

ECUmulatorTouch

A vehicle on your workbench.



**Inspect CAN traffic. Generate test frames.
Put your diagnostic tools to work.**

Start with the included OBD2 simulator. Change live values, create fault scenarios and watch how your tester responds. Add ECUmulator Studio when your work calls for custom vehicle specifications.

Product & User Guide

English · Preview guide · Software 1.0 · October 2026

www.cansole.dev/touch/

FIND YOUR WAY

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New to the device? Read [Your first bench connection](#), then choose [Your first OBD2 simulation](#) or [Reading the CAN Monitor](#). Contents entries and cross-references are clickable.

MEET ECUMULATOR TOUCH

A small instrument. A useful test vehicle.

A repeatable diagnostic environment for professional laboratory development, testing and training—without a complete vehicle beside you.

ECUmulatorTouch combines a touchscreen CAN monitor, a frame generator and an OBD2 simulator in one device. Connect a compatible scan tool, choose petrol or diesel and select 11-bit or 29-bit CAN addressing. You can then change the reported engine speed, road speed and temperatures, add diagnostic trouble codes, and check exactly what your tool displays.

The monitor makes the exchange visible. You can inspect requests and responses while the emulation continues, pause the view to examine earlier traffic, then return to Live. A separate generator supplies individual frames or a finite test sequence when you want to exercise a CAN connection.

Observe

See frames, payloads, traffic rates and controller health.

Simulate

Use included OBD2 models and editable diagnostic state.

Extend

Connect ECUmulator Studio for custom vehicle emulation.

Useful in more than one setting

Development: exercise an app or adapter against chosen values and fault states. **Training:** demonstrate a check-engine light, readiness state or freeze frame without creating a real fault. **Support:** save a known test setup and reproduce a reported scanner behavior.

Local CAN monitoring, frame generation and the included OBD2 models work offline. Network access is useful for software updates, extension activation and Studio control. Once a valid extension is stored, license verification also works offline; Studio still needs a local network path to the device.

Software series 1.0; hardware product still pre-launch. Initial availability is planned exclusively for business customers in Germany, for professional laboratory use. No consumer sales. Screens use synthetic data; compatibility depends on the tester and model.

CHOOSE THE SCOPE YOU NEED

Included and extended

Function	Included	Studio extension
CAN Monitor and buffered history	Yes	Yes
Single-frame and quality-sequence generator	Yes	Yes
Petrol/diesel OBD2, 11/29-bit addressing	Four included models	Still included
Local values, faults, identity and readiness	Included-model controls	Same local OBD2 controls
Local presets and boot checkpoint	Yes	Yes
Network control from ECUmulator Studio	No	Yes, in Studio mode
Custom vehicle specifications	No	Loaded and edited in Studio

One emulation owner at a time

The extension adds a choice between **OBD2 Simulator** and **ECUmulator Studio**. It does not remove the local simulator. Only one of these modes controls an emulation at a time. Switching modes stops the outgoing session and leaves the destination stopped or waiting for its client.

The CAN Monitor can observe either mode. Moving to the monitor does not stop the simulated vehicle or change its bitrate. The generator, however, must have the CAN controller to itself; stop physical emulation before generating frames.

What this hardware does—and does not—provide

The physical bus on the Touch is **Classic CAN**, with standard 11-bit and extended 29-bit identifiers. The included OBD2 simulator uses CAN transport. This device does not provide a physical K-Line interface or CAN FD transmission. Bluetooth on the underlying processor is not a Touch diagnostic transport in this release.

Wi-Fi and optional USB Ethernet provide network access. USB Serial / JTAG is the default USB mode.

A model defines behavior. A preset stores a reusable configuration of that model. A boot checkpoint specifies what should be available after the next restart. These are separate choices; see [Presets and saved state](#).

YOUR ECUMULATORTOUCH

Know the hardware



Front and connector-side views. The terminal strip provides the bench connections. Identify CAN-H, CAN-L and ground from the connector labels before wiring.

ECUmulatorTouch has a 4.3-inch capacitive **800 × 480** touchscreen, USB-C, a terminal connection for CAN, and an onboard real-time clock. The device has 16 MB of flash and 8 MB of PSRAM. The launch configuration is powered through USB-C at 5 V from a suitable existing USB power source. No mains power adapter or rechargeable battery is supplied.

Use the connector labels to identify power, ground and CAN-H/CAN-L. If a connection is unclear, contact support before applying power. The terminal row also contains interfaces that ECUmulatorTouch does not use. Do not assume every terminal is a CAN or power connection.

The hardware RESET button restarts the processor; it is not Factory Reset. BOOT is a programming control, not the service-menu shortcut. Use the on-screen maintenance entry described later.

The battery switch is not used in the supplied configuration and does not disconnect USB power. Use the **Shut Down** tile for software-controlled deep sleep, or disconnect USB for power-off.

PLAN YOUR TEST SETUP

Your diagnostic workbench

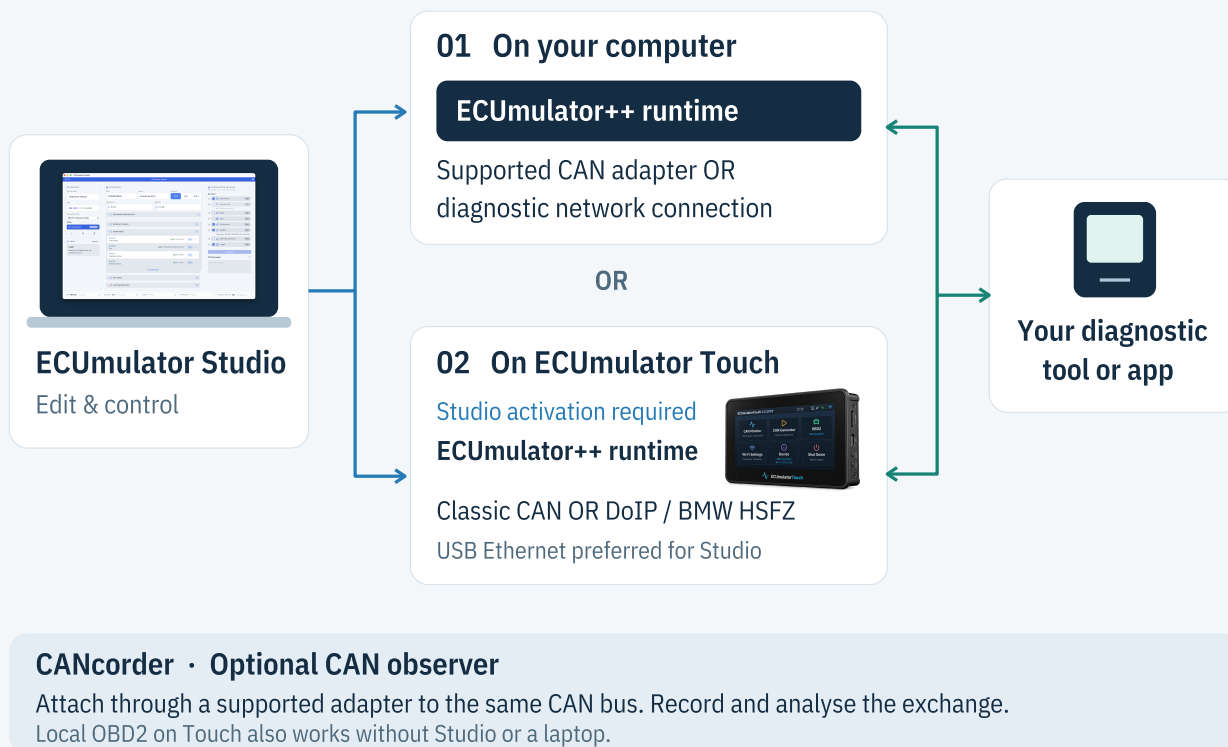
Keep the editor, the simulated vehicle and the tester distinct.

YOUR DIAGNOSTIC WORKBENCH

Choose one runtime location for your test.

— Control

— Diagnostic requests & responses



Blue: control. Green: diagnostic requests and responses. These are alternative runtime locations, not two emulators answering the same test.

Computer: Studio edits the model and controls ECUmulator++ locally. A supported CAN adapter or diagnostic network service connects the simulation to your tester. A Touch is not required for this setup.

Touch: activate Studio support to load custom models and control the device runtime. Prefer USB Ethernet with Wi-Fi off for complex models. The diagnostic connection uses built-in Classic CAN or DoIP / BMW HSFZ over the network. Available interfaces and memory differ from the desktop.

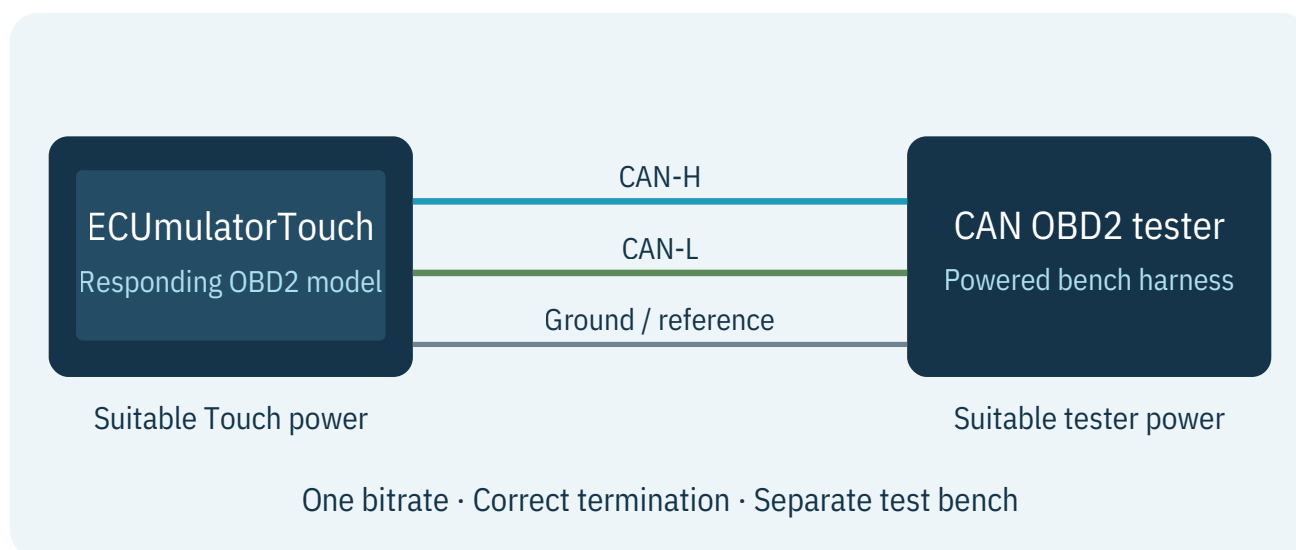
Standalone: the included OBD2 models run on Touch without Studio, activation or a laptop. CANcorder is an independent, optional application; on a CAN bench it records through a supported adapter connected to the same bus.

For your first local OBD2 test, follow [Your first bench connection](#). For custom models, continue with [Using ECUmulator Studio](#).

START HERE

Your first bench connection

For an OBD2 demonstration, use a separate test bench containing the Touch and your tester.



The diagram shows functional connections, not a connector pinout. Use the correct powered breakout or harness for your tester.

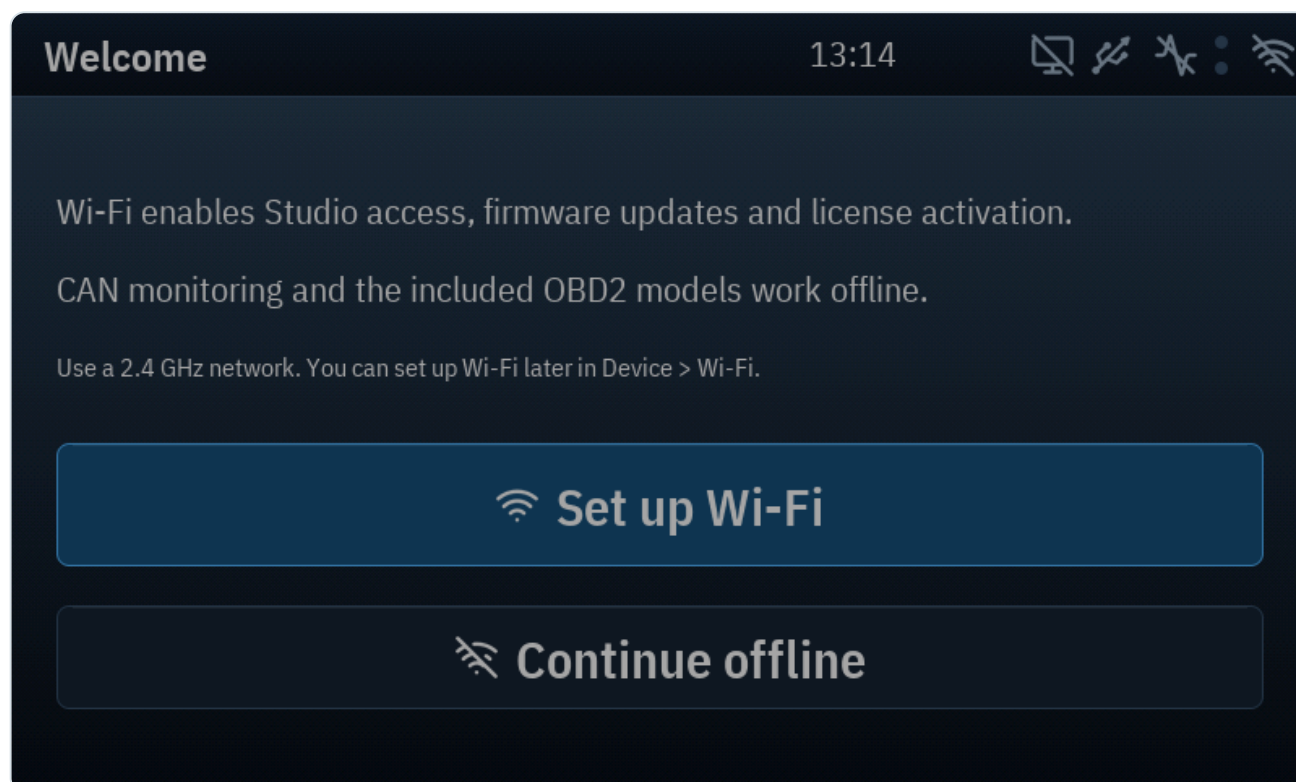
1. **Power the Touch** using a supported input.
2. **Power the tester.** A scanner powered through its OBD connector needs a suitable powered bench socket. Supplying the Touch over USB does not provide power to that socket.
3. **Connect CAN-H, CAN-L and the required common reference** through a suitable bench harness. Keep the wiring short and tidy.
4. **Check termination.** A conventional two-ended CAN bench needs termination at both ends. Account for resistors already fitted to your equipment; do not add one at every node. The Touch's termination is a hardware setting, not a software checkbox.
5. **Choose a common bitrate.** Start with 500 kbit/s for a typical CAN OBD2 test. Every participant must use the selected rate.

