

DINOKENG GAME RESERVE · ESP32 PLC 19R

Reserve gates on Wi-Fi. An ESP32 PLC opens the boom.

From RS485 cable to Wi-Fi, barcode tickets and the same printers.

[Read the interactive success story online ›](#)



Ndlovu Gate, one of the gates of Dinokeng Game Reserve.



The gate pedestal: 2-line LCD display, No Touch button, ticket dispenser with a QR ticket and barcode scanner.

5

entrance gates on the old RS485 wired system

Up to 80%

lower cost of slip printer tickets, reported by the client

-80 → -50 dB

RSSI after adding an external antenna

24/7

in operation, with minimal maintenance

THE CHALLENGE

Replace the cable. Keep the printers. Open only for paid tickets.

Access control in a nature reserve has two jobs. It protects the habitat and the animals, and it lets staff and visitors in and out under control. The old system at Dinokeng was out of date, so the reserve decided to modernise it for more security, better control and more automatic processes.

01

Old cable, high cost

The access system at 5 entrance gates used a wired RS485 interface. Maintenance and spare parts had become prohibitive.

02

Tickets without touch

A hand wave near a No Touch sensor must print a barcode and QR ticket and open the barrier. Up to 2 sensors per entrance: normal and large vehicles.

03

Keep what works

The existing serial Star TSP700II slip printers stay in service. Serial to Wi-Fi devices connect them to the new network.

04

Paid or not, at the gate

Barcode readers scan prepaid permits and tickets. A cloud database confirms the payment before the gate opens.



Upgraded by Gañar Group

Gañar Group was asked to upgrade the gate access control at Dinokeng Game Reserve. The goal was to control the system with open source technology. With a Wi-Fi PLC and a sensor at each entrance, Gañar Group got the ticket printed and the barrier opened, with quality hardware and easy programming.

HOW IT WORKS

Three loops: the entrance, the check and the radio link.

Loop 1 · Entrance

Wave a hand, take the ticket, drive in.

A hand wave near the No Touch sensor (up to 2 per entrance) starts the cycle. The ESP32 PLC 19R asks the gate controller software to print a barcode and QR ticket. When the driver takes it, the Ticket Taken signal goes to the PLC, which opens the boom and asks for a form feed.

Loop 2 · Check

The software checks the code. The PLC tells the driver.

Wi-Fi 1D/2D barcode readers send each code to the gate controller software, which checks it in a cloud database. The seller can be a third party. The software sends the result to the PLC, which shows it on a 2-line LCD. The message decides if the gate opens.

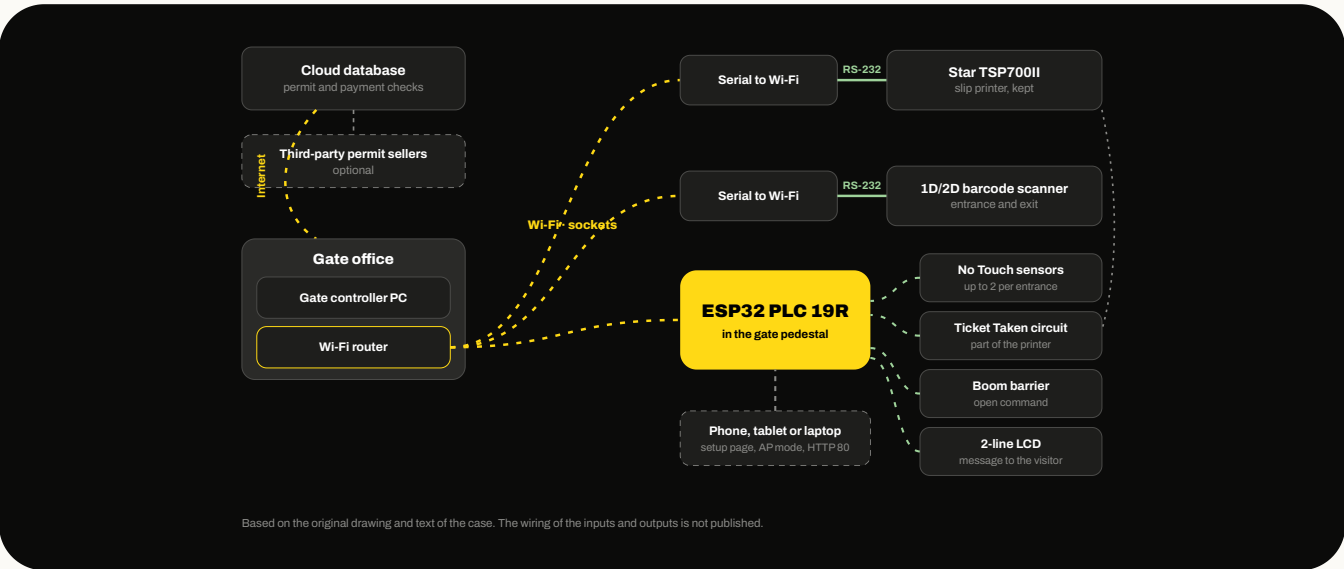
Loop 3 · Radio link

A stable link at the gate, set up from a phone.

