

Installation and Use of the CL2 for Automotive Drag Racing





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What's In the Box – Racepak Vantage CL2 - PN 20100-2004

The CL2 combines the power of mobile technology with Racepak's CL2 OBD2 EFI module, providing professional level instrumentation and data analysis, for 2008 and later OBD2 equipped vehicles.

Vantage CL2
OBD2 Extension Cable
GPS Antenna

Options

OBD2 EFI Adapter

28120-2003



Installation and Use of the CL2 Kit Requires the Following Items:



CL2 Kit



Mobile device - Can be phone or
tablet (not included with kit)



Optional mobile device mount -
(not included with kit)



Optional OBD2 to EFI adapter
(not included with kit)

Before you Begin, Register your CL2

Log onto portal.racepak.com and register your CL2 by following the step by step prompts shown online.

Registration of the CL2 provides a number of benefits, to the customer, and is necessary for use of the CL2 product. There are a number of aspects of device registration that should be reviewed, before the registration process.

The screenshot shows a web browser window with the URL portal.racepak.com. The main content is a registration form with the RACEPAK logo at the top. The form has the following fields:

- First Name
- Last Name
- Email
- Password

At the bottom of the form is a black button labeled 'REGISTER'. The background of the page is a light gray with a faint image of a person wearing a helmet.

Register Device

1. **Team:** The creation of a team provides a secure location for all cloud based data, related to that particular team and CL2. This action also provides the ability to define the desired Team from the vehicle mounted mobile device running the D3 app, for cloud data uploading purpose. Teams are also presented to remote viewers, in order to select the correct team for data review.

2. **Device Serial Number:** 12 digit/letter combination found on the bottom of the CL2.

3. **Subscription:** Available on a monthly or yearly basis, providing the ability for users to remotely view data from any location, utilizing an internet connected mobile device, running the D3 app.

My Teams

1. Provides ability to add individuals, for remote data viewing. A valid email address is required for each team member.

2. The team “owner” has exclusive access to the team, and as such is responsible for the addition or removal of team members, in order to provide access to, or remove access from, reviewing remote data.

Step 1. Download and Install the Racepak D3 App

Racepak's exclusive D3 app turns a cellular & Bluetooth enabled smartphone into an on-board instrumentation and data analysis device, while simultaneously uploading data via cellular connection to your secure, personal cloud account. Data is stored locally on the mobile phone for instant data analysis, while live or cloud recorded data can be remotely viewed via the same D3 app installed on any web connected tablet or mobile phone.



1. Search the term Racepak D3 in the Google Play or Apple store, then download onto the mobile device which will be mounted on the vehicle.

2. Install the app per your individual mobile device instructions.



Note: Access to cloud data requires a monthly or yearly subscription fee.



Note: Cellular service is not required to utilize the D3 app on a mobile phone for on-board vehicle instrumentation and data analysis, but is necessary in order to upload data to the cloud.



Note: For suggested mobile phone, tablets and protective cases, please see www.racepak.com.

Step 2. CL2 Installation

Installation of the CL2 is a quick and simple process, as shown below.



1. Locate the vehicles OBD2 connector.



2. With vehicle power OFF, plug the CL2 into the OBD2 connector.



3. If the vehicles OBD2 connector places the CL2 in an undesirable location, the OBD2 extension cable can be utilized to relocate the CL2.



4. If the OBD2 extension cable is used, ensure the ON/OFF switch is in the ON position.



5. Connect the GPS antenna to the GPS connector on the end of the CL2.



6. Route and mount the GPS antenna on the ROOF or TOP of vehicle, with a clear view of the sky.



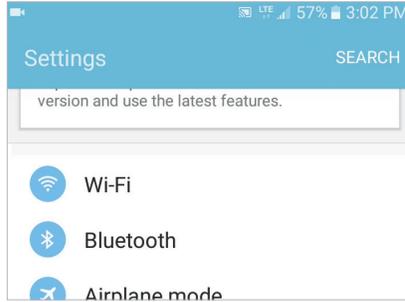
NOTE: The CL2 draws a small amount of current, when not in use. Disconnect or power off if vehicle will be inactive for a number of days.

Step 3. Pairing Mobile Device with the CL2 - Android

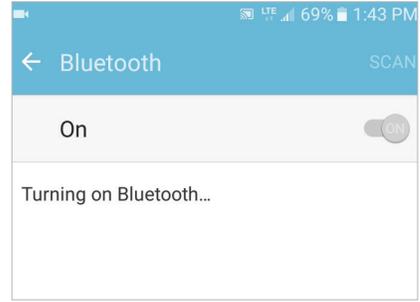
it is necessary to pair the vehicle mounted mobile device running the D3 app, with the CL2 before use. **Note: Pairing occurs when the D3 app is opened on the mobile device, not from within the bluetooth settings!** For Android and IOS, UNPAIR from any existing Bluetooth device(s) found on the mobile device, using the FORGET command, BEFORE attempting to pair with the CL2.