When another instrument is attached to the same bench, its mode matters. A listen-only instrument observes but does not acknowledge frames. An emulator or a normal-mode CAN participant supplies ACKs. No ACK can look like repeated traffic or increasing errors even when the sender is functioning.

Active Auto discovery and the generator can transmit. If you need completely passive observation from power-on, configure **Passive Auto + Listen-Only** before attaching to the bus you want to observe.

FIRST START

Online now—or later



The Welcome screen explains which functions work without a network.

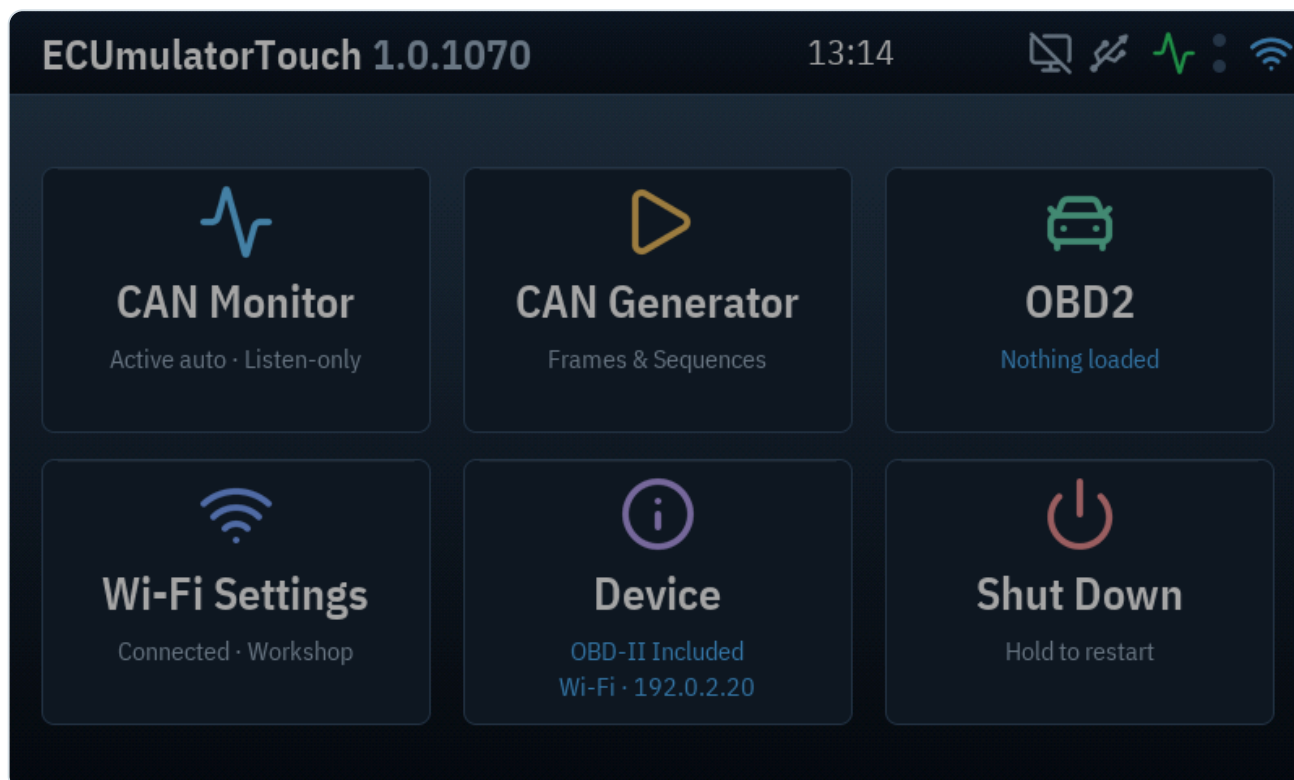
1. Choose **Set up Wi-Fi** to connect to a 2.4 GHz network, or **Continue offline** to go directly to local tools.
2. Select an access point. Use **Hidden network** if you need to enter the SSID yourself. Unsupported security configurations cannot be selected.
3. Enter the password. **Show password / Hide password** toggles visibility; each newly entered character is briefly revealed even when the rest is hidden. **123** toggles numbers and letters.
4. Tap the keyboard's **Connect** key. The Touch attempts the connection immediately and waits for an IP address.
5. After success, tap **Save and finish**. Only then do the new credentials become the saved connection.

If the attempt fails, correct the entry and retry. **Back** returns toward the network selection. During later Wi-Fi changes, cancelling the setup restores the previously saved connection. Choosing Offline deliberately changes that saved baseline.

Offline operation includes the CAN Monitor, CAN Generator and all four local OBD2 variants. Wi-Fi can be configured later under **Device → Wi-Fi**; an extension is not required for networking or firmware updates.

EVERYDAY NAVIGATION

Home and the top bar



Home gives each main function its own tile. Status subtitles describe the current configuration.

Tap a tile to open its function. Inside a function, the left chevron and title take you back. The main product name and version return at Home. Buttons show a pressed state; greyed controls are currently unavailable.

Tile	Purpose
CAN Monitor	Inspect traffic and controller health without changing the current CAN owner.
CAN Generator	Send a frame or a finite test sequence.
OBD2 / Vehicle Emulation	Open local simulation, or choose Studio with the extension.
Wi-Fi Settings	See the current connection and choose another network.
Device	Display, CAN, Wi-Fi, USB, Updates and Device Info.
Shut Down	Tap for deep sleep; hold for one second to request a restart. Both require confirmation.

A short message may slide over the top bar after an action. These **toasts** confirm a result or explain a failure, then disappear. A tap on a visible toast dismisses it. They do not represent an additional navigation level.

READ THE INSTRUMENT AT A GLANCE

Status icons and signals

Indicator	What it tells you
Clock	Local time when available. The onboard RTC can retain time; network time synchronizes it. The current release displays Europe/Berlin time.
Wi-Fi arcs	Colored arcs show signal strength over a full grey outline. A connected radio alone does not prove Internet access.
USB	Grey for Serial/JTAG, blue while USB Ethernet awaits an address, green when addressed.
CAN waveform	Lock means a rate has been confirmed by valid reception or an ACK. The slashed form means unconfirmed/unavailable. A lock is not a diagnosis of perfect wiring.
CAN RX / TX dots	RX is above TX. Pulses show activity; green through yellow to red indicates increasing estimated directional load. Red load color is not a bus-error alarm.
Vehicle symbol	Colored: emulation running. Grey and slashed: stopped, or an IP-only emulation has no network connection. The model stays loaded. USB Ethernet and physical CAN work with Wi-Fi off. Hidden: no vehicle is loaded.
Vehicle RX / TX dots	Two small dots beside the vehicle symbol show DoIP/HSFZ diagnostic activity: blue RX above green TX, viewed from the Touch. Discovery, connection handshakes and routine Studio health reads do not trigger them. Pulses show activity, not throughput or guaranteed success of a flash.
Studio monitor	Slashed grey: unavailable. Empty blue: ready and advertised. Green check: control client connected. Blue exchange: an explicit operation. Red: transport error.

A quiet connected icon is normal

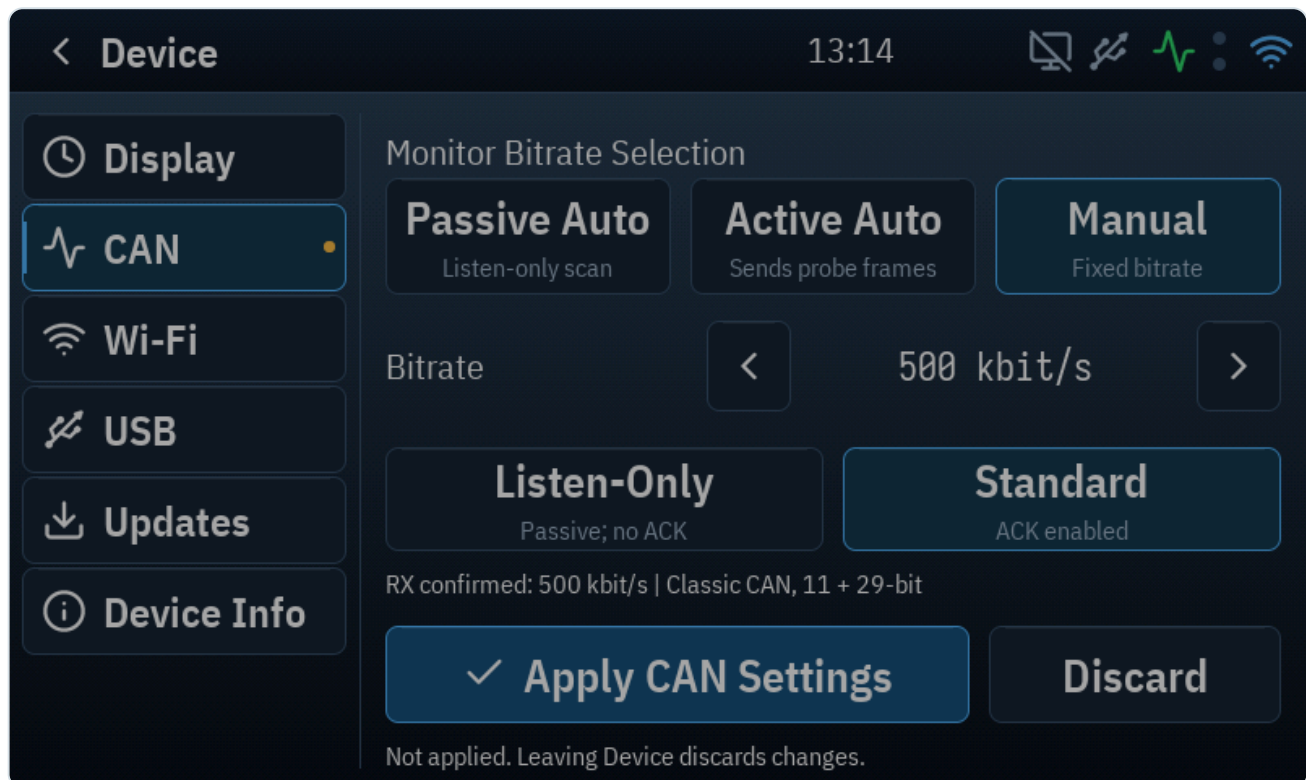
Studio continually observes the device. Routine health/status reads and the observation stream do not animate the Studio icon. Loading or applying a vehicle and other explicit control operations do. The icon describes control clients—including command-line clients—not a cryptographic identification of a particular application.

When nothing seems to be happening

Nothing loaded means that opening OBD2 has not yet created a responding vehicle. **Stopped** means a configuration exists but does not answer. **Ready for Studio** means the network endpoint is available; Studio still has to load and start its vehicle. These are useful, distinct states.

ONE BUS, CLEAR OWNERSHIP

CAN setup and startup



Discovery and operating mode are separate settings. Both identifier widths are always supported.

The factory configuration is **Active Auto + Listen-Only**, with 500 kbit/s as the initial configured fallback/emulation bitrate. At startup, automatic discovery first listens at candidate rates. If necessary, Active Auto makes one bounded active sweep using probe identifier 0x42. After detection, the selected monitor operating mode applies.

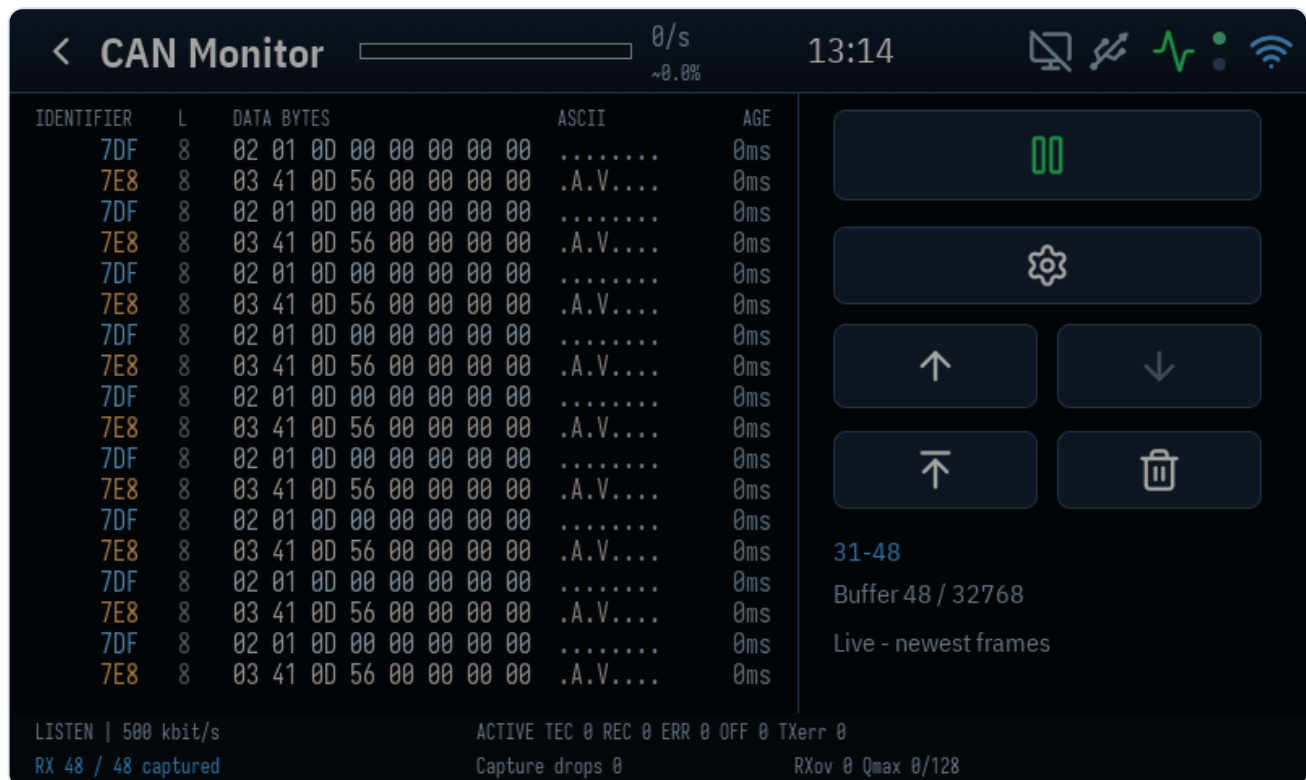
Passive Auto never adds active probes. **Manual** uses the chosen rate directly. **Listen-Only** does not supply ACKs; **Standard** does. Active Auto is therefore not strictly passive throughout startup even when the final monitor mode is Listen-Only.

