RUSTIKWORKS

SimDek User Guide

Firmware 2.7.0 · Bridge firmware 0.3.0 · November 17, 2026 · Ryan Mayes, Rustikworks

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About this guide. This guide covers SimDek firmware 2.7.0 and the wireless bridge firmware 0.3.0. It is for integrators, technicians and sales engineers who use SimDek on the bench or in a demo. You know access control; this guide tells you how SimDek works.

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1. About SimDek

SimDek is a touchscreen that pretends to be the card readers on a door. Wire it to a real panel's reader port and the panel sees OSDP readers: cards are badged, PINs are typed, doors open, are held and are forced, all from the screen, on a timer, from a script or from another system.

Supported features

- Up to **8 OSDP readers** on one RS-485 line (OSDP v2.2, with the AES-128 secure channel and KEYSET).
- Cards in 26-bit H10301, 34-bit H10306, 37-bit H10304 or raw hex, with optional PINs.
- **Auto mode**: a hands-off demo of granted, not used, denied, held and forced door events.
- 10 built-in **cardholders** with badge pictures you can replace.
- **Scenarios**: saved, step-by-step demos you can present one step at a time, including from a Stream Deck.
- A **web interface** with the same pages as the touchscreen, and a **trigger API** for scripts.
- **IoT outputs** (Full licence): MQTT, Modbus, SNMP, TCP and HTTP senders for sensor and alarm points.
- A **wireless bridge** so the panel needs no cable to SimDek.
- **Trace**: decoded OSDP traffic and events.
- Firmware updates and licences delivered over the internet.

Pages

Page	Use it to
Live	Show two readers full screen with the badge, PIN pad and door state; start and stop auto mode; step through a scenario.
Readers	Pick a reader and badge a card, type keys, and set its inputs (door contact, REX), tamper and power fail. See what the panel sends: LED, buzzer, text, outputs.
I/O	Drive the relay outputs and watch the inputs (5-inch board only).
IoT	See and change the simulated sensors and alarm points that the IoT outputs send.
Settings	Open a group: RS-485 and readers, Wi-Fi, Clock and screen, Auto mode, Cardholders, Cards, Scenarios, IoT connections, Web API, Trace, About and defaults.

2. Hardware

SimDek runs on ready-made Waveshare boards. Nothing needs soldering. See portal.rustik.works/hardware for store links.

Board	Model to buy	Notes
7-inch touch screen (ESP32-P4) recommended	`ESP32-P4-WIFI6-Touch-LCD-7B`	Fastest board. Wireless bridge over Wi-Fi only. No relay outputs or inputs.
7-inch touch screen (ESP32-S3)	`ESP32-S3-Touch-LCD-7B` (with touch)	Wireless bridge over the radio or Wi-Fi. No relay outputs or inputs.
5-inch touch screen (ESP32-S3)	`ESP32-S3-Touch-LCD-5B` (1024 × 600, with touch)	Has 2 relay outputs and 2 inputs (I/O page). Wireless bridge over the radio or Wi-Fi.
Wireless bridge optional	`ESP32-S3-RS485-CAN`	Sits at the panel and carries the readers to SimDek over the air. Needs no licence of its own.

Requirements

Item	Notes
Power	USB-C (5 V), or the board's power terminals where it has them.
A computer with Chrome or Edge	For the first install from the portal (it uses the browser's USB access). Any browser works for the web interface afterwards.
A USB-C data cable	Some cables only charge; they won't work for installing.
Wi-Fi with internet	To collect the licence and updates. Once licensed, SimDek works without internet.
An access control panel with an OSDP reader port	Two wires (A, B) plus signal ground, or the wireless bridge.
A portal account	Register at portal.rustik.works. Accounts are approved by a person.

3. Getting started

A new board goes from the box to licensed in about ten minutes: install from the portal, join Wi-Fi, set the web login, then register the unit.

To install SimDek on a new board

1. Sign in at portal.rustik.works and open **Firmware**.
2. Connect the board to the computer with a USB-C data cable:
    - **7-inch P4:** either port works. The one marked **USB** is quickest (about 30 seconds instead of 3 minutes).
    - **7-inch S3:** set the board's USB/UART switch to **UART** and use the port marked **USB TO UART**.
3. Click **Install by USB** on your board's row and pick the board's port from the list the browser shows.
4. Leave the cable in until it says it's finished. If the board doesn't restart by itself, press its reset button.

