CORTEX EBC

QUICK START GUIDE

VERSION **6.4.5** | REVISION **A**

IMPORTANT NOTE:

Cortex EBC kits are now shipping with the latest V6 firmware installed. This firmware differs significantly from the previous V5 firmware and requires the use of the Cortex Config 6 software. If you would like to revert to the V5 firmware and software, see the information at the end of this document.

SECTION 1: INSTALLATION CHECKLIST

Before you can control boost with the Cortex EBC, you must complete the items in the list below. Where pertinent, each step lists the sections of the Cortex Config 6 User Manual that may need to be referenced while completing this process.

☐ Download the Cortex Config 6 User Manual and Software Installer.

- All SIRHC Labs downloads can be found at https://sirhclabs.com/downloads.

☐ Wire the Cortex EBC.

- Basic operation requires only 12 V switched power, chassis ground, and the solenoid plugged into the harness.
- Boost by gear additionally requires an RPM signal and a vehicle speed signal driven by the transmission.
- Boost by time requires a vehicle speed signal or external button wired to an input on the wiring harness to activate the time-based control sequence.
- **See Manual Section:** *INSTALLATION → Wiring → General Wiring Guidelines*.

☐ Connect a boost reference to the back of the Cortex EBC.

- The EBC boost reference should come from after the throttle body on the intake manifold.
- **See Manual Section:** *INSTALLATION → Manifold Pressure Reference*.

☐ Plumb the boost control solenoid.

- The correct method depends on your number of turbos, wastegate type, solenoid type, and solenoid pressure reference (turbo pressure or compressed air).
- For most external wastegate applications, we recommend following the “Configuration 1” diagrams that only use the bottom chamber of the wastegate(s).
- **See Manual Sections:** *INSTALLATION → Boost Control Solenoid Plumbing – Single Turbo* and *INSTALLATION → Boost Control Solenoid Plumbing – Twin Turbo*.

SECTION 2: SOFTWARE SETUP

NOTE:
Before establishing a USB connection with the Cortex EBC, the device must be powered by 12 V through the wiring harness. Your computer will detect the Cortex EBC if the device is not powered through the wiring harness, but you will not be able to communicate with it.

☐ **Run the installer you downloaded in Section 1.**

- If Windows SmartScreen appears, click "More info," then "Run anyway."
- When Windows asks whether to allow the app to make changes, check that the verified publisher is SIRHC Labs LLC, then click "Yes."

☐ **Power the Cortex EBC with 12 V through the wiring harness.**

☐ **Plug the USB cable into the Cortex EBC device and your computer.**

- Windows installs the USB drivers automatically the first time the Cortex EBC is connected. Your computer must be connected to the internet for this, and it may take Windows a few minutes to finish. If the Cortex EBC does not appear in the COM Port list, make sure the computer is online, then unplug the USB cable and plug it back in.
- If it still does not appear after several minutes, install the drivers manually. **See Manual Section:** *SOFTWARE → USB Connection → Installing the USB Drivers Manually*.

☐ **Launch the Cortex Config 6 software and establish a connection with the Cortex EBC.**

- Select your Cortex EBC's COM port.
- **See Manual Section:** *SOFTWARE → USB Connection*.

SECTION 3: BOOST CONTROL VERIFICATION

This procedure verifies that the Cortex EBC can increase boost above spring pressure. Everything beyond it — complex open-loop, closed-loop, spool, launch, fail-safe tuning — lives in the user manual. If you have not configured the gear detection yet (Section 4), enter the values below for Gear 1 only. If you have configured it, enter them for all gears.

☐ Create a new Boost Configuration File.

- Select File → New Boost Configuration File from the software menu.

☐ Set the overboost fail-safe for Profile 1 to a safe value for your engine.

- Select Profile 1 → Fail-Safes → Overboost Fail-Safe from the Boost Control File navigation tree.
- **See Manual Section:** *BOOST CONTROL → Boost Control Settings → Fail-Safes → Overboost*.

☐ Set the open-loop start duty cycle to 30%.

- Select Profile 1 → Open-Loop → Start Duty Cycle from the Boost Control File navigation tree.
- **See Manual Section:** *BOOST CONTROL → Boost Control Settings → Open-Loop → Start Duty Cycle*.

☐ Transfer the file to your Cortex EBC.

- Click the write button (laptop with up arrow) in the software toolbar.

OVERBOOST WARNING:

Excessive boost pressure can cause catastrophic engine damage. Confirm the overboost fail-safe is set to a safe value for your engine before making a pull in Profile 1.

☐ Make a pull with the controller set to the "OFF" profile.

- Note the peak boost — this is your spring pressure baseline.
- **See Manual Section:** *DEVICE OPERATION → Menu System → Changing Boost Control Profile*.

☐ Make a pull with the controller set to Profile 1.

- Verify boost has increased by at least 1 PSI over the baseline. The exact amount depends on the spring(s) in your wastegate(s).

SECTION 4: INPUT CONFIGURATION

Before continuing onto more complex boost configuration, you must calibrate any signals or buttons that you wired to the inputs on the Cortex EBC.

- RPM input. **See Manual Section:** *INPUT SIGNAL CONFIGURATION → RPM Input → RPM Calibration Procedure*.
- Vehicle speed input. **See Manual Section:** *INPUT SIGNAL CONFIGURATION → Speed Input → Speed Calibration Procedure*.
- General-purpose input, if used. **See Manual Section:** *INPUT SIGNAL CONFIGURATION → General-Purpose Input → GPI Calibration Procedure*.
- Gear detection, required for boost by gear. **See Manual Section:** *INPUT SIGNAL CONFIGURATION → Gear Detection Tab → Gear Detection Calibration Procedure*.
- External buttons wired to an input. **See Manual Section:** *INSTALLATION → Wiring → Connecting External Buttons to Inputs*.

SECTION 5: REVERTING TO V5 SOFTWARE/FIRMWARE

If you need to return to the V5 firmware and software, install the older Cortex Config 5.1.7 software first, then follow the steps below.

☐ **With the ignition off, plug the USB cable into your computer and open the Cortex Config 5.1.7 software.**

- Select Advanced → Update Device Firmware… from the software menu.

☐ **Select the V5 firmware file and click Open.**

- The file is in C:\Program Files (x86)\Cortex Config PSI\firmware. Select the cortex-ebc-firmware-5-1-5.cfw file.

☐ **Click "Yes" when the first dialog box appears.**

☐ **Click "Yes" on the second dialog box, then immediately turn the ignition on to power the controller.**

- The controller carries out the firmware update as it powers up.

HAVING ISSUES?

For technical support, warranty assistance, or questions not covered in this guide or the user manual, contact SIRHC Labs at info@sirhclabs.com or visit sirhclabs.com.