If nothing confirms a rate, the device parks at its fallback rate and shows it as unconfirmed. Silence does not cause endless rescanning. Later frames can be seen if they use that parked rate. To search again deliberately, use **Restart Detection**.

CAN edits take effect with **Apply CAN Settings**. Switching Device categories keeps the draft; leaving Device discards unapplied changes. While emulation owns CAN, use the red **Stop Physical Emulation** action and its confirmation before editing. It stops CAN and disconnects control clients.

OBSERVE

Reading the CAN Monitor



Synthetic OBD2 requests and replies. Monitor navigation does not restart the bus.

The monitor shows traffic on the shared physical CAN controller, including traffic generated by a running emulation. The identifier distinguishes messages; the data area shows hexadecimal bytes and an ASCII interpretation. Not all payloads represent text. Standard and extended identifiers remain distinguishable.

AGE is how long ago a frame was observed. Its unit changes as the age grows: precise short intervals, then minutes, hours and longer units. This keeps the display useful without filling it with irrelevant digits.

The top-bar meter shows estimated bus utilization on a fixed scale. A full bar means approximately 100% bus occupancy; it is not a slider and does not rescale to the busiest recent sample. FPS is a frame rate, not a byte rate. Frame length, identifier format and bus bitrate affect the relationship between FPS and bus load.

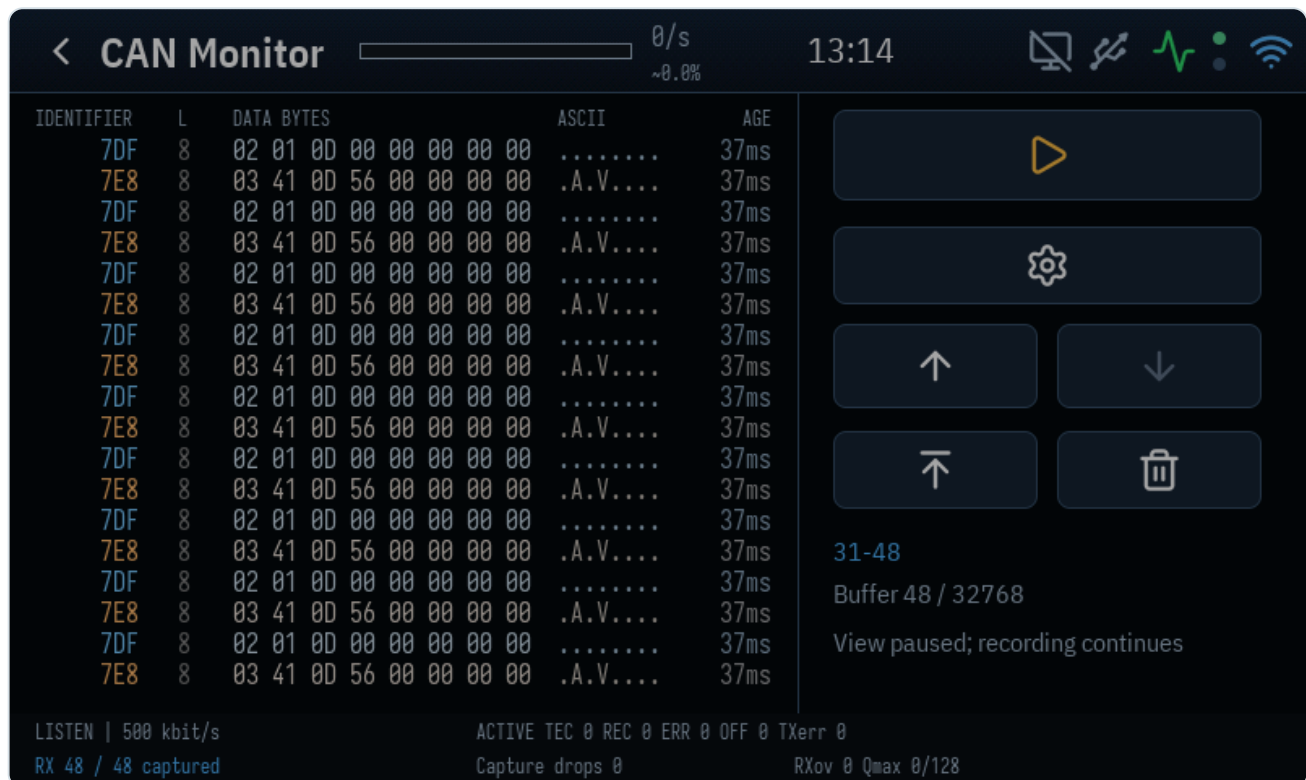
Health at the bottom

Read the health values alongside traffic: transmit/receive error counters, bus errors, bus-off and receive overflow/drop information distinguish electrical trouble from capture limitations. A high number of received frames alone is not proof that no data was missed.

Opening the monitor during emulation preserves its vehicle state, bitrate and ACK behavior. You can watch the tester's exchange without stopping the test.

INSPECT WITHOUT INTERRUPTING

Pause, browse and clear



Paused means the view is held. CAN reception and the emulator keep running.

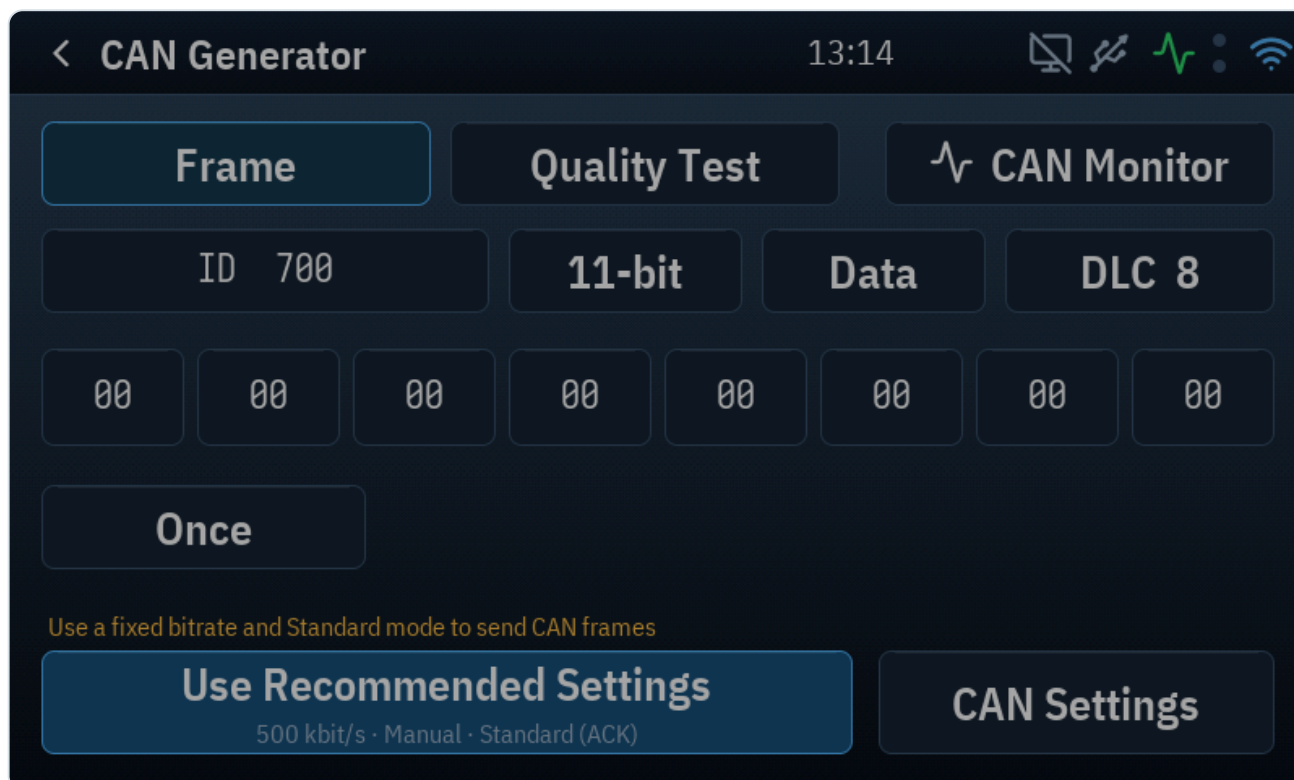
Control	Action
Pause	Hold the displayed position while incoming frames continue entering the buffer.
Play	Return to the live edge of the capture.
Arrow controls	Move through retained history a page at a time; the arrow with a line jumps to the oldest retained data.
Gear	Open options, including the choice of newest frames at the top or bottom.
Trash	Clear the monitor history and return to Live. It does not stop CAN, stop emulation or clear controller-health counters.

History is a rolling memory buffer. Its duration depends on traffic volume. When it fills, the oldest frames are replaced. A paused position can therefore expire; resume or move to the remaining history. This is an inspection buffer, not a permanent recording on disk.

Browsing uses deliberate button presses rather than drag scrolling. For an archival trace or a longer analysis on a computer, use the appropriate connected recording tools; do not assume the local history is retained after restart.

PREPARE TO TRANSMIT

First use of the generator



Factory settings favor observation. The generator asks you to configure transmission explicitly.

Open **CAN Generator** on Home. If the controller is in Auto or Listen-Only mode, choose **Use Recommended Settings** to apply a fixed bitrate and Standard mode. Check the displayed bitrate against the other devices on your bench first.

This changes the saved **Device → CAN** settings. It does not send a frame or start a sequence. Standard mode remains active when you leave the generator, so the monitor continues acknowledging valid traffic. Return to Listen-Only under Device → CAN when you want passive observation again.

If physical emulation owns CAN, stop it before starting the generator. A single controller cannot use two different bitrates or ownership modes at once.

Once configuration completes, enter the frame or quality sequence described on the following pages.

GENERATE

Send a CAN frame

< CAN Generator 13:14

Frame Quality Test CAN Monitor

ID 700 11-bit Data DLC 8

00 00 00 00 00 00 00 00

Once

Ready
500 kbit/s · Standard

Send Once Stop

Identifier, frame format, DLC and data bytes are independent controls.

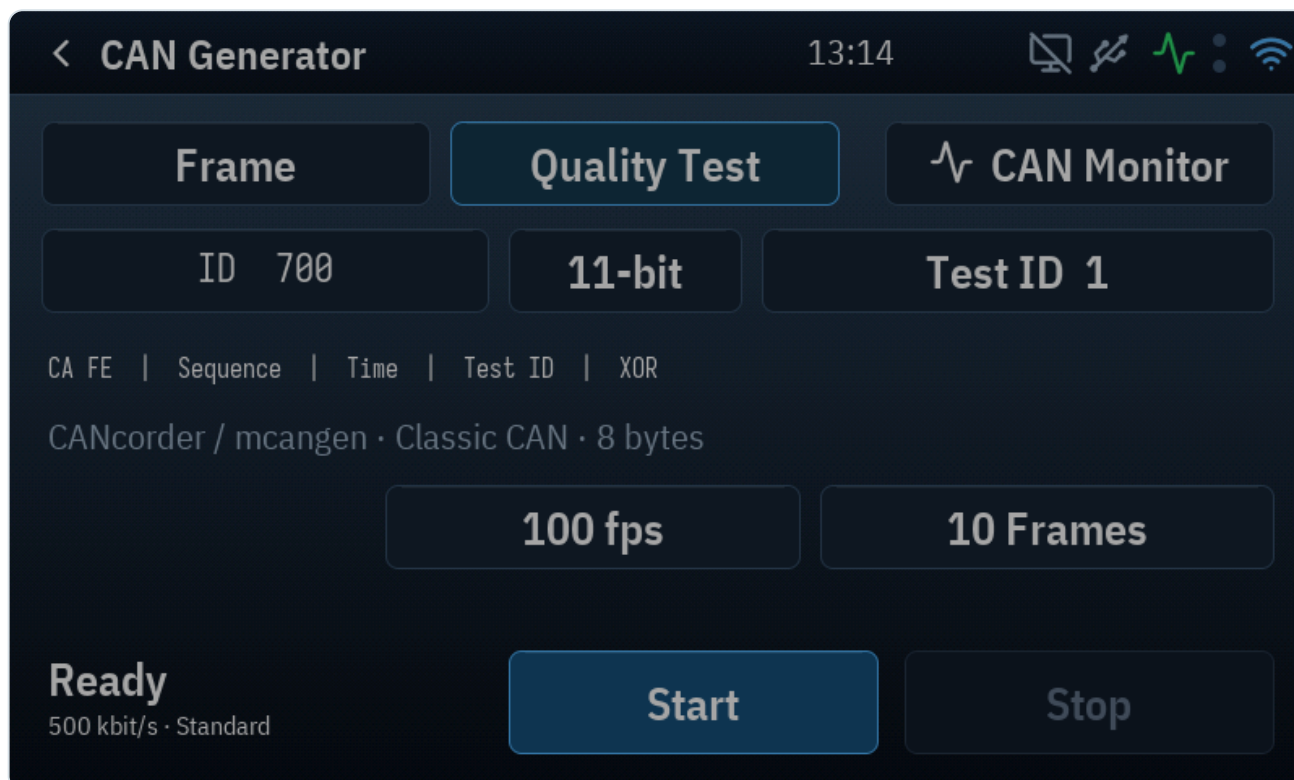
1. Open **CAN Generator** → **Frame**. If setup is required, **Use Recommended Settings** applies Manual + Standard at the displayed current/configured bitrate. It does not start transmission.
2. Tap **ID** and enter a hexadecimal identifier. Select **11-bit** or **29-bit** to match the intended frame.
3. Select **Data** or **RTR**. Choose DLC from 0 to 8. For a data frame, edit the enabled byte fields; an RTR frame does not carry those payload bytes.
4. Use **Once** for a single frame, or **Periodic** for a finite series. Set the rate and count before starting.
5. Tap the send/start action. Watch completion or an error; use **Stop** to end an active job.

The generator requires exclusive CAN ownership. It cannot run alongside physical vehicle emulation. The monitor remains available for inspection while the generator is working.

Check the identifier, contents and target bitrate before transmitting. Use a test network whose participants you control. The generator sends the bytes you enter; it does not know their meaning to another ECU.

