Ksparks CDI

Complete Web UI End User Instruction Manual

Dashboard • Engine Settings • Ignition Maps • Timing Graph • Battery • Network Configuration

Illustrated with live operating data

1. About this manual

This manual explains how to operate and understand the Ksparks CDI web interface. It describes what each tab does, what the displayed values mean, how to edit the ignition maps, and how to interpret the live timing graph and battery monitor.

ENGINE SAFETY: Ignition settings directly affect engine operation. Incorrect trigger angle, trigger edge, RPM limit or ignition advance can cause poor starting, loss of power, overheating, knock/detonation or engine damage. Keep a copy of known-good settings and verify actual ignition timing with suitable timing equipment after installation or major changes.

2. Connecting to the CDI

1. Switch on the CDI/controller and wait for its Wi-Fi network to appear.

2. Connect your phone, tablet or laptop to the Ksparks CDI Wi-Fi network.

3. Open a browser and enter the CDI IP address. A default unit normally uses 192.168.4.1 unless it has been changed in Network Config.

4. When the web page is communicating with the controller, the header shows a green CONNECTED indication. If it shows DISCONNECTED, live RPM, advance and battery information may not update.

NOTE: The CDI web interface is local. Your device may report that the Wi-Fi network has no Internet connection; this does not prevent the CDI web UI from working.

