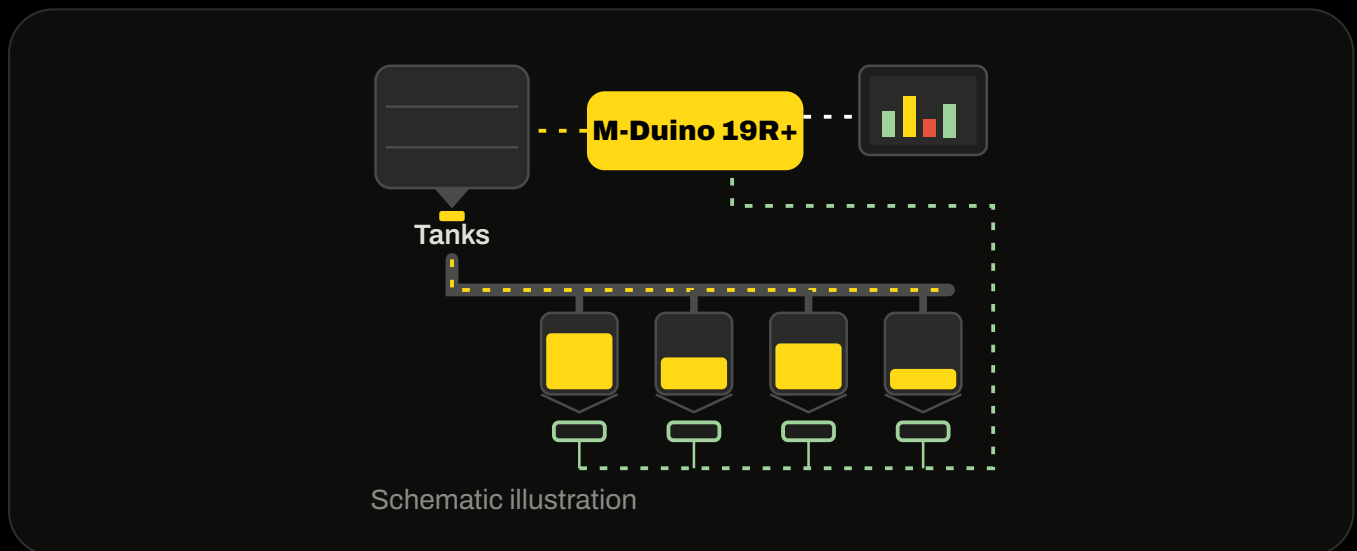


ANIMAL FEEDING · M-DUINO 19R+

Weigh every feeder. Dose the right ration.

Load cells, an M-Duino 19R+ and a Panel PC with MQTT and Node-RED.

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

1

load cell in each feeder

2

ways to move food: gravity
pipe or piston

3

jobs: feed, evacuate, clean

24/7

food amounts monitored

THE CHALLENGE

The right food, in the right amount, at the right time.

The goal is a feeding system that a PLC controls. It tracks the food to set the periods, the quantities and the kinds of food. The animal carers give the orders (kind of food, temperature and more), and the system dispenses the correct amount. The data must be visible on a panel and, if needed, from anywhere through a VPN.

01

A ration for each batch

Set the periods, the quantities and the kind of food. Adapt the ration to different batches of animals.

02

Food levels, 24/7

Every feeder has a load cell. The PLC knows how much food is left, all day and all night.

03

Food, water and medicines

Food, medicines and cleaning liquids are stored in tanks. The system gives the right amount of food, and medicines when they are needed.

04

Feed and straw move differently

Feed moves well in a gravity pipe. Straw moves better with a piston. The system uses the right one for each kind of food.



Clean the line after feeding

An evacuation section removes the food that is left. Then the system distributes the cleaning products you select, and they leave through a drain.

HOW IT WORKS

Three loops: weigh, dose, then clean and report.

Loop 1 · Weigh

A load cell in each feeder sends the food weight.

Each feeder has a load cell. It sends the weight of the food to the PLC, where the data is processed. In the scheme of the case, the load cell goes to an analog input. The PLC compares the weight with the levels set by the carers. A typical way to do it: when a feeder goes under a refill level, the PLC asks for a new dose.