EXERCISE THE CONNECTION

Run a quality sequence



The built-in sequence follows the CANcorder/mcangen quality-test format.

Quality Test creates a recognizable sequence for a compatible receiver to check. Choose the identifier and format, set the frame rate and count, then start. A finite run makes it easier to compare sent and received counts and to stop promptly when the wiring or peer is not ready.

The current UI accepts up to **1,000 frames/s** and up to **65,536 frames** per quality run. This is the offered operating range, not a claim that the bus can carry every chosen combination at every bitrate. At low bitrates, requested traffic can exceed the available wire capacity.

Judge the whole path

1. Begin with a low rate and a short count on a correctly terminated bench.
2. Use CANcorder/mcangen-compatible verification at the receiving side to check sequence continuity and payload integrity.
3. Compare transmitted and received totals, then increase the rate gradually.
4. Watch CAN health. A receiver that does not acknowledge, a wrong rate or poor wiring can produce repeated errors.

A transmit failure, loss of progress or bus-off stops the generator job. Correct the cause before starting another run. An ACK confirms acceptance at the CAN link layer; it does not prove that a receiving application's queue retained and processed the frame.

For repeatable measurements, keep the physical wiring, receiver mode and bitrate unchanged between runs. Record the settings with your results.

SIMULATE · QUICK START

Your first OBD2 simulation



The included models cover petrol and diesel with both CAN identifier formats.

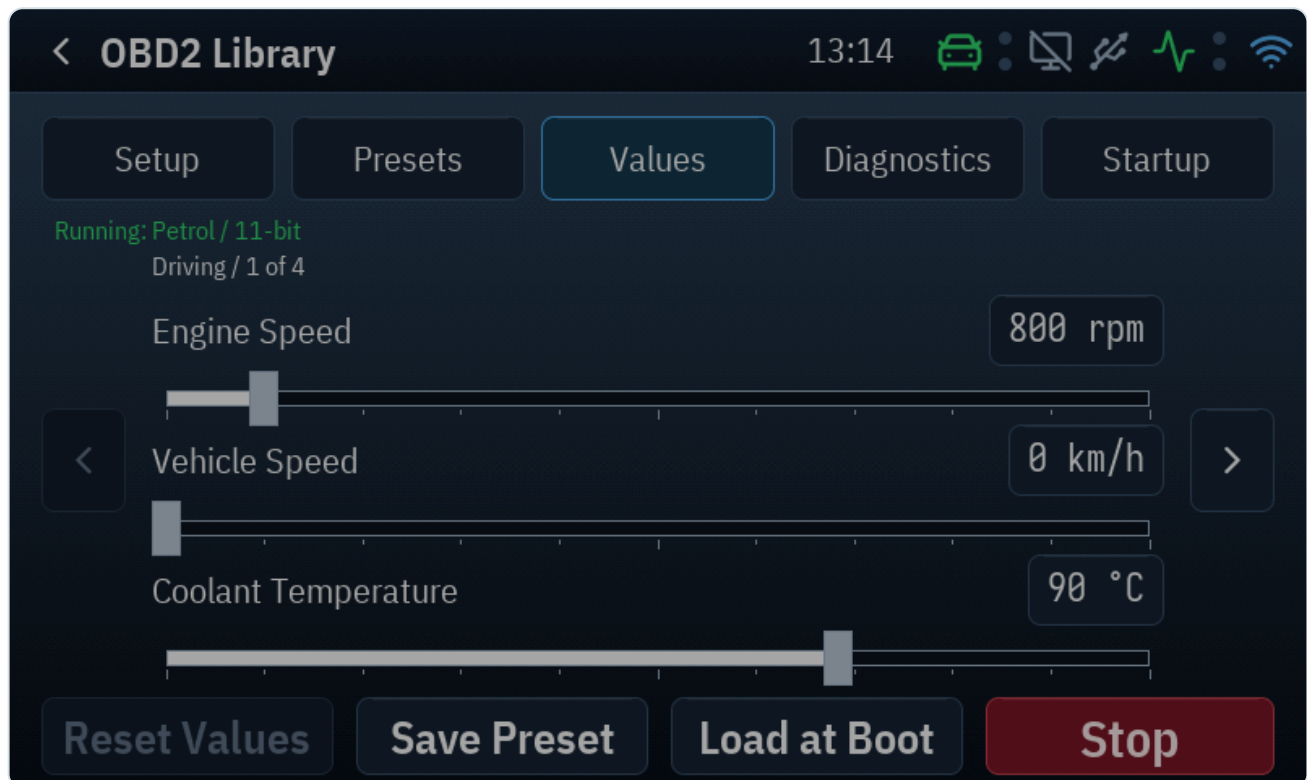
1. Connect and power the Touch and a CAN-capable OBD2 tester as described in [Your first bench connection](#).
2. Set the desired emulation bitrate under **Device** → **CAN**. For the first test, use 500 kbit/s.
3. Open **OBD2** on Home. With an extension, choose **OBD2 Simulator** from Vehicle Emulation.
4. Open the library through its chevron, then **Setup**. Choose **Petrol** or **Diesel** and **11-bit** or **29-bit**.
5. Tap **Start**. Confirm a bitrate conflict if one is shown. Running — not merely selected — is the checkpoint that the model is ready to answer.
6. Start the tester's OBD2 connection/search and request live data.

Starting emulation claims CAN in Standard mode at the selected emulation rate. A successful earlier discovery is not required on an otherwise idle bench. If another rate was positively confirmed, the Touch asks whether to use that rate or deliberately switch.

For an ELM-style adapter, the CAN protocol choices commonly used here are 6/7 at 500 kbit/s and 8/9 at 250 kbit/s, for 11/29-bit respectively. Prefer your tester's automatic detection where available.

CHANGE WHAT THE TESTER SEES

Live values



Sliders offer quick changes; tap a numeric value for exact entry.

Start the model, then open **Values**. Three controls are shown per page. Use the side chevrons to move between groups; tapping Values itself returns to that tab rather than cycling through the pages.

Drag a slider and release it to apply the value. For a precise test, tap the displayed number, enter a value and choose **Apply**. The permitted range and step belong to the model. Values with a fixed OBD2 resolution are quantized to that resolution.

The new value affects subsequent diagnostic requests. A scanner displaying an old value may simply not have polled that PID again; reopen or refresh its live-data view before assuming a change failed.

A short check with an ELM-style terminal

Set on Touch	OBD request	Positive payload
Engine speed: 800 rpm	010C	41 0C 0C 80
Vehicle speed: 86 km/h	010D	41 0D 56
Coolant: 43 °C	0105	41 05 53

These are diagnostic payloads. Adapter settings may also display CAN headers, ISO-TP length bytes or padding. In a raw CAN trace, a short response contains additional transport framing.

INCLUDED OBD2 MODEL REFERENCE

The twelve live controls

The current included models expose the following local controls. A custom Studio specification can behave differently; this table describes the factory OBD2 library.

Page / signal	Range	Mode 01 PID
Driving · Engine Speed	0–8,000 rpm	0C
Driving · Vehicle Speed	0–250 km/h	0D
Driving · Coolant Temperature	–40–150 °C	05
Temperatures · Intake Air	–40–215 °C	0F
Temperatures · Ambient	–40–215 °C	46
Temperatures · Engine Oil	–40–215 °C	5C
Engine · Calculated Load	0–100%	04
Engine · Throttle Position	0–100%	11
Engine · Intake Manifold Pressure	0–255 kPa	0B
Supply · Mass Air Flow	0–655 g/s	10
Supply · Fuel Level	0–100%	2F
Supply · Control Module Voltage	0–20 V	42

Keep a useful baseline

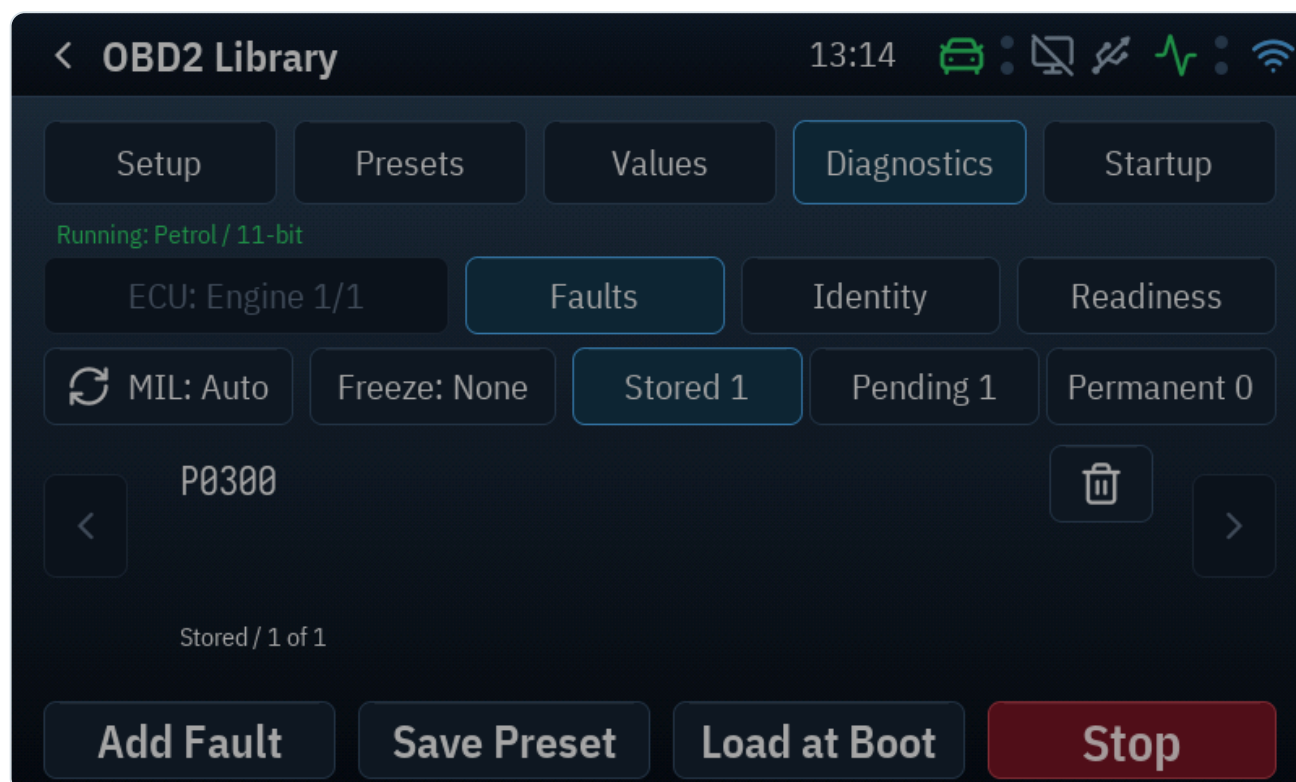
Reset Values removes temporary live-value overrides and returns to the selected model/preset baseline. It is not Factory Reset and does not erase your saved presets.

Save Preset creates a reusable configuration in the local library. **Load at Boot** stores a checkpoint for the next restart. Adjusting a slider does not automatically overwrite either saved object. See [Presets and saved state](#) for the distinction.

Reported speed, temperature and voltage are simulated data. Changing Control Module Voltage does not change the electrical supply voltage, and changing engine speed does not require any physical engine.

BUILD DIAGNOSTIC SCENARIOS

Faults and the warning lamp



Choose the ECU and category before editing a fault.

Open **Diagnostics** → **Faults** while the model is running. Where a model has several managed ECUs, use the ECU selector to choose the one whose diagnostic state you want to edit.

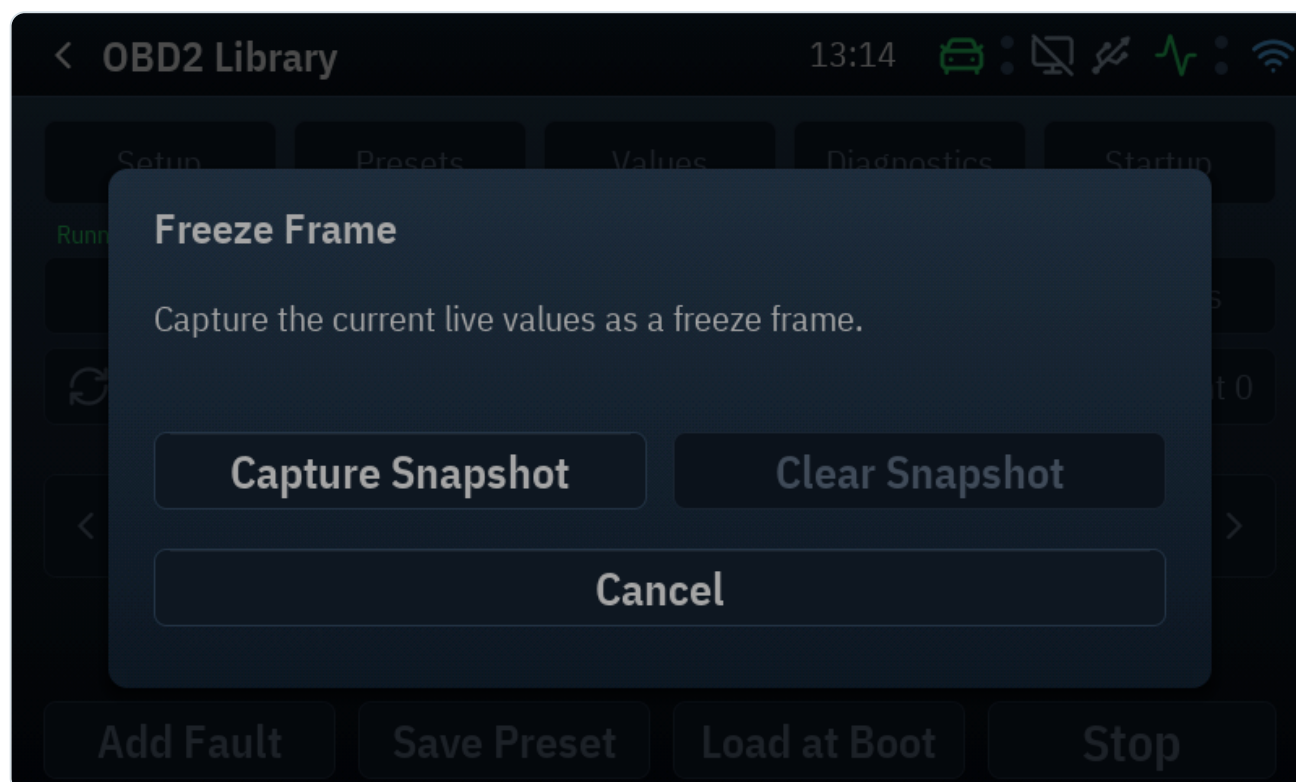
1. Choose **Stored**, **Pending** or **Permanent**.
2. Tap **Add Fault**. Enter a five-character code such as P0300. The editor restricts entry to the supported DTC syntax and rejects the zero/no-fault code.
3. Apply it, then ask your tester to read that category. A scanner may have separate menu items for stored, pending and permanent codes.
4. To remove an entry, tap its trash icon and confirm. Only that category changes.