3. Dashboard tab

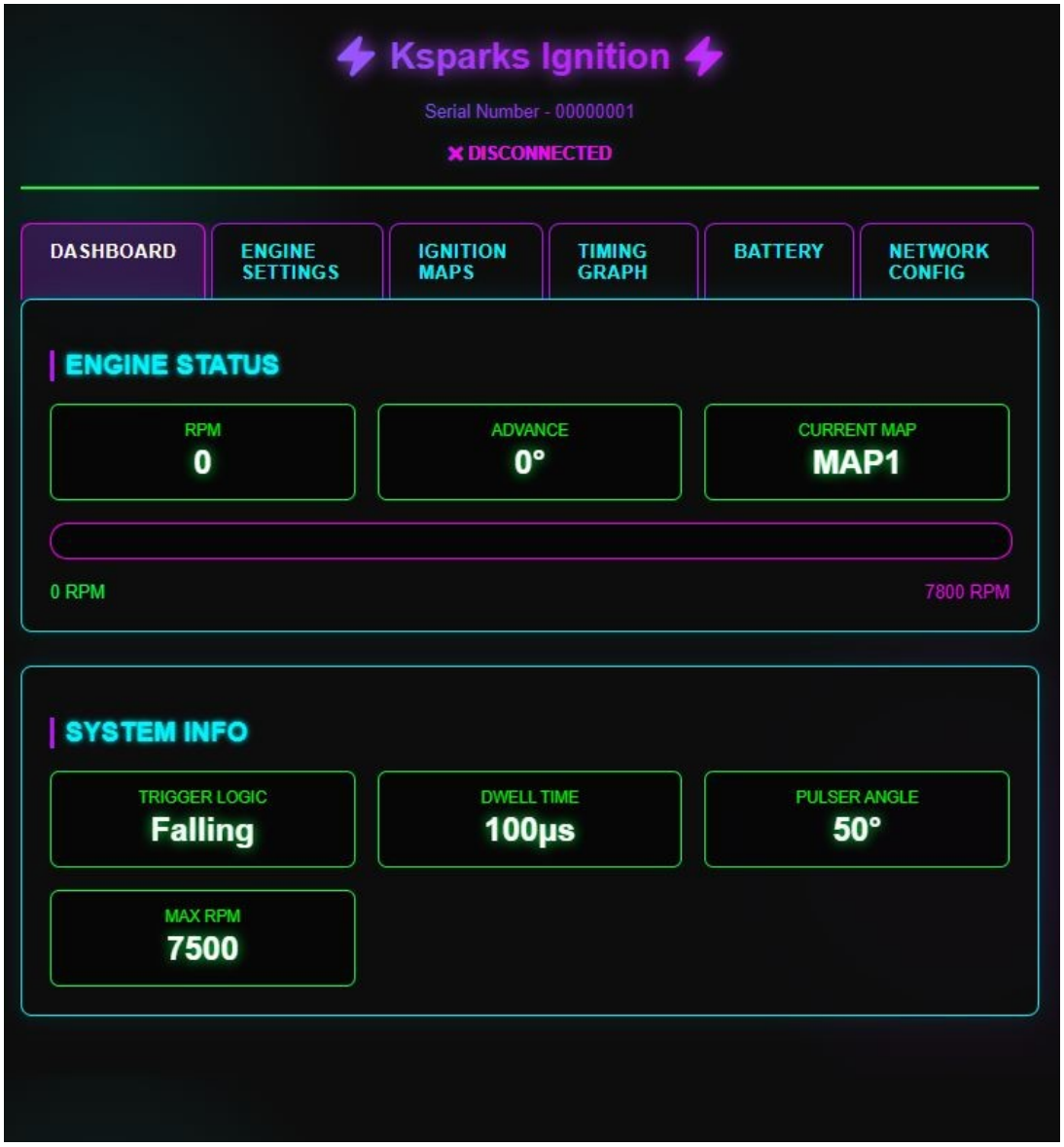

Figure 1 - Dashboard layout. The same fields update with live values when the engine/controller is connected.

The Dashboard is the main status page. Use it for a quick check before and during operation. It combines live engine information with the key configuration values currently being used by the controller.

Item	Explanation
RPM	Current engine speed calculated from the trigger pulses. If the engine is turning but this remains at 0, investigate the trigger signal and Trigger Logic.
ADVANCE	Current commanded ignition advance in crankshaft degrees BTDC (Before Top Dead Centre). This value is calculated from the active ignition map.
CURRENT MAP	Shows whether MAP 1 or MAP 2 is currently selected.
RPM bar	Visual indication of engine speed relative to the displayed range.
TRIGGER LOGIC	Shows whether the controller uses the falling edge or rising edge of the trigger waveform.
DWELL TIME	Ignition output pulse duration in microseconds (µs).
PULSER ANGLE	Physical crankshaft reference angle represented by the trigger event.

MAX RPM	Configured engine speed limit.
NORMAL USE: Before running the engine, check that the intended map is selected and that Pulser Angle, Trigger Logic and Max RPM are the expected values. Once running, confirm that RPM responds smoothly and the Advance value changes in a sensible way with RPM.	

