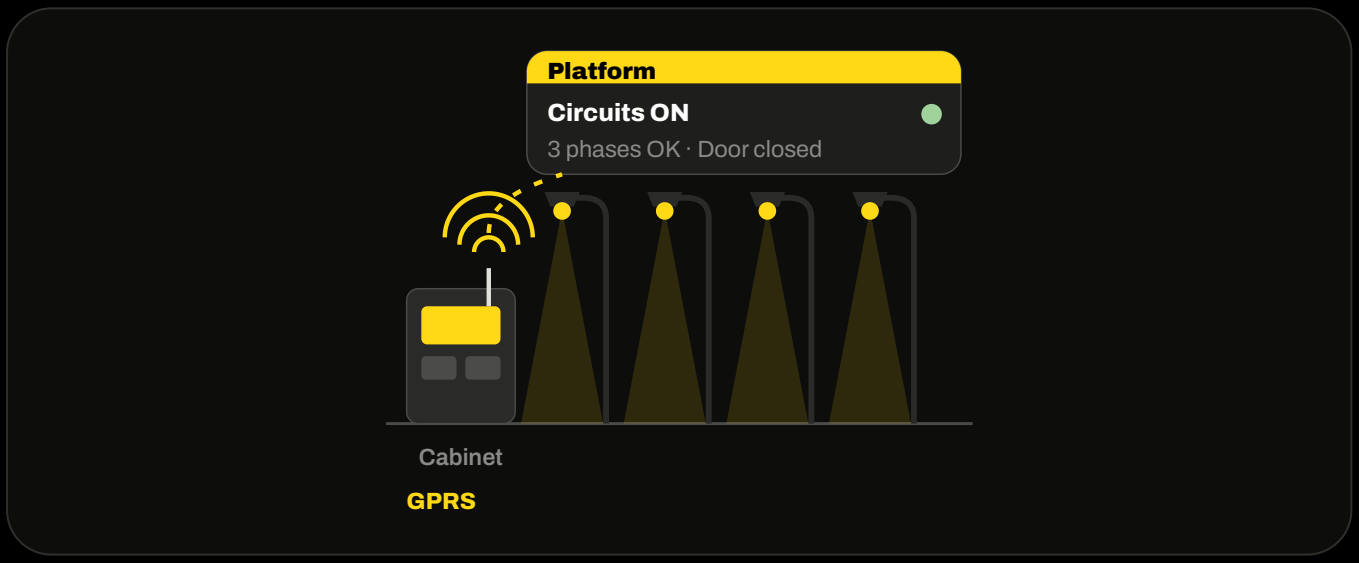
PUBLIC STREET LIGHTING

Street lighting you can see from the office. One controller in each cabinet.

Switching, three-phase metering and alarms, from cabinet to web over GPRS.

Read the interactive case study online ›



1,000+ lighting cabinets connected since March 2021	**~780** cabinets active today	**1** SIM per cabinet, no concentrators to install	**60 min** without data and the platform marks the cabinet not reachable

THE CHALLENGE

Light when it is needed. Know when it fails.

The lights must switch on and off at accurate times for the location and the calendar. The council needs the consumption of each cabinet, and an alarm when a lamp group fails, a door opens or a cable is cut. Each lighting cabinet needed a controller that does four jobs and reports to one platform.

01

Switch at the right time

On and off follow the sunset and sunrise of the town, with an offset in minutes if the council wants one.

02

See the faults

A failed lamp group or a tripped protection must raise an alarm on the platform.

03

Protect the cabinet

Open doors and cable theft are real risks for an outdoor cabinet. Both must raise an alarm.

04

Measure the real consumption

Voltage, current, power and power factor per phase. Real data per cabinet is the base for an energy audit and for the savings of each installation.

One cabinet or a whole province

Each cabinet talks straight to the platform over the mobile network, with its own SIM. There are no concentrators and no private radio network to build.

HOW IT WORKS

Three loops: switch, measure, keep going.

Loop 1 · Switch

On at sunset, off at sunrise, dim at night

The controller runs the on and off schedule by itself. The schedule can use fixed times or, as usual in street lighting, the sunrise and sunset times of the town, moved earlier or later by a number of minutes. A schedule can apply between two dates or stay permanent. Where the luminaires allow it, the platform also sends dimming profiles and a midnight point.

