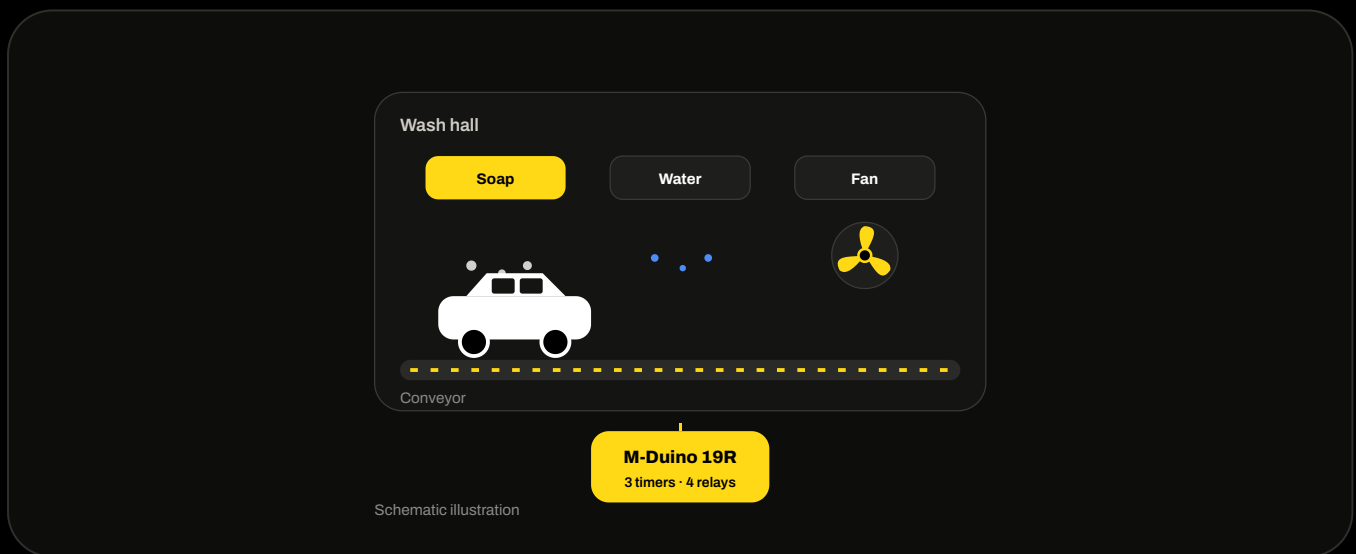


CAR WASH AUTOMATION · ARDUINO PLC

Soap, water, brushes and air in one fixed order. **One Arduino PLC** runs the whole cycle.

How an Industrial Shields M-Duino 19R automates a car wash: it detects the car, moves it along the conveyor and times soaping, washing and drying, so the wash uses less water, fewer people and less time than a manual one.

[Read the interactive case study online ›](#)

3

phases in a fixed sequence: soaping, washing, drying

3

timers, one for each phase

4

relay outputs: soap pump, brushes, water pump, fan

1 PLC

M-Duino 19R runs the cycle

THE CHALLENGE

Run every wash the same way, without an operator at each step.

When a car enters the hall, a fixed sequence has to start on its own: soaping, washing and drying, while a conveyor carries the car to the end of the route.

01

Water

Automation helps minimise water wastage compared with washing by hand.

02

Manpower

Because the system runs on its own, fewer staff are needed to operate the wash.

03

Time

Automatic control of every phase reduces the time each wash takes.



Detect the car automatically

A load cell detects a weight similar to that of a vehicle. An infrared sensor or any other presence sensor can also be used, and motion sensors could replace the timers to detect when the car reaches each phase.

HOW IT WORKS

One sequence, three timers, one controller.

Step 1 · Detection

The load cell starts the cycle

When the load cell at the entrance detects a weight similar to that of a vehicle, the PLC starts the motor that drives the conveyor and starts counting the soaping, washing and drying timers.

- Input: load cell on an analog input with interrupt
- Alternative: infrared sensor on a digital input
- Output: conveyor motor on a digital output

Step 2 · Timed phases

Soaping, washing and drying

For soaping, the PLC acts on the soap dosing pump. When that time is completed, it switches on the washing pump and, at the same time, the relay that controls the three brush motors. With the third timer, the fans start the drying.