> Installing from the portal replaces everything on the board, including its settings. If the installer can't connect, hold **BOOT**, press **RST**, let go of BOOT, and try again.

To set it up

1. On the touchscreen, tap **Settings**, then **Wi-Fi**. Under **Join a network**, tap **Scan for networks**, pick yours, type the password and save. The header shows the address SimDek got, for example `192.168.1.187`.
2. Open that address in a browser. The first person to open the page chooses the web login (see The web interface and login).
3. Find the **Device ID** in **Settings, About and defaults**. It looks like `SD-1A2B-3C4D-5E6F`.
4. On the portal, open **Units** and register that Device ID.
5. Once the unit is approved, it collects its licence by itself the next time it checks in (at start-up and about once a day). To fetch it straight away, use **Check now** under Licence on the web page (**Check licence now** on the touchscreen).

What you see: the About page shows the edition and expiry date, and the demo banner goes away.

4. Licences

Each unit is licensed by its Device ID, not by your account, so moving a unit between accounts keeps its licence. Without a licence SimDek runs as a demo.

Edition	Includes
Demo (no licence)	Everything, for 30 minutes after each start. Restart for another 30 minutes.
Standard	Readers, cards, door events, auto mode, cardholders and scenarios.
Full	Standard, plus the IoT outputs and the wireless bridge.
Developer	Full, plus experimental features.

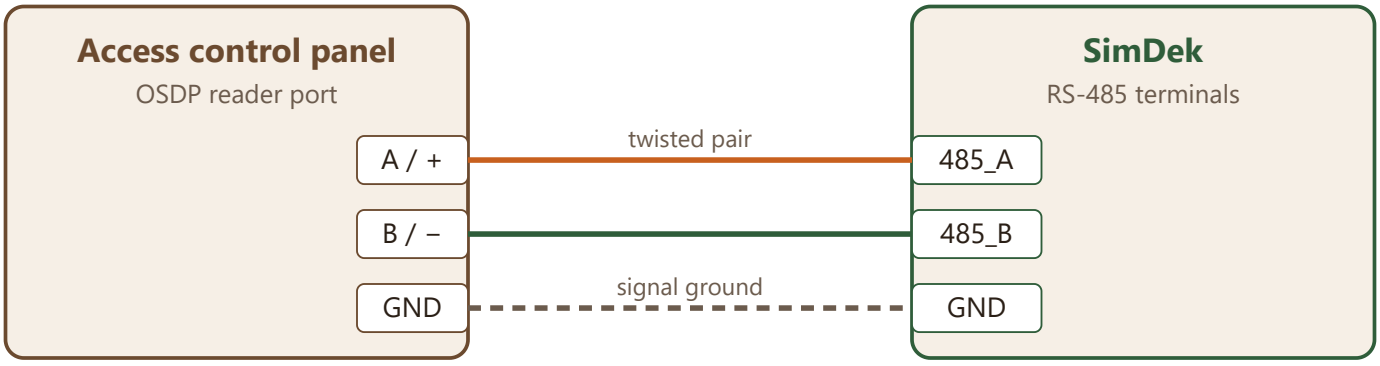
Check-in. When **Licence** check-in is on (About and defaults), SimDek contacts the licence server at start-up and about once a day. It sends its Device ID, firmware version and hardware model, and nothing else. That's how a new or changed licence and news of new firmware reach it.

Offline. A licence is stored on the unit, so SimDek keeps working with no internet until the licence's expiry date. Plan licences last up to 60 days between check-ins.

> When you ask for help, quote the **support code** on the About page. It identifies the unit and its licence.

5. Wiring to the panel

SimDek connects to the panel's reader port like any OSDP reader: two data wires and a signal ground. All readers share the one line; each answers only its own address.



A to A, B to B, and the panel's signal ground to SimDek's ground. Up to 8 simulated readers share this line.

Board	Where the RS-485 terminals are
5-inch S3	Terminal block `485_A`, `485_B`. Signal ground: the `GND` second from the left (between `VOUT` and `SDA`). Use the **120R RS-485** DIP switch at a bus end.
7-inch S3 and 7-inch P4	The board's RS-485 header (A, B, GND), as printed on the board.

To set up the line

1. Tap **Settings**, then **RS-485 and readers**.
2. Set **Readers use** to **RS-485 terminals**, **Role** to **Reader simulators (PD)**, and **Baud** to match the panel (9600 is common).
3. Under **Readers**, turn on the readers you need and give each the address the panel expects.
4. Tap **Save & apply**.