4. Engine Settings tab

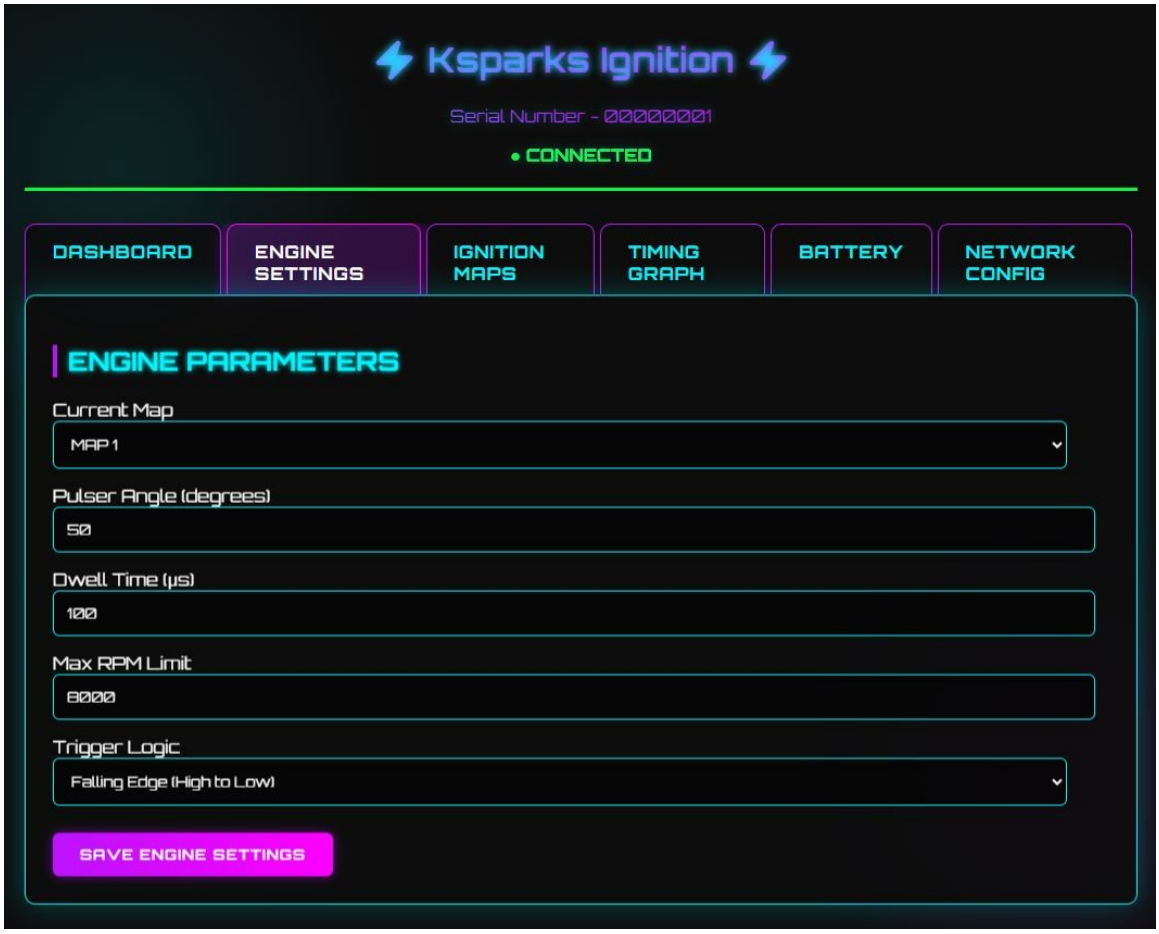

Figure 2 - Engine Settings with the controller connected.

The Engine Settings tab contains the main parameters used by the ignition calculation. These settings should normally be established during installation and then changed only deliberately.

4.1 Current Map

Select MAP 1 or MAP 2. The selected map becomes the timing curve used for the ignition calculation. The Dashboard confirms the active map.

4.2 Pulser Angle (degrees)

Pulser Angle tells the controller where the physical trigger event occurs relative to Top Dead Centre. In the example it is 50°. The trigger event must occur before the latest/most advanced spark timing the controller is expected to command.

The controller conceptually calculates the delay from the trigger using: Delay Angle = Pulser Angle - Commanded Advance. For example, with a 50° trigger reference and a requested 35° advance, the controller waits the equivalent of 15 crankshaft degrees after the trigger before issuing the ignition command.

IMPORTANT: Do not use Pulser Angle as a tuning control. It is a reference/calibration value tied to the physical trigger position. Verify the reference with suitable timing equipment. A trigger angle that does not match the real engine position makes the displayed timing different from the actual timing.

4.3 Dwell Time (µs)

This is the duration of the CDI controller ignition output pulse. The live screenshot shows 100 µs. In this controller it is a microsecond output-pulse setting; it should not be confused with the millisecond coil-charge dwell used by conventional inductive ignition systems.

4.4 Max RPM Limit

Sets the engine-speed limit used by the controller. The screenshot shows 8000 RPM. Choose a value appropriate for the engine and its mechanical safe limit. The limit is a protection setting, not a target operating speed.

4.5 Trigger Logic

Selects which edge of the conditioned trigger signal is treated as the timing reference. Falling Edge means High-to-Low; Rising Edge means Low-to-High. The correct choice depends on the trigger circuit and the edge used when the Pulser Angle was calibrated.

CAUTION: Changing trigger edge can shift the effective timing reference. If Trigger Logic is changed, re-check actual ignition timing before normal engine operation.

After editing the page, press SAVE ENGINE SETTINGS. Confirm the saved values on the Dashboard before running the engine.