- Relay outputs drive the contactors of each circuit
- Astronomical schedule with an offset in minutes

Loop 2 · Measure and alarm

Three phases measured, every alarm on the map

A Circutor CEM-C21 network analyzer in the cabinet measures voltage, current, active power and power factor. The controller reads it over Modbus RS-485 and sends the values over GPRS. Digital inputs watch the cabinet: an open door, cable theft, a phase failure or a tripped protection. Each input is declared in the platform with its own description and its alarm state.

- Voltage, current, active power and power factor per phase
- Alarm on a sudden change in consumption

Loop 3 · Keep going

The link drops. The street stays lit.

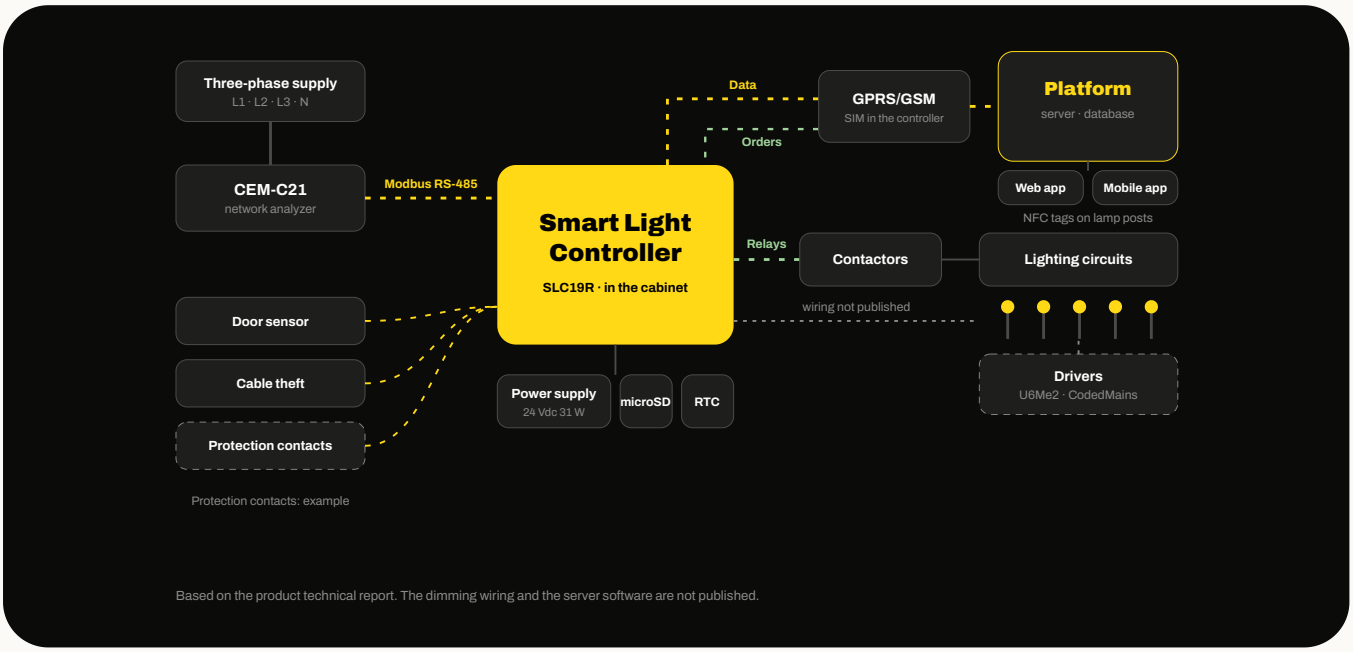
Each cabinet works on its own. If the mobile link drops, the controller keeps its schedule and keeps switching the lights. It also keeps records on a microSD card. The platform marks a cabinet as not reachable when it gets no data from it for 60 minutes.

- Schedule stored in the controller, time from its real time clock
- Local records on a microSD card

SYSTEM ARCHITECTURE

How does one controller manage a street lighting cabinet?

The network analyzer measures the three phases and talks to the Smart Light Controller over Modbus RS-485. The controller drives the contactors with its relays and reads the alarm inputs. It sends measurements, states and alarms over GPRS/GSM to the platform, and receives on and off orders, schedules and dimming set points. The platform has a web app and a mobile app with NFC tags on the lamp posts.