> Only reader 1 answers the broadcast address that panels use in programming modes, so set the other readers' addresses in SimDek, not from the panel.

Bus monitor. Set **Role** to **Bus monitor (listen only)** to watch another reader's traffic in Trace without answering.

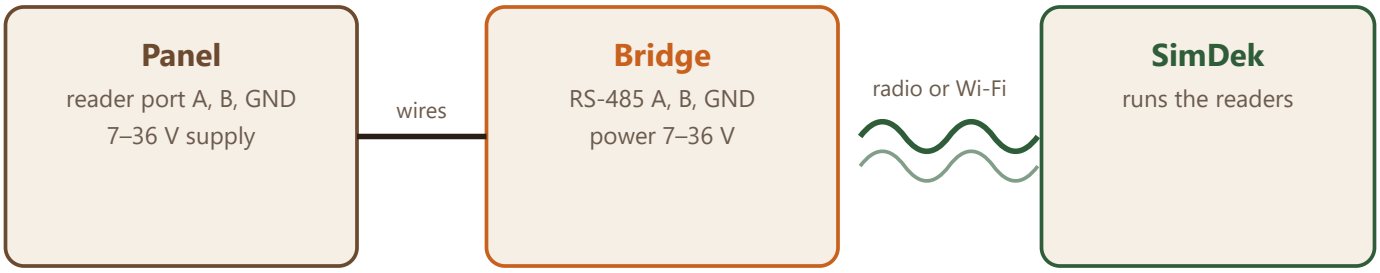
6. The wireless bridge

The bridge sits on the panel's reader port and passes the OSDP traffic to SimDek over the air, so SimDek can be anywhere in the room. SimDek still runs the readers; the bridge only carries the bytes. It needs a Full or Developer licence on the SimDek.

Choose how the bridge connects

Readers use	Boards	How it works	Choose it when
Wireless bridge (radio)	S3 boards	Direct radio link (ESP-NOW), no network needed.	The SimDek is an S3 board. Keep your Wi-Fi network on a fixed channel for a steady link.
Bridge over Wi-Fi, hotspot	All boards	The bridge joins SimDek's own hotspot, which then stays on.	The default for the P4. Works anywhere, with or without site Wi-Fi.
Bridge over Wi-Fi, this network	All boards	The bridge joins the Wi-Fi network SimDek is on.	You need more range than the hotspot gives, and the network lets devices talk to each other.

> Most guest and corporate Wi-Fi networks stop devices from talking to each other. On those, use the hotspot.



The bridge is wired like a reader. SimDek needs no wires to the panel.

To pair the bridge

1. On SimDek, tap **Settings**, then **RS-485 and readers**. Choose a bridge under **Readers use** and tap **Save & apply**.

2. Tap **Pair bridge**. SimDek looks for a bridge for 60 seconds.
3. Hold the bridge's **BOOT** button for 3 seconds. A new bridge is already in pairing mode.

What you see: the status line under **Connection to the panel** changes to *Bridge connected*, with its address and line speed. Over Wi-Fi, SimDek's hotspot is briefly the open network `SimDekPair-XXXX` while it pairs, then goes back to normal.

> Pair once. The bridge remembers SimDek and reconnects by itself after a restart or power cut. A pairing belongs to the link it was made on: switching between radio and Wi-Fi needs a new pairing. **Forget bridge** removes it.

Panel door points through the bridge

Security Center and many panels use their own door points rather than OSDP reader I/O. The bridge can switch the panel's door contact and REX inputs and read its lock relay, through its 2×10 header (P1):

Bridge pin	Use
IO4 (P1-11)	Follows reader 1's door contact (high = open). Drive an optocoupler or PhotoMOS relay across the panel's door contact input.
IO5 (P1-13)	Follows reader 1's REX (high = pressed), the same way.
IO6 (P1-15)	Reads the panel's lock relay: relay C to GND, NO to IO6 (closed = unlocked). SimDek shows it as reader 1's strike.

Both outputs turn off when the link drops, so the panel sees the door shut.

7. The web interface and login

Every page on the touchscreen is also a web page, served by SimDek itself. Use it from a laptop or phone on the same network, or on SimDek's own hotspot.