5. Ignition Maps tab

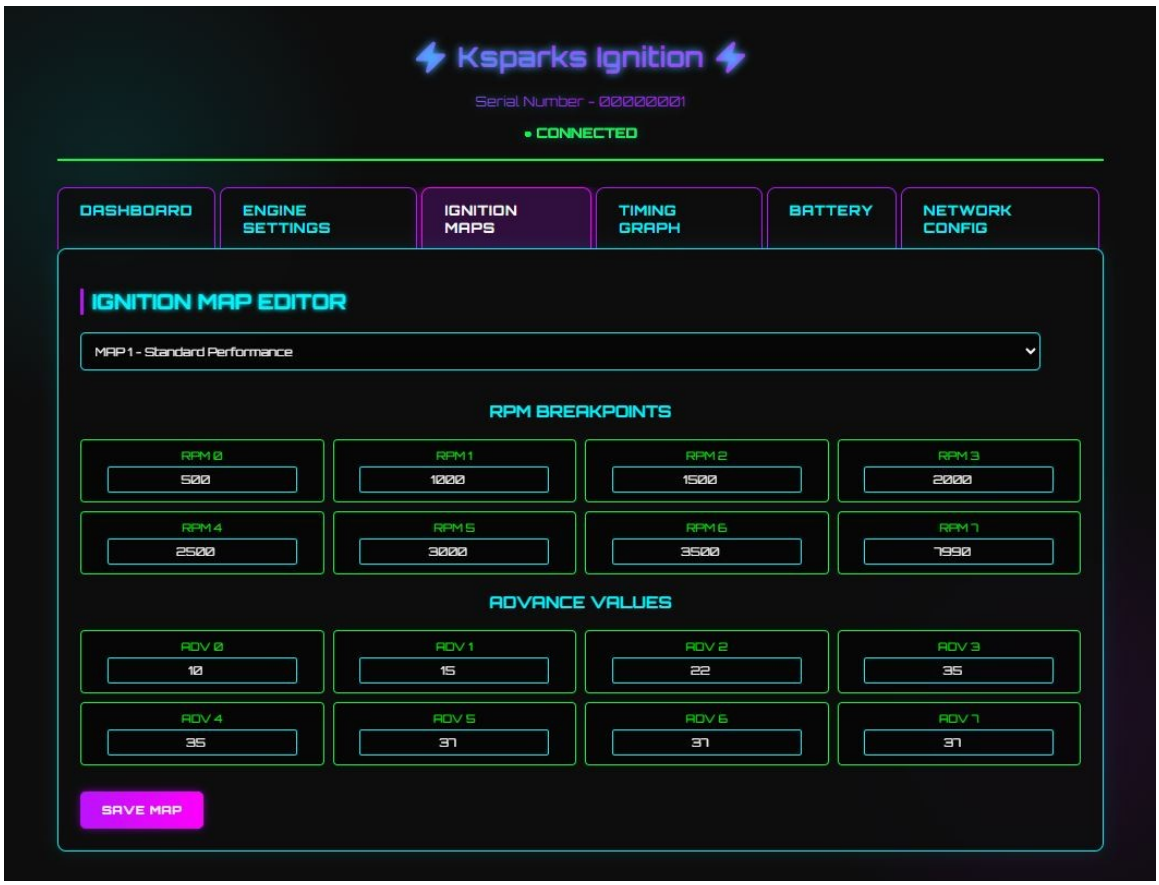

Figure 3 - MAP 1 ignition table with eight RPM breakpoints and eight advance values.

The Ignition Map Editor controls how much ignition advance is commanded at different engine speeds. Each map contains eight RPM breakpoints and eight matching advance values.

5.1 RPM Breakpoints

RPM 0 through RPM 7 define the speed positions in the curve. In the example they are 500, 1000, 1500, 2000, 2500, 3000, 3500 and 7990 RPM. The values must be in increasing order.

5.2 Advance Values

ADV 0 through ADV 7 are paired directly with RPM 0 through RPM 7. The example map therefore requests 10° at 500 RPM, 15° at 1000 RPM, 22° at 1500 RPM, 35° at 2000 and 2500 RPM, and 37° from 3000 RPM upward in the displayed table.

BTDC: The advance numbers are degrees Before Top Dead Centre. A larger positive number means the ignition is commanded earlier in the compression stroke. For example, 37° BTDC is more advanced than 15° BTDC.

5.3 What happens between breakpoints

The controller uses linear interpolation between adjacent RPM points, producing a smooth calculated timing value instead of jumping abruptly from one cell to the next. Example: between 1000 RPM = 15° and 1500 RPM = 22°, at 1250 RPM the mathematical value is approximately 18.5°.

Below the first breakpoint the first advance value is used. Above the final breakpoint the last advance value is used, subject to the Max RPM limit.

5.4 How to edit a map

- Select the map you want to edit from the drop-down list.
- Photograph or record the existing map before changing it.
- Enter RPM breakpoints in strictly increasing order.
- Enter the desired advance for each matching RPM point.
- Check the complete curve for sudden or unintended jumps.
- Press SAVE MAP.
- Re-open/check the map and confirm the values were stored correctly.
- Make small controlled changes and verify actual timing and engine behaviour.

TUNING SAFETY: Do not copy timing numbers from an unrelated engine. Required advance depends on engine design, compression, fuel, load, temperature and combustion characteristics. Excessive advance can cause knock/detonation and engine damage.