MIL: Auto derives the simulated malfunction-indicator state from stored faults. You can also force the lamp on or off to test a display independently of that automatic rule. Readiness, pending faults and a captured freeze frame are separate aspects of the model.

A tester's clear-diagnostics request changes the runtime's diagnostic state too. It clears stored and pending faults and the freeze frame, and resets readiness to incomplete; permanent faults are not simply treated as stored faults. Do not confuse this with removing one list entry in the Touch UI.

HOLD THE CONDITIONS OF A FAULT

Freeze frames



Capture the current values, replace a prior snapshot or clear it deliberately.

A freeze frame lets the tester read a fixed set of diagnostic values representing a selected moment. It is useful when teaching or testing the difference between live data and the conditions recorded around a fault.

1. Set the desired engine speed, load, temperatures and other live values.
2. Configure the fault and MIL state you want the tester to see.
3. In **Diagnostics** → **Faults**, tap the **Freeze** control and choose **Capture Snapshot**.
4. Change the live values again. Read live data and freeze-frame data separately on the tester to compare them.

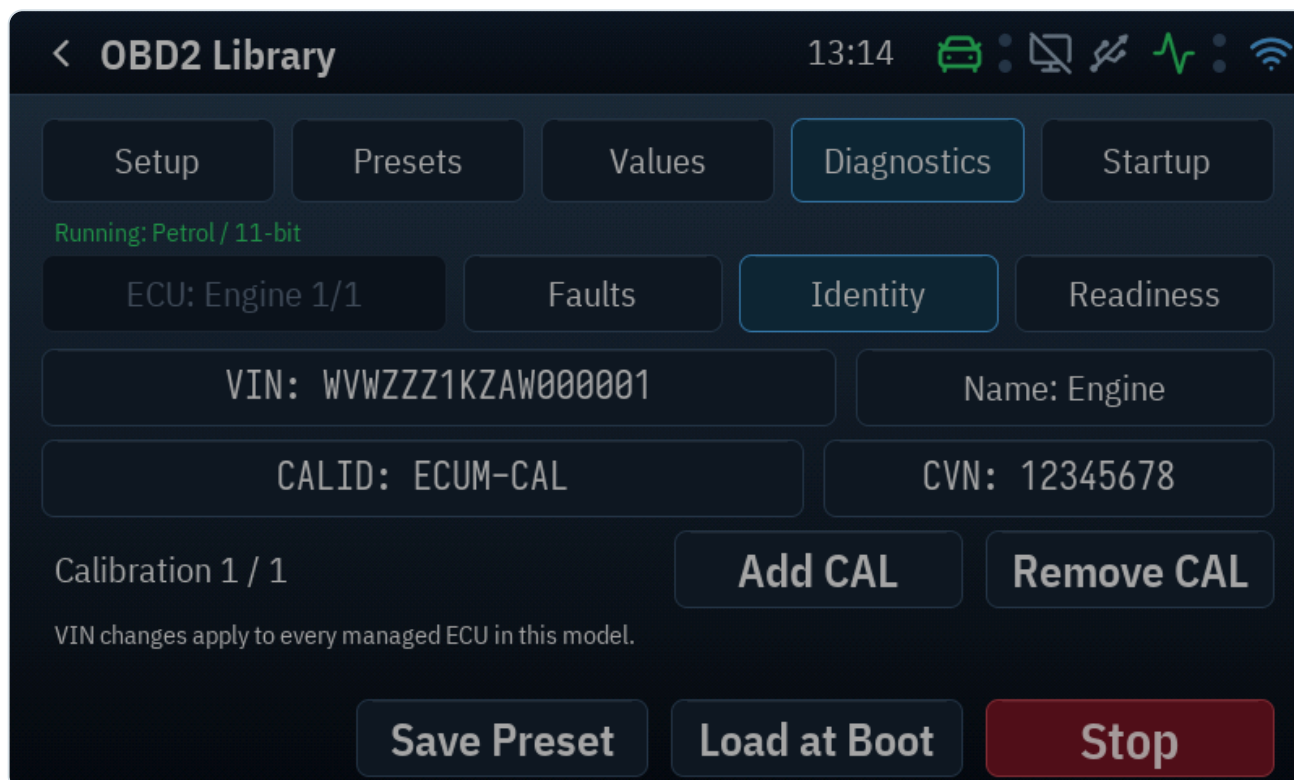
An existing snapshot remains fixed until it is replaced or cleared. Adding a fault is not an instruction to continuously refresh the snapshot. Removing one DTC from one list does not silently discard the snapshot either; the confirmation explains this distinction.

Use **Replace Snapshot** to capture the new conditions and **Clear Snapshot** when the scenario should have none. Save the resulting diagnostic setup as a preset if it is something you want to demonstrate again.

The scanner decides which freeze-frame indexes and fields it requests. A screen with fewer fields than expected may reflect the tester's capabilities or query behavior. The CAN Monitor can show what it actually asked.

IDENTIFY THE SIMULATED VEHICLE

VIN and calibration identity



Identity belongs to the simulated model, not to the Touch's own serial number.

Open **Diagnostics** → **Identity**. Tap the VIN, ECU name, calibration ID or CVN to edit it with the appropriate keyboard. The model must be running for diagnostic changes to apply.

Field	Entry rule and scope
VIN	17 letters/digits, excluding I, O and Q. The editor applies a VIN change across the model's managed ECUs.
ECU name	Up to 20 characters for the selected ECU.
Calibration ID	Up to 16 characters per entry.
CVN	Eight hexadecimal digits associated with that calibration entry.

Use **Add CAL** to add a calibration/CVN pair, up to four, and the calibration selector to move between pairs. **Remove CAL** confirms removal of both the selected ID and its CVN.

These fields are independently configured test data. Editing a calibration ID does not calculate a new CVN from an actual firmware image. Likewise, a syntactically valid test VIN is not evidence that the specification reproduces the corresponding real vehicle.

All vehicle identities in this guide are synthetic demonstration values. Keep your own test identities clearly separated from customer vehicle records.

CONTROL DIAGNOSTIC COMPLETION STATES

Readiness monitors



Readiness has two independent questions: is a monitor supported, and has it completed?

In **Diagnostics** → **Readiness**, use the page arrows to move through the monitor list. Petrol and diesel models expose the appropriate monitor names for their ignition type.

Supported controls whether the simulated ECU reports the monitor as available. **Complete** controls its completion state when supported. Turning support off also removes an inconsistent completion setting; you cannot mark an unsupported monitor as complete.

Common monitors include misfire, fuel system and comprehensive components. The remaining list differs between petrol and diesel—for example oxygen-sensor/catalyst monitors on petrol, and exhaust/aftertreatment-related monitors on diesel.

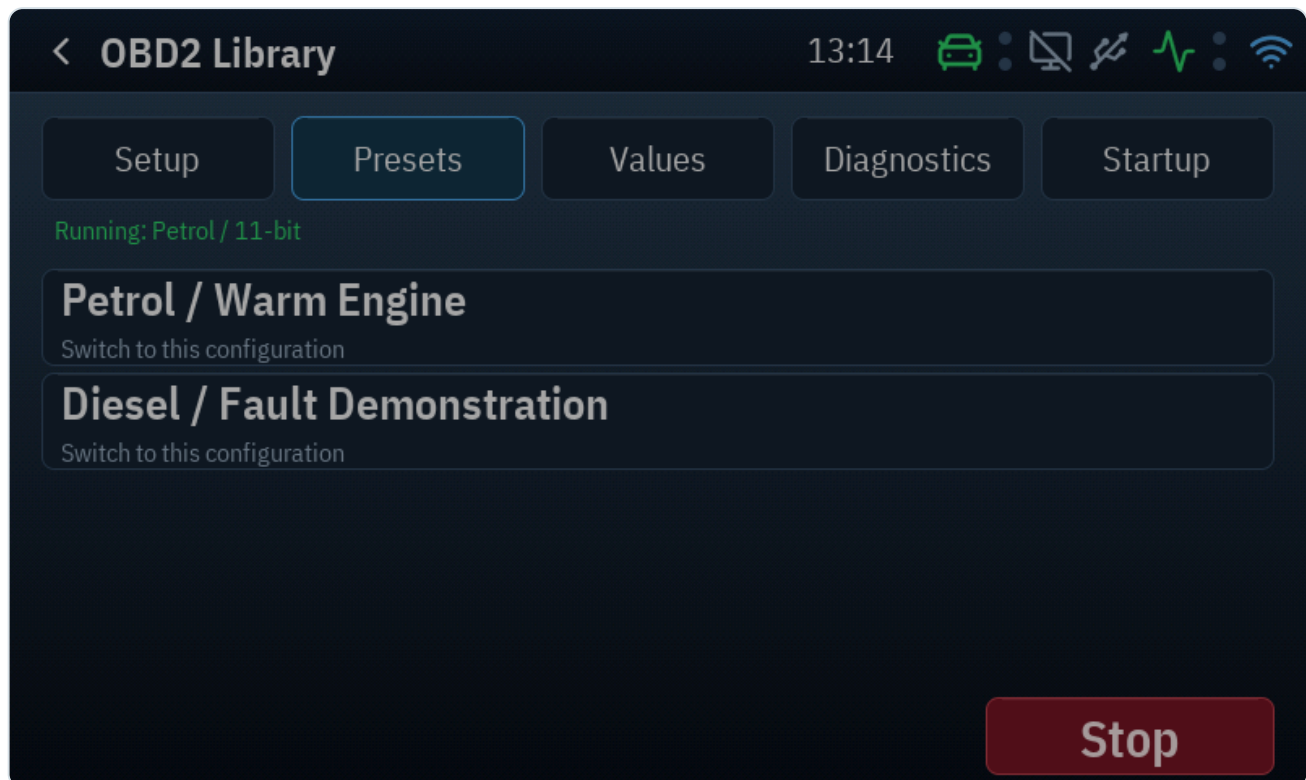
A repeatable readiness demonstration

1. Choose the fuel type and start the model.
2. Mark the desired monitors as supported, with a mixture of complete and incomplete states.
3. Read readiness on the tester and note how it labels unsupported monitors.
4. Change one supported monitor to complete, then request readiness again.
5. Save a preset for the initial state if you want to repeat the exercise.

Readiness is not the same as fault memory or MIL state. The simulator lets you set these independently to exercise the tester's presentation. It does not run a physical drive cycle or certify an actual vehicle's emissions readiness.

REPEAT A USEFUL SETUP

Presets and saved state



Presets are reusable configurations of models. The names here are illustrative.

Item	Purpose
Model	The vehicle definition: available diagnostics, encodings, parameters and behavior.
Live edits	Current changes applied to the running selection. They are not automatically saved.
Preset	A reusable model-based setup, including chosen values and managed diagnostic state.
Boot checkpoint	The selected configuration explicitly stored with Load at Boot.

Use **Save Preset** after configuring a useful test. The current Touch UI creates a new numbered entry. Select it in **Presets** to start that setup again. Creating a preset does not automatically select it as the next boot configuration.

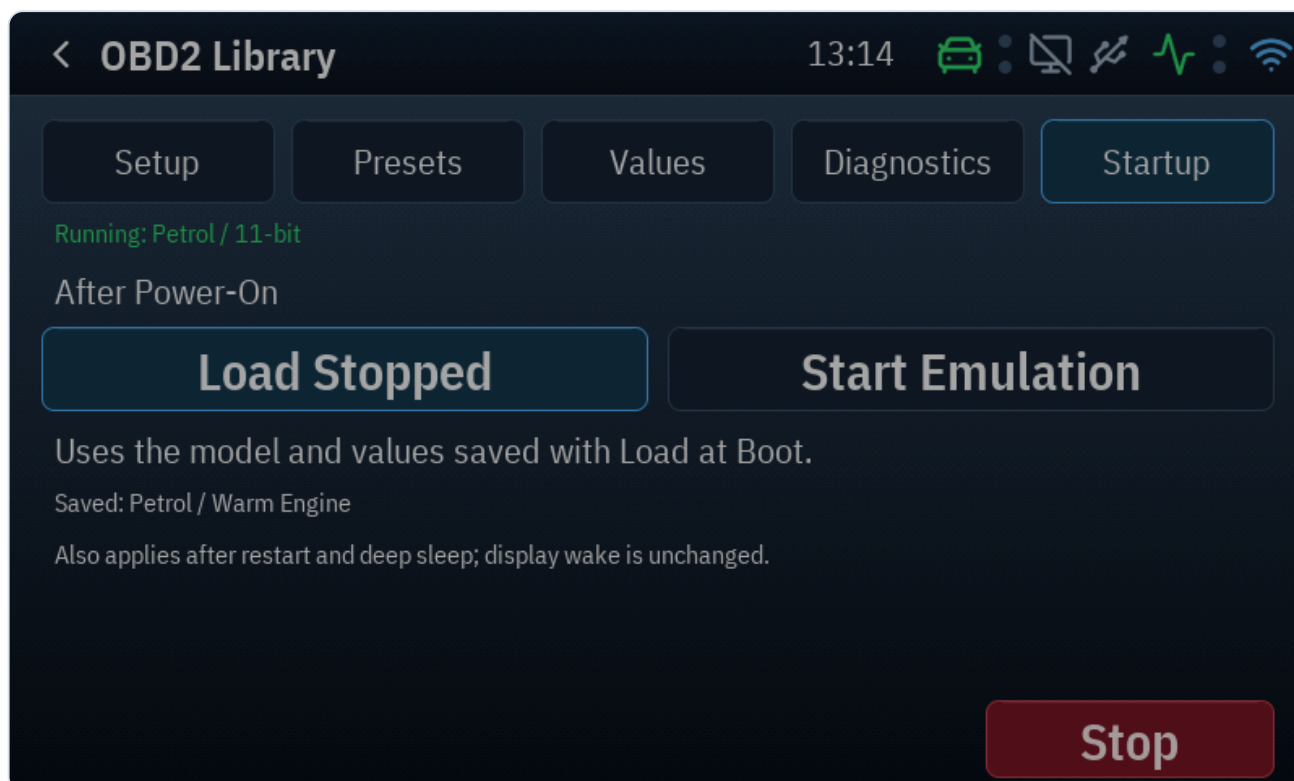
Load at Boot saves the current explicit configuration for restart. Later edits require another Load at Boot action if you want them in that checkpoint. Startup policy determines whether the checkpoint loads stopped or starts automatically.