How to reach it	Address
On the same network	The address in the header, for example `http://192.168.1.187`, or `http://simdek-xxxx.local`
On SimDek's hotspot `SimDek-xxxx`	`http://192.168.4.1`. The hotspot's factory password is `simdekdemo`; change it in **Settings, Wi-Fi**.

The web login

- **First use:** there is no default login. The first person to open the page chooses the user name and password.
- **Password rules:** 8 to 64 characters, with an upper case letter, a lower case letter, a number and a special character such as `.` or `!`.
- **Change it** in **Settings, About and defaults, Web login**. Changing it logs out every other browser.
- **Lost password:** on the touchscreen, tap **Settings, About and defaults, Reset web login**. The next person to open the page sets a new one.
- **Turning it off:** on a closed local network you can turn off **Require web login** on the touchscreen. It is on by default.

The same login protects the trigger API (scripts use it with `curl -u USER:PASSWORD`). Firmware updates keep it.

8. Readers and cards

The Readers page is one reader at a time, with a picker for readers 1 to 8. It shows what the panel tells the reader (LED colour and blink, buzzer, text, outputs) and lets you act as the person at the door.

To badge a card by hand

1. Open **Readers** and pick the reader.
2. Tap one of the **Cards** buttons, or switch the card area to **Manual**, choose the **Format**, enter the facility code and card number, and tap **Send**.
3. If the door is card-and-PIN, type the PIN on the keypad when the panel asks.

Cards (Settings) sets up the card buttons: name, format, facility code, card number and an optional PIN. A card with no name isn't shown.

Reader settings

Setting	What it does
Role	Off, Reader simulators (PD), or Bus monitor (listen only).
Baud	The line speed. The panel can change it with OSDP COMSET.
Readers: on, address, serial	Each reader answers only its own address.
Install mode and SCBK	For the secure channel. A key the panel sends with KEYSET is stored for that reader and turns its install mode off.
Reader identity	Vendor, model and card format code that the readers report to the panel.

9. Auto mode and the Live screen

Auto mode runs the door for you. It badges in a random cardholder at a set interval and mixes in the other door events, so a demo keeps going on its own.

To run auto mode

1. In **Settings, Auto mode**, choose which events to include under **Doors**, set **Panel unlock time (s)** to match the door in your ACS, and choose the two readers the Live screen shows (**Live screen, left** and **right**).
2. Open **Live** and tap **Start auto mode**.

Event	What happens
Access granted	A card read; once the panel unlocks, the door opens for 10 s.
Access granted, not used	A card read the panel unlocks, but the door is never opened.
Access denied	A card from the **Denied cards** list, which the panel should deny. The door stays shut.
Door held	A card read whose door, once unlocked, stays open until 15 s after the panel unlock time runs out.
Door forced	The door contact opens for 10 s without a card read.

What you see: the badge slides over the reader, the reader's LED follows the panel, and the door contact, REX and strike light up. On a card-and-PIN door an amber *WAITING FOR PIN* panel shows the PIN being typed.

Denied cards default to facility code 255, cards 65001 to 65004 (26-bit). Don't enroll them in the ACS.

10. Cardholders

Auto mode and the trigger API badge in the 10 cardholders in **Settings, Cardholders** (web page). Enroll the same facility codes and badge IDs in your ACS. The built-in set is listed in the appendix.

- **PIN:** up to 15 keys of 0–9, * and #. On a card-and-PIN door SimDek types it one key at a time when the panel asks; with no PIN, the panel times out and denies.
- **In use:** only cardholders in use are picked.
- **Change image:** replaces the whole badge picture (photo, name and background are one picture). It's cropped to the badge shape and saved straight away.
- **Export CSV** saves the cardholders in use, ready to import into your ACS. **Restore built-in cardholders** puts the original 10 back.

11. Scenarios

A scenario is a saved list of steps, for a demo you want to give the same way every time. Up to 8 scenarios of 40 steps are kept through firmware updates and factory defaults.

To build and present a scenario

1. On the web page, open **Settings, Scenarios** and click **+ New scenario**.
2. Add steps: card read, access granted, not used, door held, door forced, access denied, PIN, reader input, relay, wait, **Pause (presenter)**, fire point, sensor point and more. Save.
3. To present: **Present** loads it; **Next** (on the Live page, the touchscreen bar or a Stream Deck key) runs everything up to the next Pause. **Run** plays it straight through, once or in a loop.

> Door events wait for the door to be free (up to 60 s), so a scenario never trips over its own last event. Add Wait steps to space events out. Relay steps work only while that output is set to Manual on the I/O page.