6. Timing Graph tab

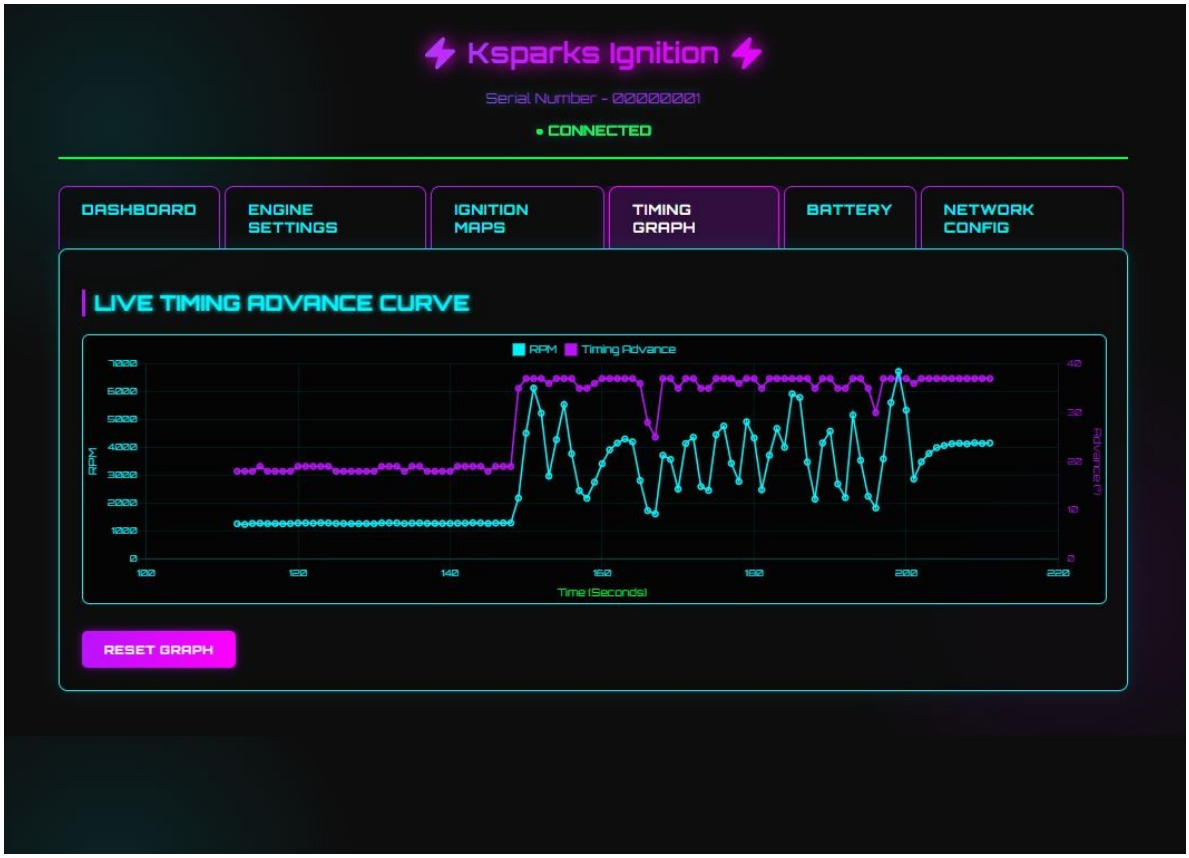

Figure 4 - Live Timing Advance Curve with real RPM and commanded advance data.

The Timing Graph is a live history display. It is not the editable ignition-map curve. Instead, it records how RPM and the controller's commanded timing advance change over time while the web page is connected.

Item	Explanation
Horizontal axis - Time (Seconds)	Elapsed graph time. New samples are added as the web interface receives live data.
Left vertical axis - RPM	Scale for the cyan RPM trace. In the supplied live example the scale extends to approximately 10,000 RPM.
Right vertical axis - Advance (°)	Scale for the magenta Timing Advance trace. In the supplied example it extends to 40°.
Cyan line - RPM	Shows engine speed changing over time.
Magenta line - Timing Advance	Shows the advance being commanded by the active ignition map at the corresponding RPM.
RESET GRAPH	Clears the displayed history and starts a fresh trace.