When you choose another model with unsaved changes, the Touch asks before switching. Cancel keeps the current session. Confirming the switch replaces that active setup; it does not implicitly save a preset.

Saved setups retain their model revision. A firmware update can add newer included models without rewriting old saved configurations. If a saved preset lacks a newer diagnostic editor, start the current included model and save a new setup.

MAKE POWER-ON BEHAVIOR DELIBERATE

Restore stopped—or start



The setting uses the checkpoint saved with Load at Boot.

Load Stopped is the default. The saved configuration returns after reboot, but it does not answer until you press Start. This is useful when you attach the device to different benches or want to check the connection first.

Start Emulation is an explicit opt-in for a dedicated test setup. Save a boot checkpoint, select the policy and allow its setting to finish saving. On the next boot the Touch attempts to start that saved OBD2 configuration after initialization and CAN checks.

If the observed CAN rate conflicts with the selected emulation rate, the device asks for a choice. An unavailable CAN interface or a failed start leaves emulation stopped; it does not retry indefinitely and surprise you later. Check the on-screen message and start manually when ready.

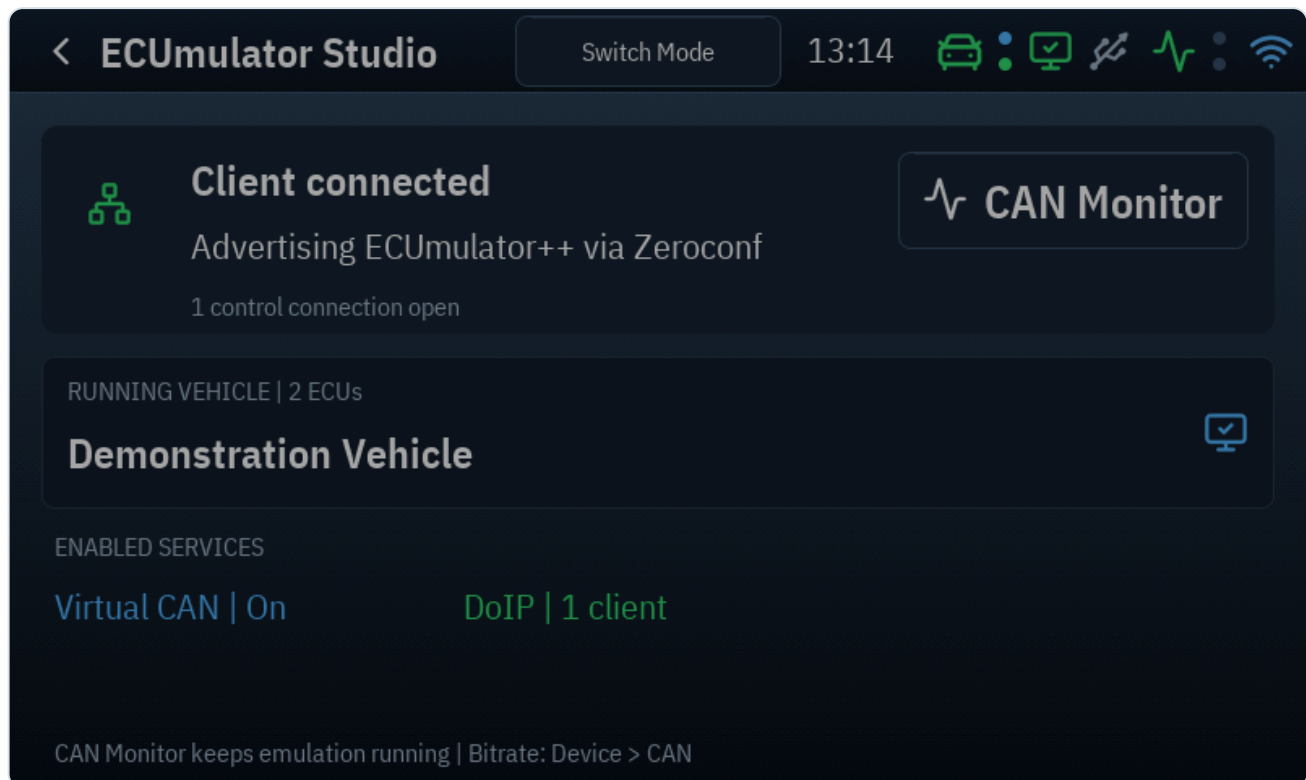
Three different kinds of return

Event	Behavior
Display wakes	The running device continues. There is no model reload or new startup attempt.
Restart or deep-sleep wake	A fresh boot applies the saved mode and the OBD2 startup policy.
Switch between OBD2 and Studio	The destination is prepared stopped/waiting. Switching does not invoke boot autostart.

Studio mode starts empty and waits for its client. Studio may subsequently reapply a vehicle; that is a client action, separate from local OBD2 boot policy.

EXTEND THE WORKBENCH

Connect ECUmulator Studio



A DoIP simulation in Studio mode. The vehicle symbol and its RX/TX dots show diagnostic activity; the separate Studio symbol shows the control connection.

Recommended with the Studio extension: use **USB Ethernet (NCM)** with **Wi-Fi Fallback: Off**. Disabling Wi-Fi leaves more internal RAM for complex vehicle models. See [USB Ethernet](#) for setup; Serial / JTAG alone is not a network connection.

1. Activate the Studio extension for this device and provide a working local network path.
2. On Home, open **Vehicle Emulation** and choose **ECUmulator Studio**. Wait for **Ready for Studio**.
3. In Studio, select the discovered Touch runtime. If discovery is unavailable across your network, use its IP address and the control port, 29190.
4. Load your vehicle specification in Studio. For physical CAN, configure External CAN with the Touch's own interface and the intended bitrate. For network diagnostics, enable the model's DoIP or HSFZ service instead. Apply the configuration.
5. Check that the Touch names the vehicle and reports the expected services. Confirm a real tester request receives a response.

The CAN interface belongs to the **runtime host**—the Touch. Select its interface to use its CAN terminals, not a computer-local adapter. Termination remains a physical hardware setting.

Studio's bounded live trace observes the runtime without blocking diagnostic responses. Reported trace gaps mean the display is incomplete, not that the emulator stopped.

Flash-protocol testing. Touch handles programming transfers without storing or executing downloaded firmware. Memory reads and uploads return synthetic FF bytes at configured lengths. Sessions, security and routines follow the model. Use the desktop runtime for retained firmware readback or comparison.

KEEP BOTH WAYS OF WORKING

Switch emulation modes



The Studio extension adds a second mode; local OBD2 remains available.

After a mode has been selected, a short tap on Home's **Vehicle Emulation** tile returns to the last chosen mode. To choose again, hold that tile for one second. Its border indicates progress; move away to cancel. The visible **Switch Mode** button in the emulation page's top bar provides the same choice.

Changing modes stops the outgoing emulation and diagnostic services. Leaving Studio disconnects control clients and requires confirmation. A running generator must also relinquish CAN before the transition completes.

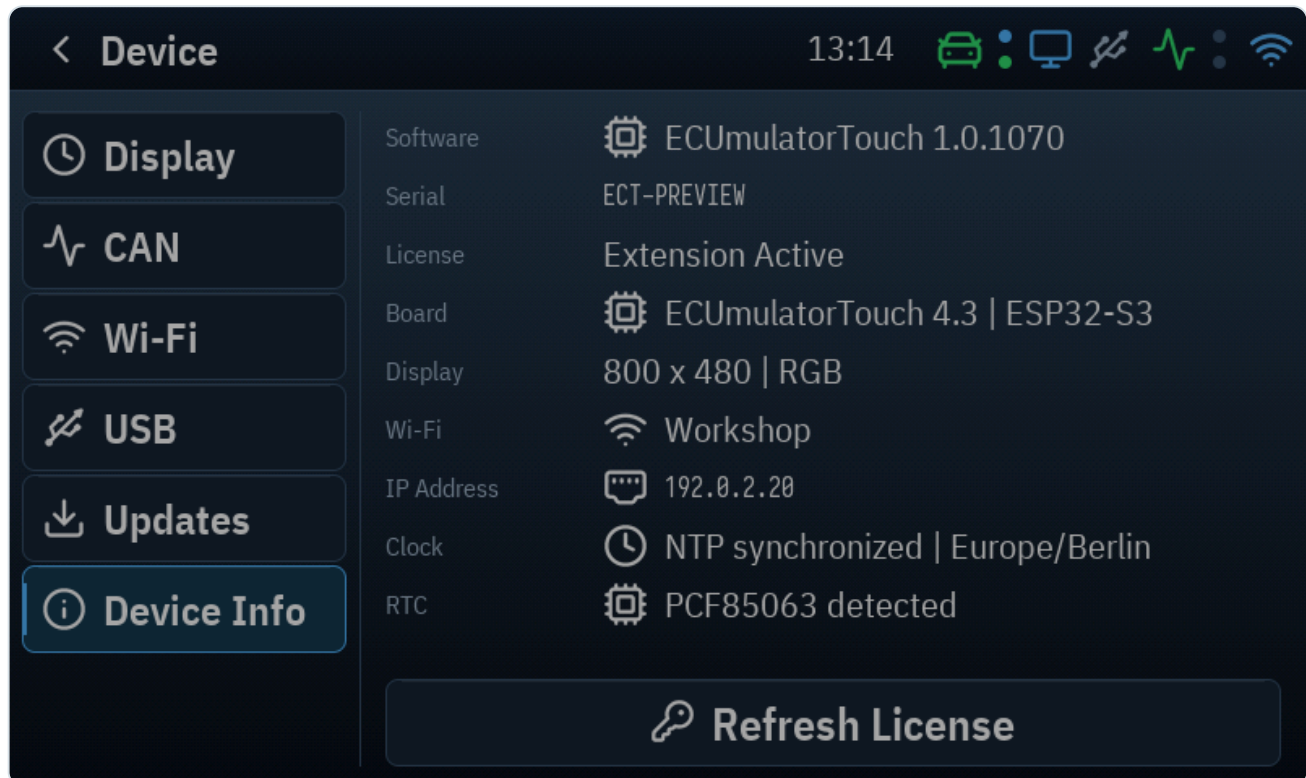
Your local OBD2 selection, values and managed diagnostic state are kept when leaving OBD2. Returning restores that local setup **stopped**. Starting Studio mode does not export the OBD2 vehicle as a custom Studio vehicle; Studio supplies its own specification.

In OBD2 mode, Studio's control listener and network advertisement are disabled—even on a licensed device. This keeps remote and local ownership explicit. If Studio cannot find a licensed Touch, first check that the device is actually in Studio mode.

Without the extension, Home is labelled **OBD2** and opens the local simulator directly. There is no mode chooser to navigate and no Wi-Fi requirement for local emulation.

DEVICE IDENTITY AND EXTENSION

Activate this device



Device Info is the reference for your unit's serial, firmware and extension state.

Open **Device** → **Device Info**. The serial identifies the Touch hardware to the activation service. The simulated vehicle's VIN is a different value and is not used as the device serial.

1. Connect through Wi-Fi, or through USB Ethernet with an Internet-sharing host.
2. Use **Check Activation** to refresh the device's registration/extension state.
3. When purchasing or requesting an extension, provide the device serial so the entitlement can be assigned to the correct unit.
4. After assignment, check again. **Extension Active** confirms that the license has been accepted and stored.

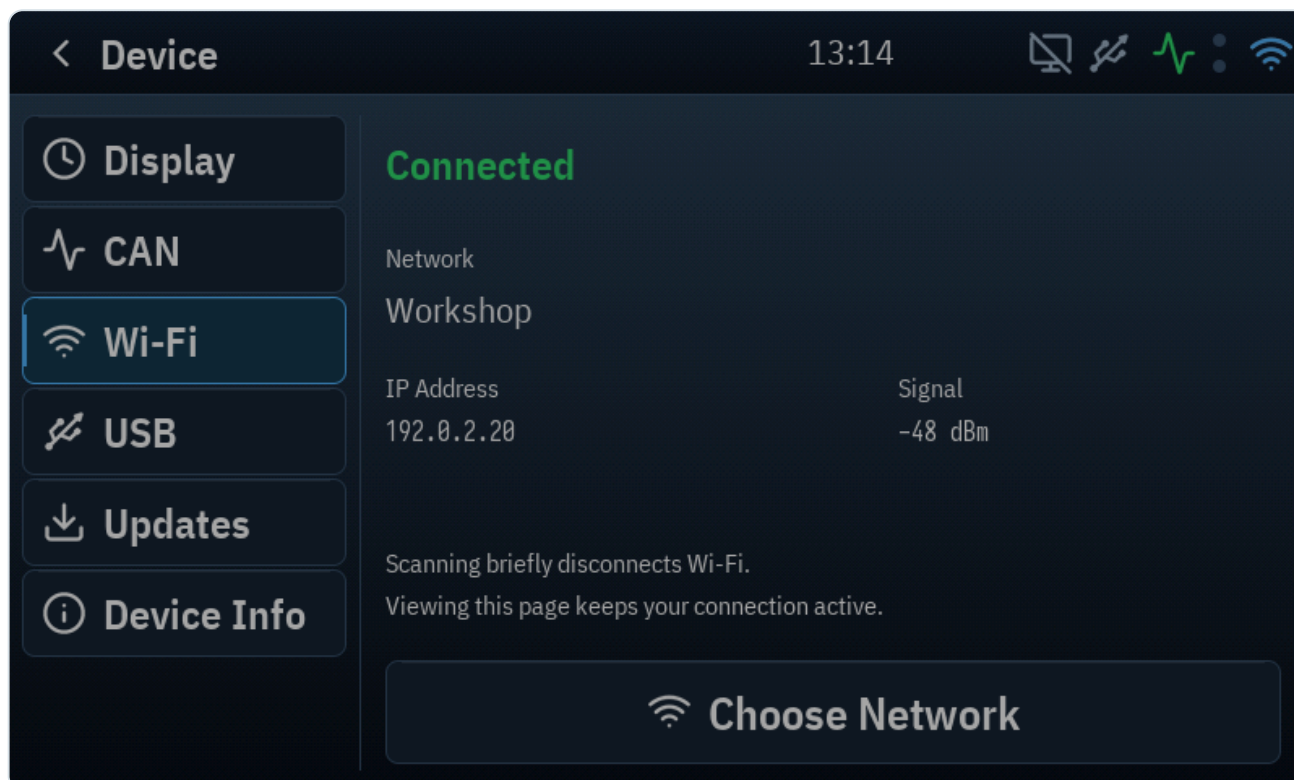
The included OBD2 functions do not depend on that activation. An IP address is required before the activation button can be used; an address alone does not guarantee that the server is reachable.