12. I/O and IoT outputs

Relay outputs and inputs (5-inch board)

The 5-inch board has two open-collector outputs (DO0, DO1: 5–36 V, 450 mA) and two optocoupled inputs (DI0, DI1: 5–36 V). Outputs can be manual, pulsed, or follow reader 1's OSDP outputs; inputs can mirror reader 1's inputs 1 and 2.

> The outputs sink to ground when on. Wire a relay coil or strike between your supply (+) and DOx, with a flyback diode on inductive loads.

IoT outputs (Full licence)

SimDek also simulates building devices for a security platform to monitor: environmental sensors, a fire alarm panel, a vehicle gate and analytics points. Set them up in **Settings, IoT connections** and watch or change them on the **IoT** page.

Output	What it does
MQTT	Publishes sensor and alarm points to a broker.
Modbus TCP	Serves coils and registers (for example the vehicle gate).
SNMP	A read-only v1/v2c agent on UDP 161.
TCP sender	Sends one sensor to an IIoT TCP server connector.
HTTP sender	POSTs one sensor as JSON to an IIoT HTTP server, with the server's certificate pinned.
Weather	Feeds real outdoor readings into the sensors (needs internet).

13. Triggering events from other systems

Any script or system can fire an event with one HTTP POST. Send values in the query string, a form body (`reader=1&card=1001`) or JSON (`{"reader":1,"card":1001}`). Every request needs the web login as HTTP Basic auth. **Settings, Web API** lists them and can send a test request.

Endpoint	What happens	Values
`/card-read`	A card is read. The door opens only if the panel unlocks it.	`reader` , `fc` , `card` , `bits` (default 26), `pin` . No card: a cardholder badges in.
`/access-granted`	A cardholder badges in; the door opens and closes normally once unlocked.	`reader` , `cardholder` , `pin`
`/access-granted-not-used`	Unlocked, but the door is never opened.	`reader` , `cardholder` , `pin`
`/door-held`	Badges in and holds the door open until 15 s after the unlock time.	`reader` , `cardholder` , `lock_s` , `pin`
`/door-forced`	Opens the door contact without a card read.	`reader` , `open_s`
`/access-denied`	Reads a card the panel should deny; the door stays shut.	`reader` , `card` , `fc` , `bits` . No card: one from Denied cards.
`/rex`	Presses the request-to-exit button.	`reader`
`/pin`	Types a PIN at the reader now.	`reader` , `pin`
`/script-run` , `/script-stop`	Plays or stops a saved scenario.	`script` (number or name)

`reader` is 1 to 8 (default 1). `cardholder` is 1 to 10; leave it out for a random one in use. `pin` is 1 to 15 keys of 0–9, * and # (in a URL, # is `%23`). Replies are JSON: `{"ok":true,...}` , or `{"ok":false,"error":"..."}` with status 400 (a bad value) or 409 (the reader is off or offline, the door is busy, or the card doesn't fit the format).

Examples

Windows (type `curl.exe` , not `curl` , in PowerShell):

```
curl.exe -u USER:PASSWORD -X POST "http://192.168.1.187/card-read?reader=1&fc=42&card=1001"
```

PowerShell:

```
$auth = [Convert]::ToBase64String([Text.Encoding]::UTF8.GetBytes("USER:PASSWORD"))
Invoke-RestMethod -Method Post -Headers @{ Authorization = "Basic $auth" } `
  -Uri "http://192.168.1.187/access-granted?reader=2&cardholder=3"
```

> SimDek doesn't ask for the login (so browsers don't pop up their own box), so send the Authorization header yourself. `-Credential` alone doesn't send it.

Linux and macOS:

```
curl -u USER:PASSWORD -X POST http://192.168.1.187/door-forced -d reader=1 -d open_s=10
```

Python:

```
import requests
r = requests.post("http://192.168.1.187/access-denied", auth=("USER", "PASSWORD"), json={"reader": 1})
print(r.json())
```

14. Trace

Trace shows the decoded OSDP frames between the panel and the readers, I/O changes and system events. It's the first place to look when a reader stays offline.

- Open **Settings, Trace** (or the Trace page on the touchscreen). Use the source filters to show only what you need; polls and hex are optional.
- On the web page you can save the trace as a text file to send with a support request.
- Tick **Send to USB** to copy OSDP and I/O lines to the USB console as well (off by default).