Bare ESP32 chips hung and lost the link because of electromagnetic noise. On ESP32 PLC 19R units the shielding was a vast improvement, and an external antenna typically raised the RSSI from -80 dB to -50 dB. Each PLC has a setup page in AP mode, on HTTP port 80.

How does an ESP32 PLC fit into a Wi-Fi gate system?

One Wi-Fi network links the gate office with the devices at each gate. The gate controller software runs on a PC in the gate office, next to the Wi-Fi router, and checks the codes in a cloud database. Printers and barcode scanners reach it through serial to Wi-Fi converters and socket connections. The ESP32 PLC 19R handles the signals of the gate itself.



— Wi-Fi and internet links — Wired at the gate: sensors, outputs, RS-232 — Setup access and optional parts

Signals and data

Flow	Between	Type	Purpose
Hand wave	No Touch sensor → ESP32 PLC 19R	Sensor input	Starts the ticket cycle. Up to 2 sensors: normal and large vehicles
Print request	ESP32 PLC 19R → gate controller software	Wi-Fi	Asks the software to print a ticket
Ticket	Gate controller software → Star TSP700II	Socket, serial to Wi-Fi, RS-232	Prints the barcode and QR ticket on the existing slip printer
Ticket taken	Ticket Taken circuit → ESP32 PLC 19R	Sensor input	Tells the PLC that the driver took the ticket
Open command	ESP32 PLC 19R → boom barrier	PLC output	Opens the boom
Barcode	1D/2D scanner → gate controller software	RS-232, serial to Wi-Fi, socket	Sends permit and ticket codes for the check
Validity check	Gate controller software ↔ cloud database	Internet	Checks the payment and the paid or free status. The database can belong to a third-party permit seller
Visitor message	Gate controller software → ESP32 PLC 19R → LCD	Wi-Fi, then a 2-line LCD	Shows the result and decides if the gate opens
Setup	Phone, tablet or laptop → ESP32 PLC 19R	Wi-Fi AP mode, HTTP port 80	Changes the PLC parameters, saved in flash memory

One ESP32 PLC 19R in the gate pedestal.



ESP32 PLC 19R

An industrial controller built on the dual-core ESP32, with Wi-Fi, Bluetooth LE, Ethernet, RS-485 and RS-232, 8 relay outputs and a real-time clock, for DIN rail. At Dinokeng it sits in the gate pedestal. It reads the No Touch sensor and the Ticket Taken signal, opens the boom and shows the messages of the gate software on a 2-line LCD.

Processor	ESP32 dual core, up to 240 MHz, 16 MB flash
Inputs	6: 4 analog/digital (0-10 V), 2 digital optoisolated
Outputs	11: 8 relays, 3 analog/digital/PWM (0-10 V)
Wireless	Wi-Fi 2.4 GHz, Bluetooth LE
Wired comms	Ethernet (RJ45), RS-485, RS-232, I2C, SPI
Programming	Arduino IDE
Power supply	12 to 24 Vdc
Mounting	DIN rail TS35, IP20

The case names the controller "ESP32 19R IO+" and "ESP32 19R+". The original case page linked this same product, sold today as the ESP32 PLC 19R. The case does not publish which inputs and outputs it uses.

[See the ESP32 PLC 19R >](#)

Built for electrical noise

Bare ESP32 chips hung and lost the link near the gate equipment. With ESP32 PLC 19R units at the entrance and exit gates, the team saw its expectations exceeded. The shielding was a vast improvement.

Same code, new board

The prototype was written in the Arduino IDE. Moving it to the industrial controller meant adapting the same code to the new board, in the same tool.

Less hardware, open and modular

One Wi-Fi PLC at the gate replaces wired interfaces back to the office. Open and modular: the code lives in the Arduino IDE, and the specifications can grow with the site.

SIMILAR PROJECT?

Tell us about your gates. An engineer will answer.

Tell us how many gates and lanes you have, which printers, scanners and barriers are already installed, and where the codes must be checked. We will tell you which controller fits and how to connect the devices you keep.

READ IT ONLINE

industrialshields.com/success-story-game-reserve-gate-access-control-esp32-plc

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