- Load cell in every feeder, on an analog input
- Food and state levels for each feeder
- Data for the consumption of each batch

Loop 2 · Dose and distribute

A gate opens, the food moves, the load cell sends the weight.

When the parameters are set, the distribution starts. The tanks give the exact amount through an automated gate. A gravity pipe or a piston moves the food to the animals, depending on the kind of food. In the scheme, both the tanks and the distribution system are on digital outputs of the PLC.

- Automated gate on the tanks, on a digital output
- Gravity pipe for feed, piston for straw
- Medicines in the ration when they are needed

Loop 3 · Clean and report

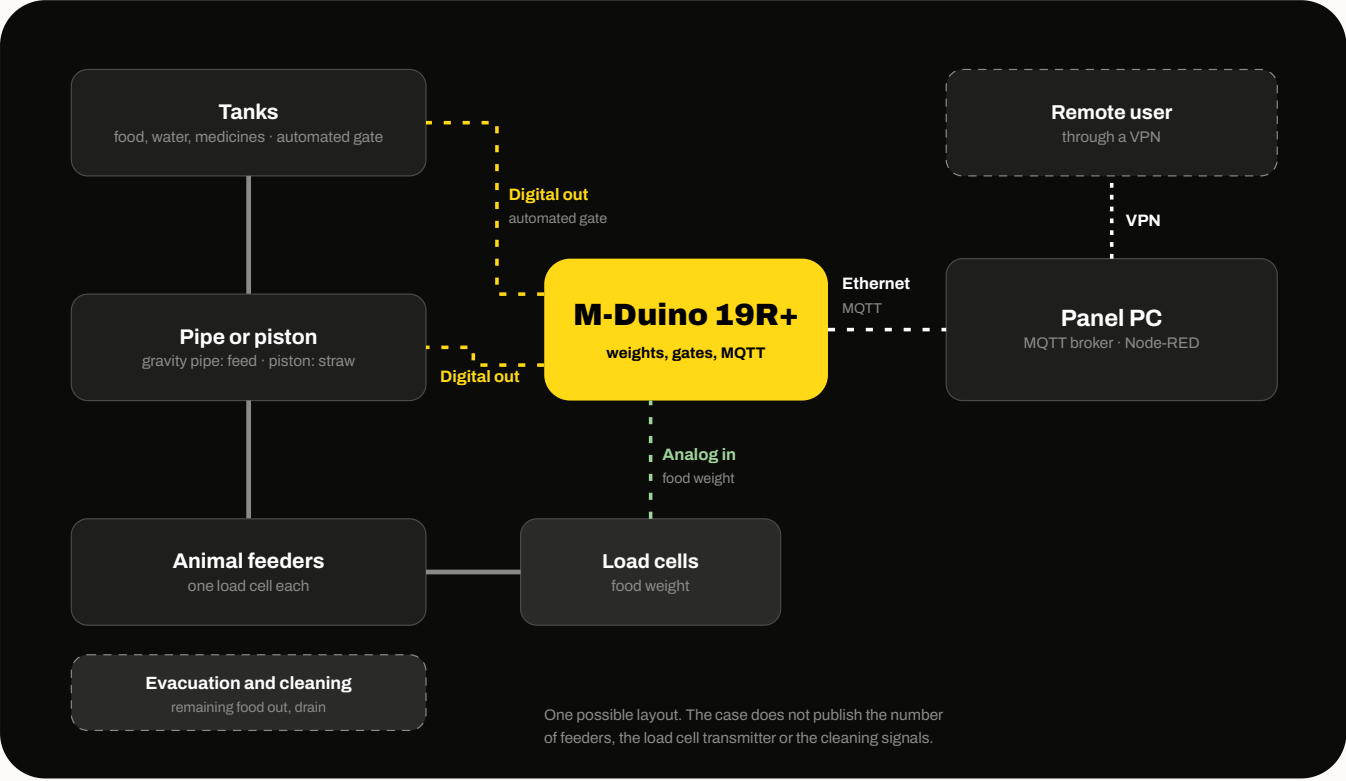
The line is cleaned, and the data goes to the panel.

An evacuation section removes the food that is left, with pipes or pistons. The cleaning products go through the system and leave through a drain. All the data goes to the Panel PC: an MQTT broker on the Panel PC sends and receives the data, and Node-RED shows it. Through a VPN connected to the MQTT server, you can see it from anywhere.