Data from the cabinet Orders to the cabinet Example or detail not published

Signals and data

Flow	Between	Type	Purpose
Phase measurement	CEM-C21 → controller	Modbus RS-485	Voltage, current, active power and power factor of the cabinet
Circuit switching	Controller → contactors	Relay outputs	On and off of each lighting circuit, or of the whole cabinet
Door alarm	Door sensor → controller	Digital input	Detects an open cabinet door
Cable theft alarm	Theft detector → controller	Digital input	Raises an alarm when a cable is cut
Other alarms	Protection contacts → controller	Digital input	For example a phase failure or a tripped protection
Dimming	Controller → luminaire drivers	U6Me2 or CodedMains	Dimming profiles and midnight point, where the installation allows it
Data up	Controller → platform	GPRS/GSM	Measurements, states and alarms
Orders down	Platform → controller	GPRS/GSM	On and off orders, schedules and dimming set points
Local records	Controller → microSD	Local storage	Keeps records in the cabinet

HARDWARE USED

The Smart Light Controller, and the PLCs behind it.



Smart Light Controller SLC19R

The controller of this case. It is supplied as a full kit, ready for the cabinet: the controller with a GPRS/GSM modem and a microSIM built in, a CEM-C21 network analyzer, a 24 Vdc 31 W power supply, the RS-485 cable and a microSD card. The SIM activation with a VPN and the first year of data are included.

Inputs

6 digital, 5 to 24 Vdc, galvanic isolation, 4 also analog 0-10 V (10-bit)

Outputs

8 relays, 3 digital or analog 0-10 V (8-bit) with PWM

Comms

GPRS/GSM with built-in microSIM, RS-485, Ethernet, RS-232, I2C, SPI, USB

The Smart Light Controller is not sold in the online shop. Ask an engineer for the kit and the platform. The datasheet and the installation documents are in Spanish. The 2021 datasheet says that the SIM card is not included: the current full kit includes it.

Smart Light Controller datasheet ›



M-Duino Ethernet PLC Arduino 19R

The first Smart Light Controllers were built on M-Duino PLCs with an original Arduino Mega 2560 and the same 17 I/O layout. For your own lighting cabinet, the M-Duino 19R switches contactors with its relays and reads a network analyzer over RS-485.

Inputs

6: 4 analog/digital (0-10 V, 10-bit) and 2 digital optoisolated, 5 to 24 Vdc, 2 with interrupt

Outputs

11: 3 analog/digital/PWM (0-10 V, 8-bit), 8 relays (230 Vac 4 A / 24 Vdc 2 A, resistive)

Comms

Ethernet, RS-485, RS-232, TTL serial, I2C, SPI

See the M-Duino 19R ›



ESP32 PLC 19R

New Smart Light Controller deployments use the ESP32 PLC. One core can run the I/O and the lighting logic while the other handles communications.

Processor

ESP32 dual core, up to 240 MHz

Inputs

6: 4 analog/digital (0-10 V, 11-bit) and 2 digital optoisolated, 5 to 24 Vdc

Outputs

11: 3 analog/digital/PWM (0-10 V, 12-bit), 8 relays (230 Vac 4 A / 24 Vdc 2 A, resistive)

See the ESP32 PLC 19R ›

Built for the cabinet

The controller mounts on a DIN rail, runs from 12 to 24 Vdc, works from 0 to 60 °C and carries the CE marking. It acts on the contactors already in the cabinet, so it can live with the manual control.

No network to build

Each cabinet has its own SIM and talks straight to the platform. A town does not need concentrators or its own radio network.

Same tools, two generations

The first systems run on M-Duino PLCs. New deployments use the ESP32 PLC. Both are programmed with the Arduino IDE, so the code and the skills move from one to the other.

LIGHTING PROJECT?

Tell us about your cabinets. An engineer will answer.

Tell us how many lighting cabinets you manage, how many circuits each one has, and how the luminaires dim. We will tell you if the Smart Light Controller fits, or which PLC to use for your own system.

FULL CASE STUDY ONLINE

industrialshields.com/case-study-smart-street-lighting-controller

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