- Relay 1: soap dosing pump
- Relay 2: three brush motors
- Relay 3: water pump

Step 3 · End and safety

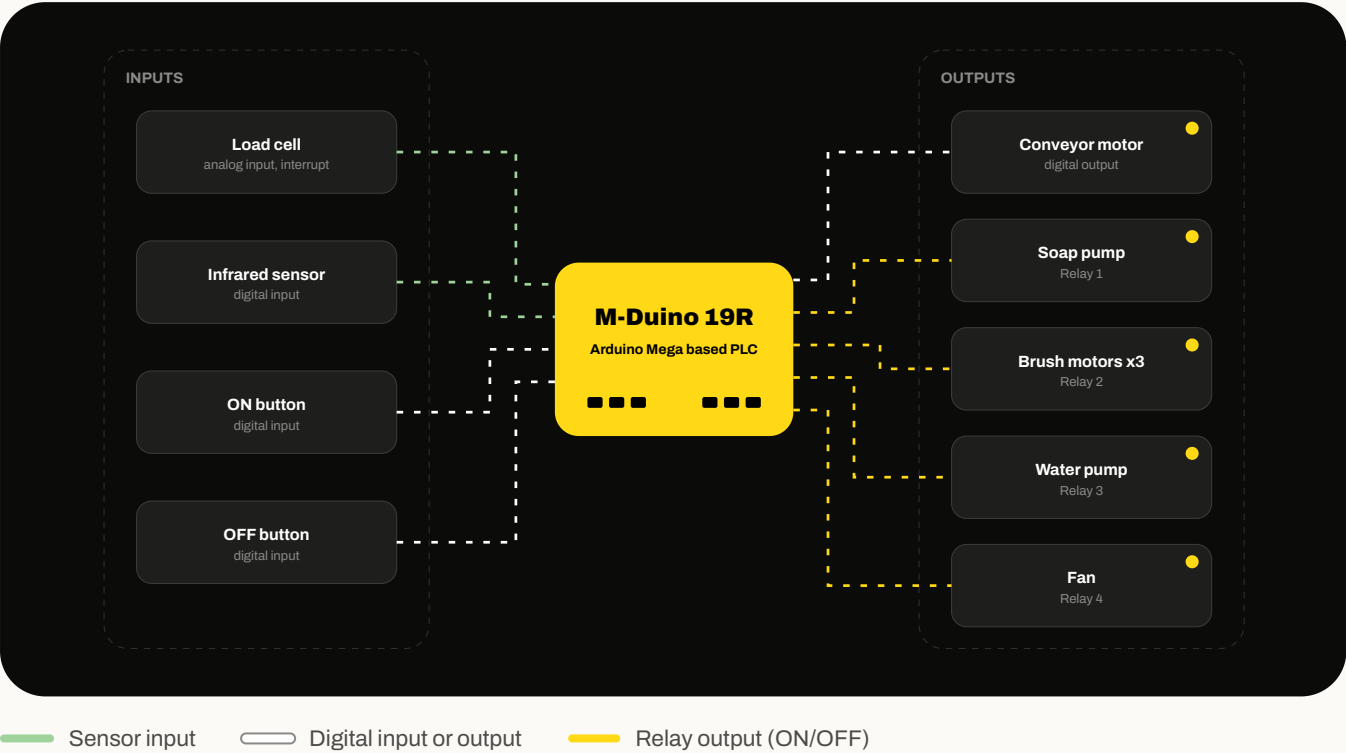
Limit switch and manual buttons

The conveyor takes the car to the end of the route. When the limit switch detects it, the whole process is closed. Manual ON and OFF buttons let the operator start or stop the system when required.

- Input: limit switch at the end of the route
- Inputs: manual ON and OFF buttons
- Result: the process closes and waits for the next car

Every signal, end to end.

The original wiring scheme of the installation, redrawn. Sensors and buttons on the left, the PLC in the middle, the loads on the right.



Signal list

Signal	Direction	Type	Purpose
Load cell	Sensor → PLC	Analog input with interrupt	Detects a weight similar to that of a vehicle and starts the cycle
Infrared sensor	Sensor → PLC	Digital input	Detects the presence of the car
ON button	Operator → PLC	Digital input	Starts the system manually
OFF button	Operator → PLC	Digital input	Stops the system manually
Conveyor motor	PLC → motor	Digital output	Moves the car along the wash
Soap dosing pump	PLC → pump	Relay 1 · ON/OFF	Soaping phase
Brush motors (3)	PLC → motors	Relay 2 · ON/OFF	Scrubs the car during the washing phase
Water pump	PLC → pump	Relay 3 · ON/OFF	Washing phase
Fan	PLC → fan	Relay 4 · ON/OFF	Drying phase

One controller on the DIN rail.



M-Duino Ethernet PLC Arduino 19R+

The original case uses the M-Duino 19R, the relay version of the Arduino Mega based M-Duino family. The 19R+ is its current version.

Inputs	6 (4 analog 0-10 V)
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Outputs	11 (8 relays, 3 analog/PWM)
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Communications	Ethernet, RS-485, RS-232, TTL, I2C, SPI
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Power	12 to 24 Vdc, IP20
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[See the M-Duino 19R+ >](#)

The whole cycle in one program

Detection, the three timers, the conveyor and the four relay outputs run in the same program, on the same controller.

Relays for the loads

The relay version of the M-Duino switches the soap pump, the brushes, the water pump and the fan directly from its outputs.

Open and adaptable

The sequence is written in Arduino code, so the timers can be replaced by motion sensors that detect when the car reaches each phase.

SIMILAR PROJECT?

Tell us your sequence. An engineer will answer.

Car washes, conveyors, pumps or any timed process: describe what you need to detect and drive, and we will tell you which controller fits.

FULL CASE STUDY ONLINE

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