A stored valid extension is verified locally on later boots. It does not require a continuous Internet connection for each emulation session. Studio control needs a reachable local network, which can exist without an Internet uplink.

Factory Reset removes the stored license as well as settings. It does not itself transfer or revoke a server-side purchase. After a reset, reconnect and refresh activation for the same device if its entitlement is still assigned.

CONNECT WITHOUT LOSING YOUR PLACE

Wi-Fi settings



Viewing status keeps the connection active. Choosing another network starts a scan.

Home's **Wi-Fi Settings** tile and **Device** → **Wi-Fi** open the same page. It shows the saved/current network, IP address and signal strength. Merely viewing this page does not disconnect Wi-Fi.

Choose Network starts a scan, which can temporarily interrupt the current connection. If a control client is attached, confirm the interruption first. The password workflow is the same as during first start.

If you back out without saving another network, the device reconnects to the previous saved network in the background. A successfully tested new connection becomes permanent only after **Save and finish**. A deliberate Offline choice replaces the old saved connection.

Temporarily switch Wi-Fi off

On Home, hold the **Wi-Fi Settings** tile for one second, until its border completes. A short tap still opens settings. Holding switches the radio off and releases its driver buffers. The loaded vehicle, local CAN emulation and CAN Monitor continue running. Any Studio connection over Wi-Fi is interrupted; activation, updates and other online functions need another network connection.

Hold again to reconnect to your saved network. With no saved network, the device opens network setup. This is a temporary choice: restarting restores the usual saved connection. USB Ethernet with Wi-Fi fallback disabled keeps its existing USB policy.

For a complex vehicle that approaches the device's memory limits, load and start the simulation first, then switch Wi-Fi off as a troubleshooting workaround. This frees some working memory; it does not increase the device's total capacity or guarantee that every vehicle will fit. Reconnect before editing the model in Studio.

If connection is slow or fails

Check that the access point offers 2.4 GHz, the password is correct and the displayed signal is usable. Wait for the connection result before issuing another attempt. If the scan list is empty, try Rescan; a hidden SSID requires manual entry.

For Studio discovery, use a network that permits communication between clients. Guest-network isolation or a different subnet can prevent discovery and control even when Internet access works.

In USB Ethernet mode with Wi-Fi fallback off, this page explains that Wi-Fi is disabled and links to USB settings. It is not an unexpected radio failure.

THE RECOMMENDED STUDIO CONNECTION

USB Ethernet



Mode changes are explicit and require a restart.

More memory headroom for vehicle simulation

For Studio users with the extended vehicle-simulation license, USB-NCM is our recommended connection. Wi-Fi driver buffers share the limited internal RAM with the runtime and network services. Keep **Wi-Fi Fallback: Off** to release those radio resources; merely connecting USB while Wi-Fi stays enabled retains its memory cost. USB reduces pressure but does not make the device's capacity unlimited.

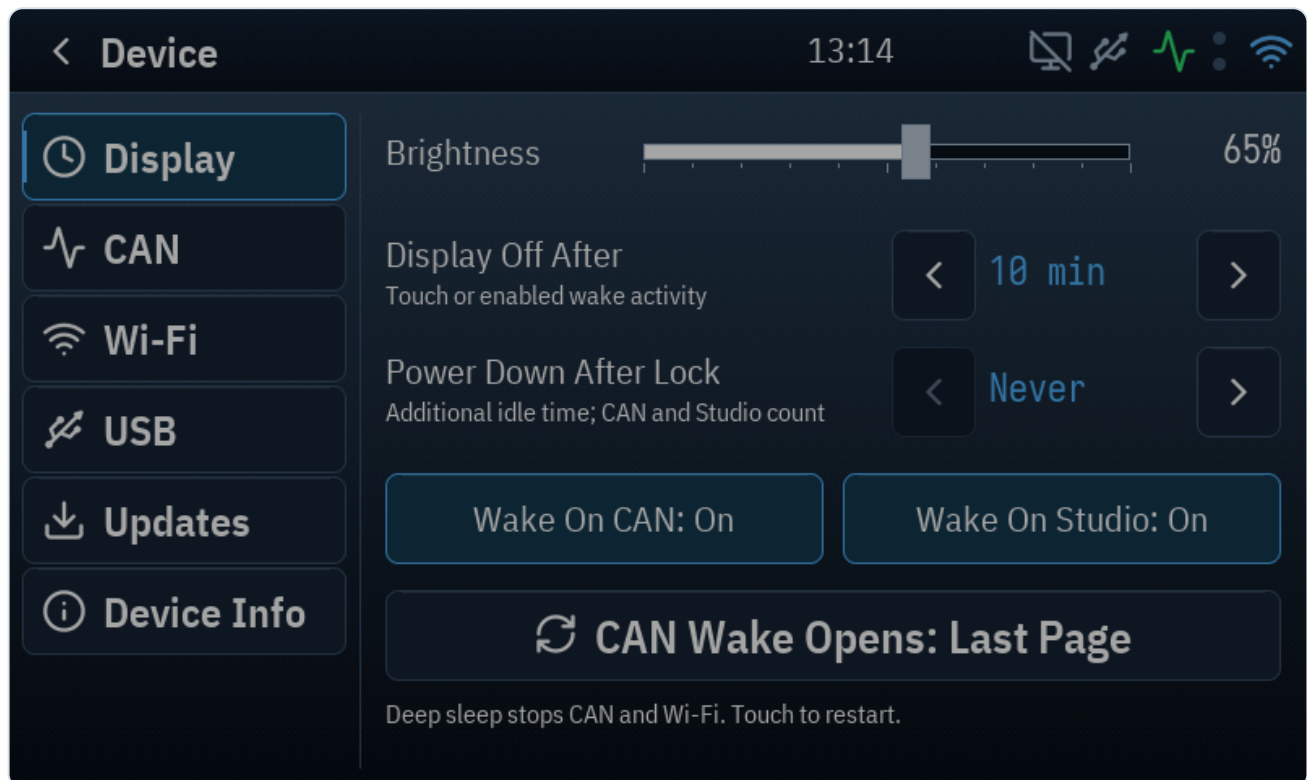
The normal USB mode is **Serial / JTAG**. To use the cable as a network connection, choose **Device → USB → USB Ethernet**. This enables NCM networking plus a debug console.

1. Use a USB data cable and a host that supports the NCM interface.
2. Choose whether Wi-Fi fallback should be enabled. It defaults to Off for a genuinely wired path.
3. Tap **Apply And Restart**, confirm, and wait for the device to reappear.
4. Configure the host to supply DHCP on this connection. Enable Internet Sharing if the device also needs activation or update-server access.
5. Read the resulting IP on Home's Device tile or Device Info. Use that address for direct Studio access if discovery is unavailable.

The USB icon is blue while awaiting an address and green once the NCM link is addressed. Without a host DHCP service, waiting for an address is expected. There is no universal fixed IP address to enter.

COMFORT AND IDLE BEHAVIOR

Display, sleep and wake



Display-off and power-down are different stages with separate settings.

Brightness changes the apparent screen brightness; the default is 65%. **Display Off After** defaults to ten minutes. Choose Never or a shorter/longer interval to suit the bench.

When only the display is off, CAN, networking and emulation keep working. Touch wakes the screen, with the wake gesture consumed so it cannot accidentally press a control underneath. **Wake On CAN** and **Wake On Studio** can additionally wake the display; both default to On.

CAN Wake Opens defaults to Last Page. You can choose CAN Monitor if incoming bus activity should open the traffic view. That choice applies to a CAN-triggered display wake; it is not a general instruction to leave an editor whenever a frame arrives.

Power Down After Lock is an additional inactivity interval after display-off. It defaults to Never. Deep sleep stops CAN and networking; touch then performs a fresh boot. CAN/Studio display-wake settings do not make those stopped interfaces wake deep sleep.

Active clients, pending operations and other busy conditions inhibit automatic shutdown. Raw control activity—including routine observation—still counts for idle handling even though it no longer animates the Studio icon.

KEEP THE INSTRUMENT CURRENT

Check, review, update



Checking for an update does not immediately install it.

1. Connect to a network with Internet access. An IP address enables **Device** → **Updates** → **Check Now**.
2. Wait for the server check. The activity indicator and status text describe the current phase. Secure connection setup can take longer than the file transfer.
3. If an eligible release exists, read its notes. Use the release-notes arrows if they span several pages.
4. Tap **Update Now**, then confirm. Stop the test session and allow the device to prepare for installation.
5. Keep power connected until the device has restarted.

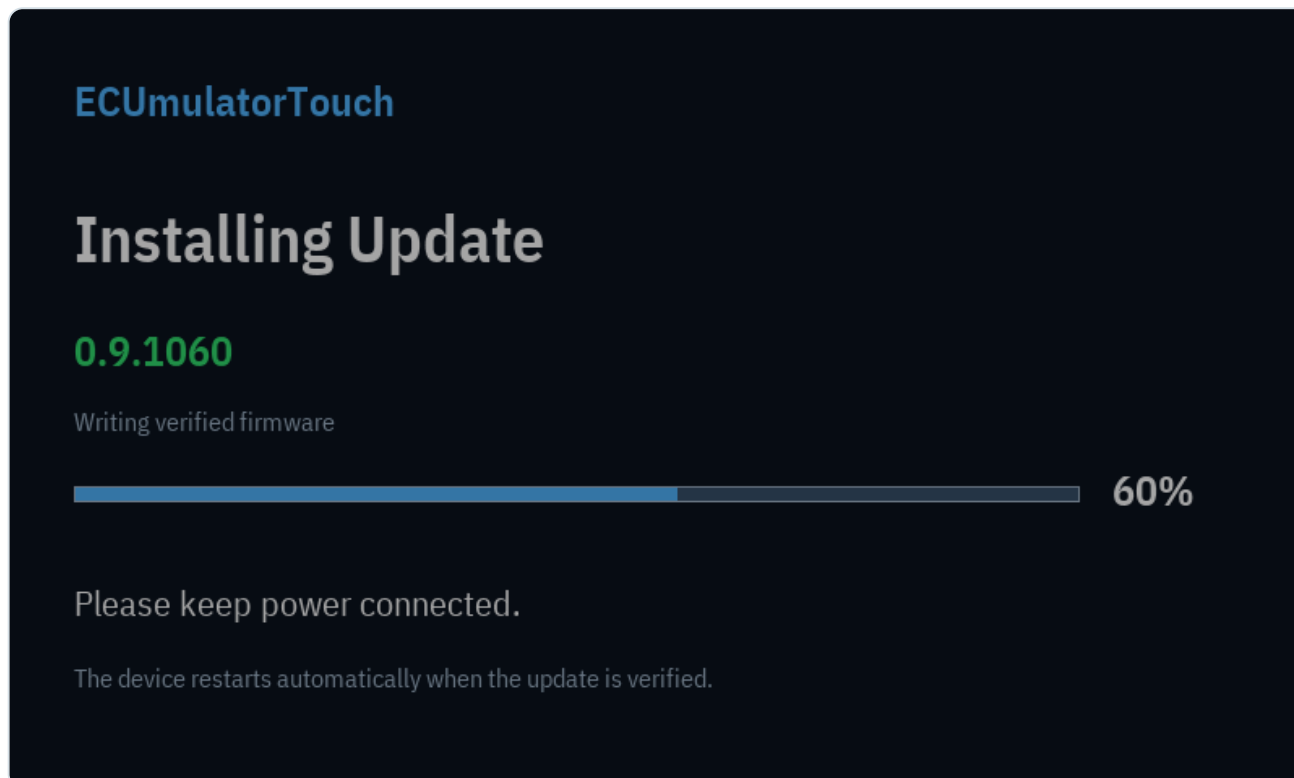
The device also checks periodically, approximately daily when conditions permit. Installation remains a separate confirmed action. Release availability can depend on the device: a beta assigned to one unit is not necessarily offered to all units.

Settings, identity and stored licenses are intended to survive an ordinary firmware update. Updating is not Factory Reset. After restart, verify the version in Device Info before resuming an important bench test.

The screenshots use a demonstration update offer. The public server decides which version is currently eligible; the illustrated version number is not a promised release.

UNDERSTAND THE PROGRESS DISPLAY

During installation



Downloading and writing are distinct phases. Progress refers to the current phase.

Phase	What happens
Preparing for update	The release is confirmed and services are brought to a suitable state for installation.
Downloading update	The image is received and staged in memory. Temporary network interruption may trigger a resume.
Writing	The verified image is written to the alternate application slot. Interactive services are stopped.
Restarting	The device boots the installed image and checks that startup is healthy.

