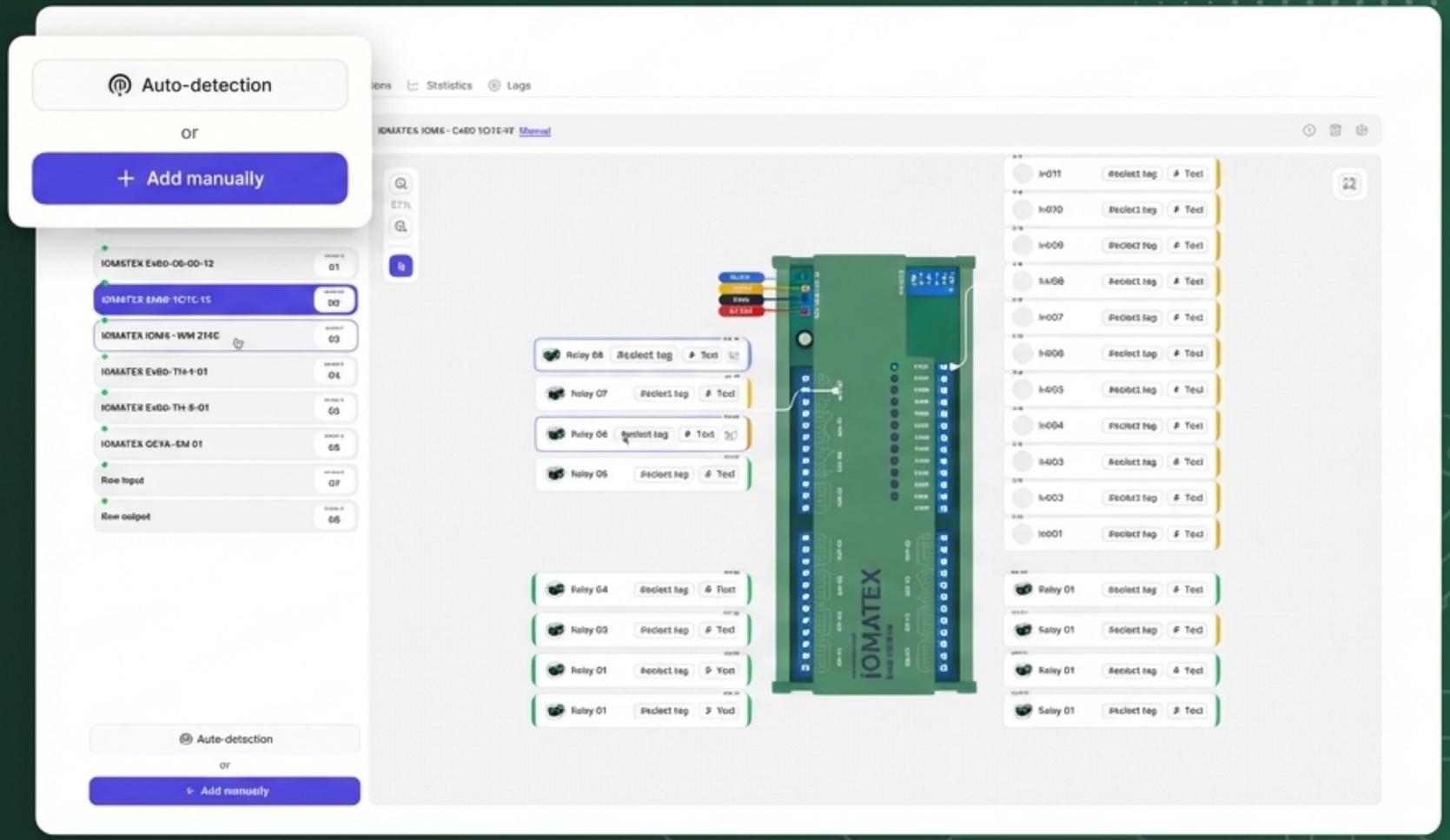
Network Topology: Bridging to the Gateway



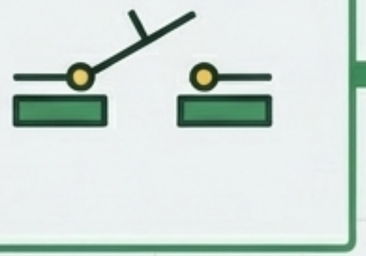
- **Scale Capabilities**: Up to 32 independent modules can be supported on a single RS-485 bus line per gateway.
- **Gateway** requires active Ethernet/Wi-Fi connection to register telemetry in the iOmatex system.

Cloud Integration: iOmatex Web Interface

1. Access iOmatex web interface and navigate to **Devices**.
2. Click **Auto-detection**. The system will scan the RS-485 network and instantly map the connected module.
3. Configure individual Input tags and Relay logic directly via the visual drag-and-drop web UI.

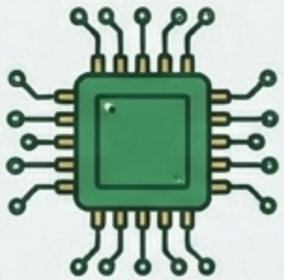


The Signal Journey: End-to-End Architecture



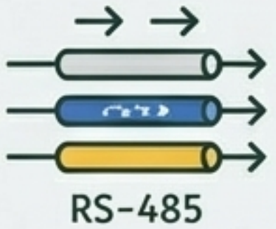
1. The Physical Layer

Actuation: A physical switch closes. Dry contact connects to module GND.



2. The Hardware Layer

Processing: ExBD NPN opto-isolator reads signal, converts to Modbus RTU based on Slave ID.



3. The Transport Layer

Transmission: HEX data travels across the daisy-chained RS-485 bus to the IOMX Gateway.

4. The Application Layer

Reflection: Gateway pushes telemetry over Ethernet; web UI instantly registers IN01 as active.

From dry contact to global cloud control seamlessly.