6.1 Reading the supplied live graph

At the left side of the live graph the engine is running at a relatively steady low RPM and the magenta timing trace is also relatively steady. Around the middle of the graph, RPM rises sharply and then varies considerably. At the same time, the timing trace moves up toward the high-30-degree region because the displayed MAP 1 commands approximately 37° from around 3000 RPM upward.

Where RPM drops into lower map regions, the magenta trace also drops. Where RPM returns to the higher region, the timing trace returns toward the higher advance value. This is a useful way to confirm that the controller is moving through the map as expected.

IMPORTANT: The magenta graph is the controller's calculated/commanded timing value. It is not a direct measurement of the actual spark at the crankshaft. Trigger geometry, wiring, sensor delay and ignition hardware can create a difference between commanded and actual timing. Verify actual timing with suitable timing equipment during setup.

6.2 What to look for

- RPM should respond smoothly to engine speed rather than randomly jumping when the engine is steady.
- Timing should broadly follow the shape of the active map.
- A flat timing trace at high RPM can be completely normal if the map has the same advance across those RPM breakpoints.
- Unexpected large RPM spikes can indicate trigger noise or an input problem.
- Unexpected timing changes should be compared with the active map and RPM at the same moment.

7. Battery tab

The Battery Monitor provides a quick indication of the voltage being measured by the CDI controller. It displays Voltage, an estimated Percentage, a Status message and a coloured bar.

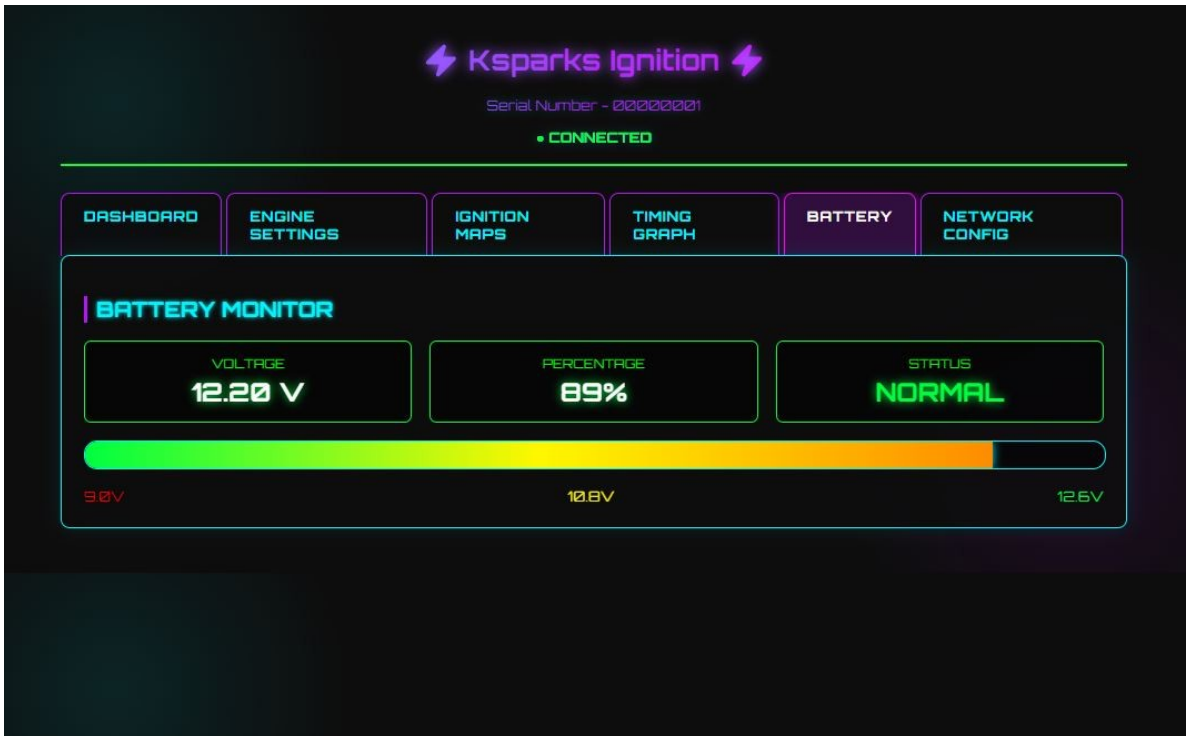

Figure 5 - Battery Monitor showing 12.20 V, 89% and NORMAL status.