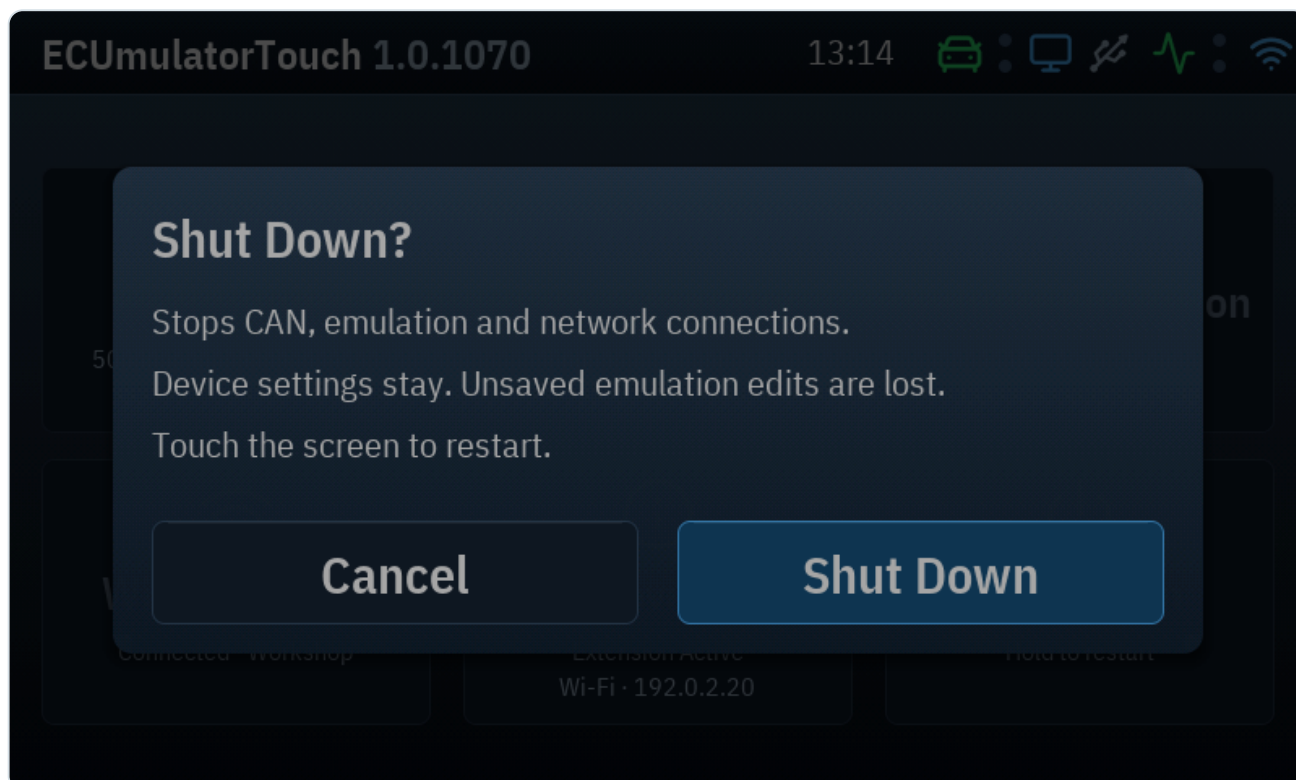
The display keeps its installation view while flash is written. Sparse progress updates are intentional. Do not interpret a brief pause as permission to remove power.

The bootloader retains a previous application slot and can roll back if the new application's first boot is not confirmed healthy. An interrupted download does not itself select an incomplete image as the next firmware.

If installation reports failure, allow its restart path to complete. Check the installed version, network and offered release before trying again. Record the message and version when contacting support. Repeated failures of the same release should be investigated rather than hidden by repeated resets.

END A SESSION

Shut Down, restart, reset



Shut Down keeps settings but ends the active session.

Use Home's **Shut Down** tile, then confirm. The device stops CAN, emulation and network connections before entering deep sleep. Touch the screen to start it again. Startup policy applies because this is a fresh boot. To reboot immediately, hold **Shut Down** for one second until the border completes, then confirm **Restart**. Cancel leaves the device running.

A hardware RESET or a power cycle also restarts the device, but it is not an orderly stop for ongoing work. Save a preset or boot checkpoint before ending a session whose changes you need to keep.

Factory Reset is deliberately separate

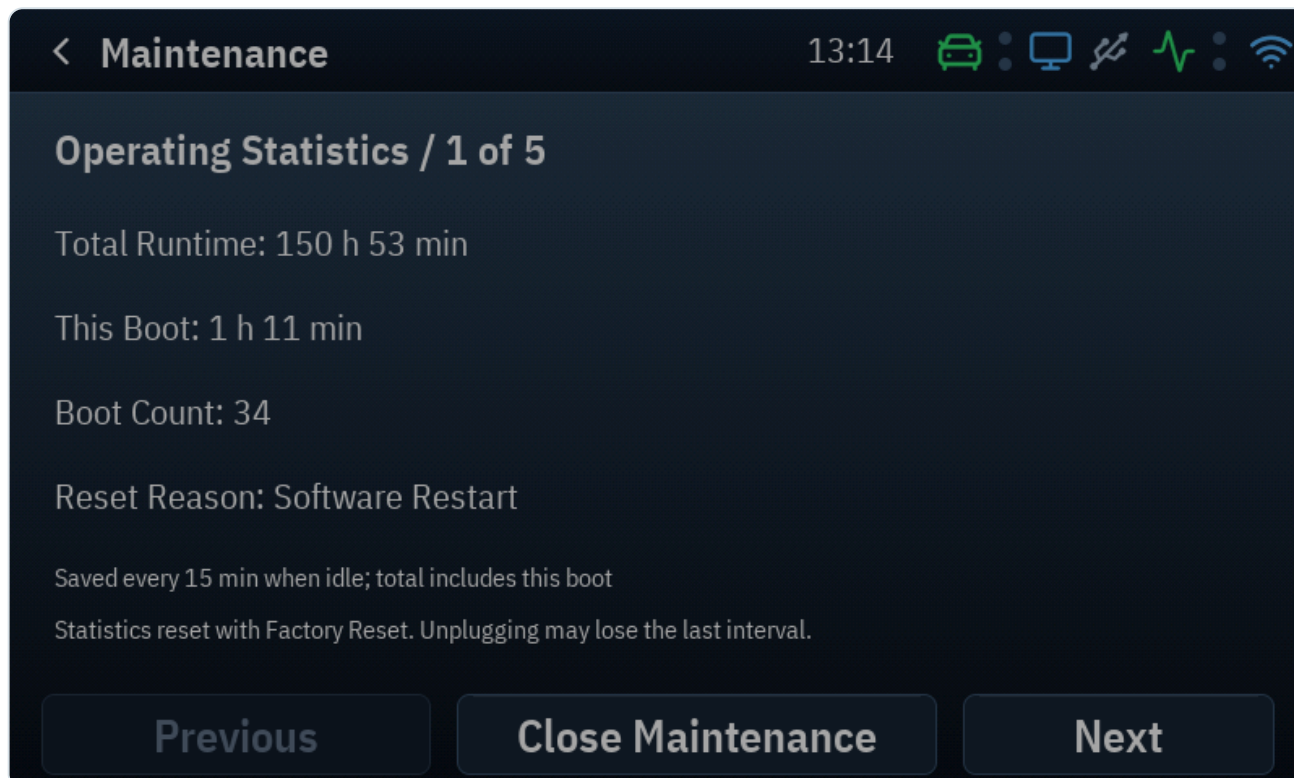
1. Return to Home.
2. Hold the **Device** tile for five seconds, until Service Options appears. Release the touch.
3. Choose **Factory Reset**.
4. Read and confirm the second dialog, or Cancel.

Factory Reset returns the device to its initial configuration. It removes saved settings, Wi-Fi credentials, stored licenses, local saved library state/presets and service statistics. The included read-only OBD2 models remain available. After the reset, the Welcome workflow returns.

A restart, a stopped emulation and Factory Reset are different actions. Factory Reset is the one that erases the local setup. It is not needed for a normal model change or update.

SERVICE-ASSISTED DIAGNOSTICS

The maintenance pages



Service information helps describe a problem precisely. Most users will not need these pages.

Hold the Home **Device** tile for five seconds, release, then select **Maintenance**. Enter the PIN supplied by support. Use the on-screen entry; the physical BOOT button is not this shortcut.

Page	Information
Operating Statistics	Total runtime, this boot's uptime, boot count and reset reason.
Tasks & Memory	Memory pools and a task/stack snapshot. Refreshing tasks explicitly stops CAN.
CAN Health	Current rate/confirmation, RX/TX counts, errors, overflow and bus ownership.
Network	Wi-Fi/USB state, IP addresses and signal.
Firmware	Version, current firmware slot and board/display information.

Lifetime statistics are periodically saved rather than written on every change. Abrupt power removal can lose the most recent interval, and Factory Reset clears the totals. Treat them as service information, not an exact lifetime billing counter.

Memory pools can overlap; do not add every displayed pool as if each were independent capacity. A task snapshot is a moment in time, not a live trace. Use the explicit refresh only when its interruption of the test is acceptable.

WHEN A TEST DOES NOT BEHAVE AS EXPECTED

Troubleshooting

Observation	Check first
The tester finds no vehicle	Is the model Running? Does the tester have power? Check CAN-H/L, ground, termination, bitrate and selected 11/29-bit protocol. “Nothing loaded” and “Stopped” do not answer diagnostics.
Frames repeat; errors climb	Check wiring and rate, then ensure a normal-mode node can acknowledge. A listen-only observer is not an ACK peer. Stop a generator run while correcting the bench.
No CAN lock on a quiet bus	An unconfirmed fallback rate is not proof of a broken bus. Check the expected rate; use Manual or an explicit Restart Detection when appropriate.
CAN settings are disabled	A running emulator or generator owns the controller. Stop that owner using the displayed action before applying another setup.
Monitor appears frozen	Check Pause/Live first. Pausing the view does not stop incoming capture. A history position may also have expired from the rolling buffer.
Studio cannot find the device	Verify Extension Active, Studio mode, an IP address and a network that permits peer traffic. Try the device's IP directly. OBD2 mode intentionally disables Studio discovery/control.
Studio connects but CAN stays pending	Select the Touch-hosted CAN interface, check the requested bitrate and physical service state, and avoid requesting CAN FD or software termination on this hardware.
Values or diagnostics cannot be edited	Start the selected model. Older saved revisions may lack new managed diagnostic state; select a current included model to compare.
The scanner still shows old values	Request fresh data. Check the selected ECU/category. A freeze frame intentionally stays unchanged after live values change.
Activation/Check Now is disabled	Wait for an IP address and initialization. An operation may already be running. With NCM, check host DHCP and Internet Sharing.
The screen never sleeps	Check wake-on-activity settings, ongoing CAN/control traffic and connected clients. A quiet Studio icon does not mean there is no control I/O.

For support, report the device serial, firmware version, emulation mode, CAN bitrate, tester model, exact request/message and whether the issue survives a fresh start. Note what you expected and what the Touch and tester each displayed.

REFERENCE

Glossary · A–M

ACK

Acknowledgement at the CAN link layer. It confirms that another participating node accepted a frame, not that its application processed it.

Active Auto

Bitrate discovery that first listens, then may transmit a bounded set of probe attempts. It is not strictly passive.

Bitrate

The bit transmission rate of the CAN bus, normally expressed in kbit/s. All connected participants must use a compatible rate.

Boot checkpoint

The configuration stored by Load at Boot, separate from reusable presets and the choice of automatic start.

Bus-off

A CAN controller state reached after excessive transmit errors. The controller stops normal participation until recovery.

CALID

Calibration identification: a textual identifier reported by the simulated ECU.

CAN

Controller Area Network, the message-based bus used by the physical Touch interface.

Classic CAN

The CAN frame format with at most eight data bytes. Distinct from CAN FD.

CVN

Calibration Verification Number. In the local simulator it is editable test data paired with a calibration ID.

Deep sleep

A low-power state entered by Shut Down or an idle power-down rule. CAN and networking stop; touch starts a fresh boot.

DHCP

A network service that supplies an IP address. USB Ethernet expects the host to provide it.

DLC

Data Length Code. In Classic CAN it specifies a payload length from zero to eight bytes; RTR frames do not carry that payload.

DTC

Diagnostic Trouble Code, such as P0300. Stored, pending and permanent are separate diagnostic categories.

ECU

Electronic Control Unit. A model may represent one or several diagnostic ECUs.

FPS

Frames per second. A traffic rate, not the screen refresh rate when shown in the CAN Monitor.

Freeze frame

A retained diagnostic snapshot whose values remain fixed while live data can continue to change.

Identifier

The CAN message ID. Standard identifiers use 11 bits; extended identifiers use 29 bits.

Listen-Only

Passive CAN operation without transmitted data, ACKs or error frames.

MIL

Malfunction Indicator Lamp: the simulated check-engine warning state reported to the tester.

Model

The vehicle specification and its available parameters, protocols and diagnostic behavior.

REFERENCE

Glossary · N–Z

NCM

USB Network Control Model. The optional 4.3-inch USB Ethernet mode provides a network interface over the data cable.

NTP

Network Time Protocol, used to obtain and refresh the clock from a network time source.

OBD2 / OBD-II

On-board diagnostics. Here, the included simulated diagnostic services are accessed over Classic CAN.

OTA

Over-the-air update: firmware delivered through the network. The Touch can also receive that network traffic over USB Ethernet.

Passive Auto

Bitrate discovery based only on listening. It cannot identify a completely silent bus by reception alone.

PID

Parameter Identifier, used to request an OBD data item such as engine speed or coolant temperature.

Preset

A reusable configuration tied to a model revision, with chosen values and managed diagnostic state.

Readiness

The reported support and completion state of diagnostic monitors. Separate from fault memory and the MIL.

REC / TEC

Receive/Transmit Error Counters maintained by the CAN controller.

RTC

Real-Time Clock. Keeps time locally between network synchronizations.

RTR

Remote Transmission Request, a Classic CAN frame requesting data rather than carrying data bytes itself.

Runtime

The component executing the selected vehicle and its diagnostic services. In this guide, the runtime host is the Touch.

RX / TX

Receive and transmit, seen from the Touch's perspective.

Standard mode

The CAN controller's normal participating mode, including ACKs. Distinct from “standard identifier,” which means an 11-bit ID.

Studio extension

The device entitlement that enables ECUlator Studio control and custom vehicle loading in Studio mode.

Termination

Resistors at the ends of the physical bus that reduce signal reflections. Separate from software bitrate and ACK settings.

Toast

A temporary status message that appears over the top bar.

VIN

Vehicle Identification Number. The simulator's vehicle identity is separate from the Touch's device serial.

Zeroconf / mDNS

Local-network discovery used to advertise a Studio-ready device without manually entering its IP address.

KEEP EXPLORING

Reference and next steps

Start with one known request. Change one value. Observe the answer. Save the setup when it tells the story you need.

The included OBD2 models provide that first repeatable environment. The CAN Monitor shows the exchange; the generator exercises the connection; Studio extends the same device to your own vehicle specifications.

Useful defaults

CAN discovery / final monitor mode	Active Auto / Listen-Only
Configured fallback and emulation rate	500 kbit/s
Brightness / display-off interval	65% / 10 minutes
Automatic deep sleep	Never
Wake on CAN / Studio I/O	On / On
CAN display-wake destination	Last Page
OBD2 startup policy	Load Stopped
4.3-inch USB mode / NCM Wi-Fi fallback	Serial / JTAG / Off

These are factory defaults. Existing saved choices survive normal updates and can differ from the table. The available Classic CAN rates are 10, 20, 33.333, 50, 83.333, 100, 125, 250, 500, 800 and 1,000 kbit/s.

Product and supporting documentation

[ECUmulatorTouch product preview and current guide](#)

[ECUmulator Studio](#)

[Autel AL319 manufacturer information](#)

Guide edition: October 2026, software series 1.0. Screens are rendered from the shared device UI with synthetic examples. IBM Plex Sans Condensed and Iosevka are used throughout to match the instrument. Hardware names belong to their respective manufacturers. Product availability, packaging and final photography will be announced separately.