15. Updating the firmware

A running unit updates itself over Wi-Fi. Settings, Wi-Fi, cardholders, scenarios, the web login and the licence are kept.

To update from the licence server

1. When a newer version is available, the About pages say *Firmware X is available*.
2. On the web page, open **Settings, About and defaults**, and under **Firmware update** click **Check for update**, then install it.
3. Leave the page open. SimDek restarts into the new version in about a minute; the header shows the new version.

To update from a file

1. Download the firmware file for your board from the portal's Firmware page (**Download the file**).
2. In **Firmware update**, click **Choose .bin file**, pick the file, check the version it shows, and click **Update**.

> If the new firmware doesn't start properly, SimDek goes back to the previous one at the next restart. The bridge's firmware is installed from the portal by USB.

16. Troubleshooting

Problem	Cause	Fix
The portal installer says *Failed to initialize*	The browser can't talk to the board's chip.	Use Chrome or Edge and a data cable. Try the board's other USB port. Hold BOOT, press RST, let go of BOOT, and try again.
The panel shows the reader offline	Wiring, baud or address.	Check A/B aren't swapped and ground is connected. Match the baud and address. Look in Trace: polls with no answer mean the address or baud is wrong; no polls means wiring.
Readers stop after 30 minutes	No licence: the demo time is over.	Restart for another 30 minutes, or register the unit on the portal.
Not in this licence next to the bridge	The bridge needs a Full or Developer licence.	Ask for the licence to be upgraded, or use the RS-485 terminals.
The bridge shows *Looking for the bridge*	The bridge is off, out of range, or (on "this network") the network blocks device-to-device traffic.	Check its power. Move it closer. Switch to **Bridge over Wi-Fi, hotspot** and pair again.
Join a Wi-Fi network next to the bridge	"This network" is chosen but SimDek isn't on one.	Join a network in Settings, Wi-Fi, or use the hotspot option.
Card-and-PIN door denies auto mode	The cardholder has no PIN.	Give the cardholder the PIN enrolled in the ACS.
Lost the web password		Touchscreen: Settings, About and defaults, Reset web login.
No licence arrives after approval	Check-in is off, or the unit has no internet.	Turn on Licence check-in on the About page and use Check now.

Still stuck? Email support@rustik.works with the support code from the About page and a saved trace.

17. Appendix: built-in data

Built-in cardholders

#	Name	Facility code	Badge ID
1	Leif Eriksson	42	1001
2	Gunnhild Mother of Kings	42	1002
3	Egil Skallagrimsson	42	1337
4	Sigrid the Haughty	100	25000
5	Snorri Sturluson	7	500
6	Erik the Red	42	1003
7	Lagertha Shieldmaiden	42	1004
8	Eric the Victorious	100	25001
9	Thora Borgarhjort	7	512
10	Brynhild Budladottir	42	1850

All are 26-bit H10301. The firmware zip's `cardholders/cardholders.csv` has them ready to import, with photos named `card1.jpg` to `card10.jpg`.

Denied cards

Facility code 255, cards 65001, 65002, 65003 and 65004, 26-bit. Don't enroll these.

18. Changelog

Newest first.

Version 2.7.0 (November 17, 2026)

- The wireless bridge works over Wi-Fi, on every board and now on the 7-inch P4: through SimDek's hotspot or the site's Wi-Fi.
- Fixed: the web page's Cardholders showed each badge picture one card late (since 2.6.1).

Version 2.6.5 (November 17, 2026)

- No more thin lines on the 5-inch and 7-inch S3 screens after a restart: the panel is reset properly at every start.

Version 2.6.0 (November 14, 2026)

- Renamed SimDek. Plan licences renew themselves at check-in.

Version 2.4.0 (November 12, 2026)

- Firmware updates from the licence server: Check for update on the About page.

Version 2.3.0 (November 12, 2026)

- Online licence check-in at start-up and once a day.

Version 2.2.0 (November 11, 2026)

- Licences: Device ID, demo mode, Standard, Full and Developer editions.

Version 1.9.0 (November 2, 2026)

- Scenarios, presented step by step, including from a Stream Deck.

Version 1.7.0 (November 2, 2026)

- Up to 8 readers, one Readers page, and a choice of readers for the Live screen.

SimDek began as the ACS Simulator, created by Adam Rhodes. The reader and door simulation, the IoT simulator and the Sherbet interface are his design and his work. Ryan Mayes carries it forward under Rustikworks. © 2026