7.1 NORMAL battery state

In the NORMAL example the controller reports 12.20 V and 89%. The bar is filled well into the normal operating range and the status is shown in green. This indicates that the measured voltage is comfortably above the low-voltage region used by the interface.

Figure 6 - Battery Monitor showing 9.50 V, 14% and LOW status.

7.2 LOW battery state

In the LOW example the controller reports 9.50 V and 14%. The status changes to LOW and a LOW BATTERY WARNING is displayed. The bar is only partially filled, providing a clear visual warning that the measured supply voltage is low.

7.3 Understanding Percentage and the scale

The interface shown uses a displayed scale from 9.0 V to 12.6 V, with 10.8 V marked at the centre. The percentage shown by the current firmware is a simple voltage-based estimate across that range: approximately 0% at 9.0 V and 100% at 12.6 V. This is why 9.50 V is displayed as about 14% and 12.20 V as about 89%.

IMPORTANT: Battery percentage is an indication derived from measured voltage; it is not a laboratory state-of-charge measurement. Battery chemistry, load, charging state, wiring voltage drop and calibration all affect the voltage. Use the actual Voltage reading as the primary diagnostic value.
LOW VOLTAGE: If LOW is displayed while the engine is expected to run, check the battery, charging system, power wiring, grounds and battery-sense calibration. Low supply voltage can cause unreliable electronic operation even if the web interface is still visible.

8. Network Config tab

Figure 7 - Network Configuration and Admin Login screen.

Network Config controls how the user connects to the CDI and how protected settings are accessed.

Item	Explanation
WiFi SSID	The name of the CDI Wi-Fi network. Give each unit a clear, unique name if several units are used.
WiFi Password	Password used to join the CDI Wi-Fi network.
IP Address	Address entered in the browser to open the CDI web interface.
Gateway	Normally configured with the CDI network settings; keep it consistent with the intended local network configuration.
Current IP	Shows the address currently in use by the CDI.
Subnet Mask	Normally 255.255.255.0 for the standard CDI access-point network.
MAC Address	Unique network hardware address of the controller.

Admin Username / Password	Credentials used to protect Settings, Maps and OTA functions.

Press SAVE NETWORK SETTINGS after changing the Wi-Fi or IP configuration. The browser connection may then drop because the network has changed. Reconnect using the new SSID/password and browse to the new IP address.

RECOMMENDED: Write down the new SSID, Wi-Fi password, IP address and administrator credentials before pressing Save. Refer to the separate Ksparks CDI Wi-Fi & Administrator Setup guide for detailed network instructions.

9. MAP 1 and MAP 2 - how to use them

MAP 1 and MAP 2 are two independent ignition curves. The controller uses only the map currently selected. The second map can be used for an alternative calibration, but the meaning of each map depends entirely on the values stored in it.

A sensible workflow is to keep one known-good baseline map and make controlled changes to the second map. Confirm the active map on the Dashboard before running the engine. Do not assume that MAP 2 is automatically safer, faster or more advanced than MAP 1.

10. Recommended first-run procedure

1. Connect to the web UI and confirm the header shows CONNECTED.

2. Record Engine Settings and both ignition maps.

3. Confirm Pulser Angle matches the physical trigger reference.

4. Confirm Trigger Logic is correct.

5. Confirm the intended map is selected.

6. Check that all RPM breakpoints increase from left to right.

7. Review all advance values and ensure the curve is appropriate for the engine.

8. Set a conservative Max RPM limit appropriate to the engine.

9. Check the Battery tab and investigate a LOW warning before high-RPM operation.

10. Start the engine and confirm Dashboard RPM is plausible.

11. Observe the Timing Graph and confirm RPM and commanded advance behave as expected.

12. Verify actual crankshaft ignition timing with suitable timing equipment before high-load/high-RPM tuning.

11. Troubleshooting guide

Symptom	What to check
Header shows DISCONNECTED	Confirm your device is still connected to the CDI Wi-Fi. Reload the page, check the CDI IP address and controller power.
RPM stays at 0 while engine turns	Check trigger wiring, trigger conditioning, Trigger Logic and whether valid trigger pulses reach the controller.
RPM jumps unexpectedly	Inspect trigger signal quality, grounds, shielding and electrical noise. Erratic trigger input produces erratic calculated RPM.