- Evacuation of the remaining food
- Cleaning products and a drain
- MQTT broker and Node-RED on the Panel PC, remote access through a VPN

How does a PLC automate animal feeding?

Load cells in the feeders send the food weight to an analog input of the M-Duino 19R+. With this weight and the parameters of the carers, the PLC uses digital outputs to open the gate of the tanks and to run the pipe or piston system. A Panel PC on Ethernet holds the MQTT broker and Node-RED. A VPN gives remote access.



— Analog signals — Digital outputs — Ethernet, MQTT and VPN — Mechanical assembly

Signals and data

Signal	Between	Type	Purpose
Food weight	Load cell in each feeder → M-Duino 19R+	Analog in	Food and state levels of each feeder. Signal conditioning not published
Dose gate	M-Duino 19R+ → food and water tanks	Digital out	The automated gate gives the exact amount from the tanks
Distribution	M-Duino 19R+ → pipe or piston system	Digital out	Moves the ration to the animals: gravity pipe for feed, piston for straw
Evacuation and cleaning	M-Duino 19R+ → evacuation section, cleaning products, drain	Not published	Removes the food that is left and cleans the line
Data and parameters	M-Duino 19R+ ↔ Panel PC	Ethernet, MQTT	The broker on the Panel PC sends and receives the data. Node-RED shows it
Remote access	Remote user ↔ MQTT server	VPN	See the information from anywhere

HARDWARE USED

M-Duino 19R+ to control. Panel PC to see and set.



M-Duino Ethernet PLC Arduino 19R

An industrial PLC built on an original Arduino Mega 2560, with 17 I/O, 8 relays, Ethernet and RS-485, for DIN rail. In the feeding line it reads the load cells, opens the gates, runs the distribution and sends the data to the Panel PC.

Role	Load cells, dose gates, distribution, data to the Panel PC
Inputs	6: 4 analog/digital (0-10 V), 2 digital optoisolated with interrupt
Outputs	11: 8 relays, 3 analog/digital/PWM (0-10 V)
Comms	Ethernet (W5500), 2 x RS-485, RS-232, TTL, I2C, SPI
Extras	Real-time clock, microSD slot
Power and mounting	12 to 24 Vdc, DIN rail TS35, IP20

The original case names the M-Duino 19R. It is this product, reference IS.MDuino.19R+.

[See the M-Duino 19R+ »](#)



TouchBerry Pi Panel PC 10.1"

The panel of the feeding line. An industrial Panel PC with a Raspberry Pi, Linux and a touch screen. It holds the MQTT broker and the Node-RED dashboard, and the carers set the parameters on it.

Role	MQTT broker, Node-RED, parameters, monitoring
Screen	10.1", 1280 x 800, capacitive touch
Computer	Raspberry Pi 4, Linux preinstalled
Link to the PLC	Gigabit Ethernet
Reliability	UPS with supercapacitors for a safe shutdown

The case says "a Panel PC based on Raspberry Pi" and does not publish the exact model. The image and the link show the current TouchBerry Pi Panel PC 10.1" FLEX.

[See the TouchBerry Pi 10.1" »](#)

Dose by weight

The load cell measures what is in the feeder. The PLC knows how much food the animals ate, and how much to add.

One system for food, medicines and cleaning

Food, water, medicines and cleaning liquids are stored in tanks and go out through the distribution system. You set all of them from the panel.

The right transport for each food

A gravity pipe for feed, a piston for straw. Digital outputs of the PLC run either one.

Open data path

MQTT between the PLC and the Panel PC, and Node-RED on top. You can read the data, keep it and analyse it for continuous improvement.

Relays in the controller

The M-Duino 19R+ has 8 relay outputs and 3 analog/PWM outputs. It can switch gate actuators, pumps or motors through the right contactors.

Remote, with a VPN

The panel can be fixed or remote. A VPN to the MQTT server gives access from anywhere, without opening the broker to the internet.

SIMILAR FARM?

Tell us your animals and your feeders. An engineer will answer.

Tell us how many feeders you have, the kinds of food (feed, straw, water, medicines), how the food moves today and what the carers need to see. We will tell you which controller fits and how to read the load cells.

READ IT ONLINE

industrialshields.com/animal-feeding-automation-case-study

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