Advance does not exactly match a map cell	Normal between breakpoints: the firmware interpolates between adjacent RPM/advance points.
Timing graph is flat	A flat trace can be normal if RPM is steady or the map commands the same advance over that RPM range. If both traces are zero, check live connection and trigger input.
Battery shows LOW	Check actual battery voltage, charging system, power wiring, grounds and voltage-sense calibration.
Cannot reconnect after Network changes	Join the new SSID using the new password, then enter the new CDI IP address in the browser.
Engine timing does not match displayed Advance	Re-check Pulser Angle, Trigger Logic and physical timing with suitable timing equipment.

12. Quick reference

Setting / Display	What it does	Key point
RPM	Live engine speed	Derived from trigger pulses.
Advance	Commanded spark timing BTDC	Higher positive number = more advance.
Pulser Angle	Physical trigger reference angle	Calibration/reference, not a normal tuning control.
Dwell Time	Ignition output pulse duration	Specified in microseconds in this CDI.
Max RPM	Engine speed limit	Set to suit the engine.
Trigger Logic	Chooses rising/falling trigger edge	Must match trigger calibration.
RPM Breakpoints	Positions along the ignition curve	Must be strictly increasing.
ADV Values	Advance at each RPM breakpoint	Interpolated between points.
Timing Graph	Live history of RPM and commanded advance	Not a direct timing-light measurement.
Battery Voltage	Measured supply indication	Primary battery diagnostic value.
Battery Percentage	Voltage-derived estimate	Useful indication, not precise state of charge.
Network Config	Wi-Fi/IP/admin setup	Record changes before saving.

13. Owner settings record

Unit / Vehicle	_____
Serial Number	_____
Active Map	_____
Pulser Angle	_____
Dwell Time	_____
Max RPM	_____
Trigger Logic	_____
Wi-Fi SSID	_____
CDI IP Address	_____
Notes	_____

14. Password / Factory Reset Recovery

If the Wi-Fi network password or administrator login details are forgotten or misplaced, the CDI can be returned to its factory configuration using the unit's factory-reset function. Use this procedure only when normal access to the web interface cannot be recovered.

IMPORTANT - FULL FACTORY RESET: This is a complete reset. It restores the controller's factory configuration and also removes the current activation. Custom engine settings, ignition-map values, network settings and administrator credentials may be returned to their factory defaults.

14.1 When to use Factory Reset

• The CDI Wi-Fi password has been forgotten and the user can no longer connect to the unit.

• The administrator username or password has been forgotten and the Network Configuration page can no longer be accessed.

• The network settings have been changed and the user no longer knows the CDI's SSID or IP address.

• Ksparks support has instructed the user to return the controller to its factory configuration.

14.2 Before performing the reset

If the web interface is still accessible, record or photograph the Engine Settings and both Ignition Maps before resetting. This makes it easier to restore a known-good engine calibration afterwards.

14.3 Performing the Factory Reset

1. Make sure the vehicle/engine is in a safe condition and the engine is not running.

2. Operate the CDI's designated factory-reset input/button as supplied or identified by Ksparks.

3. Hold the reset function for the required reset period until the controller completes the factory-reset sequence.

4. Release the reset input and allow the CDI to restart.

5. Reconnect to the CDI using the factory Wi-Fi details supplied with the unit.

6. Open the factory CDI IP address in the web browser and confirm that the activation page is displayed.

SERVICE NOTE: On the current controller/firmware, the factory-reset input is GPIO18 and the reset is activated by pulling this input to GND. This technical information is intended for installation/service use; end users should use the designated reset control provided with the product.

14.4 Activation after a reset

A factory reset removes the existing activation. After the CDI restarts, the activation screen will show the unit's device serial number. Contact Ksparks directly and provide this serial number to obtain the activation code for the unit. Enter the supplied activation code and complete activation before returning the CDI to normal use.

SECURITY: Activation codes are supplied directly by Ksparks. Keep the activation code and the CDI's login details with the product records.

14.5 After recovery

• Reconnect using the factory Wi-Fi credentials, then change the Wi-Fi SSID/password if required.

• Set a new administrator username/password and record it somewhere secure.

• Restore the correct Engine Settings and ignition maps if the reset returned them to factory values.

• Confirm Pulser Angle, Trigger Logic, Dwell Time, Max RPM and the selected map before running the engine.

• Verify actual ignition timing with suitable test equipment before high-load or high-RPM operation.

DO NOT: Perform a factory reset merely to experiment with settings. Because activation and configuration are reset, it should be treated as a recovery procedure.