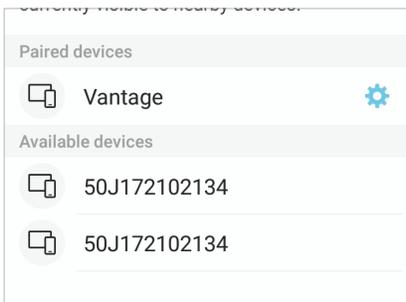
1. With vehicle power ON, the LED adjacent to the GPS antenna connector should glow BLUE.



2. Locate Settings in your mobile device, then Bluetooth. For Android, Settings are typically found in Apps on the home page.



3. Turn Bluetooth ON.



4. Vantage should now appear as a device connection option.



5. Open the D3 app.



6. TOUCH and HOLD the mobile device on the CL2.



Note: Do not pair from this window!

Step 3. Pairing Mobile Device with the CL2 - Android



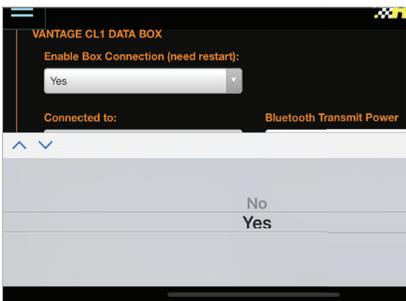
7. The LED will change from solid BLUE to blinking GREEN/BLUE, indicated phone and CL2 are paired.



8. The top three icons (Race Dash, Run Results and Manual Record) will now change from Gray to Green and Red. This indicates the mobile device and the CL2 are now paired.



9. If unit fails to pair, press and hold the Clear Pairing button until the LED glows purple. Disconnect, then re-connect the CL2 and repeat the prior pairing steps.



10. If a tablet is to be utilized in the vehicle, a setup change in the D3 app is necessary. Tap Settings then Tap Enable Box Connection. Change from NO to YES. Restart the D3 app. At this time, the tablet can now be paired with the CL2.



Note: Disable mobile device screen lock, after installation of D3 app.



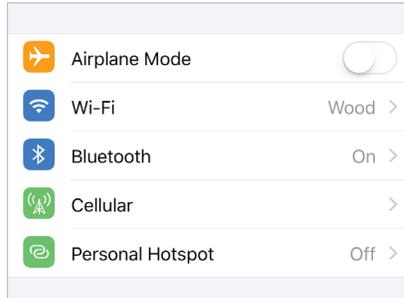
Note: If CL2 was previous paired to another mobile device, it will be necessary to CLEAR PAIRING from the CL2, before attempting to pair with new mobile device.

Step 3. Pairing of the Mobile Device with the CL2 - iOS

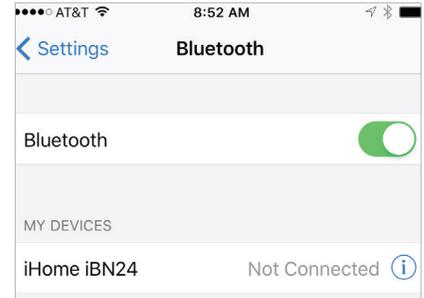
It is necessary to pair the vehicle mounted mobile device running the D3 app, with the CL2 before use. **Note: Pairing occurs when the D3 app is opened on the mobile device, not from within the bluetooth settings!** For Android and IOS, UNPAIR from any existing Bluetooth device(s) found on the mobile device, using the FORGET command, BEFORE attempting to pair with the CL2.



1. With vehicle power ON, the LED adjacent to the GPS antenna connector should glow BLUE.



2. Locate Settings in your mobile device, then Bluetooth. For iOS devices, Settings are typically found on the home screen.



3. Turn Bluetooth ON.



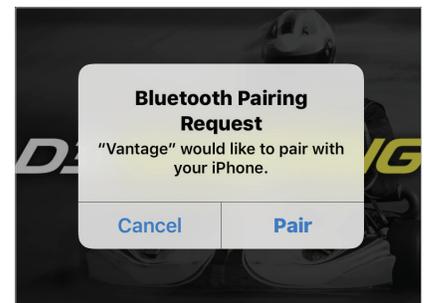
Note: Do not pair from this window!



4. Open the D3 app.



5. TOUCH and HOLD the mobile device on the CL2.

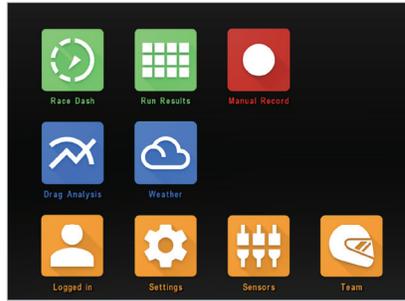


6. Wait for the Bluetooth Pairing Request message. Select Pair.

Step 3. Pairing of the Mobile Device with the CL2 - ios



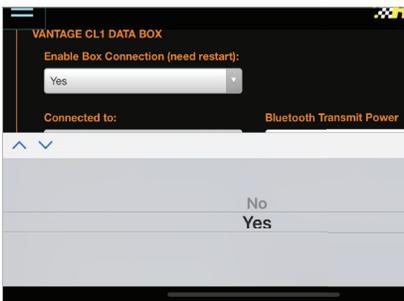
7. The LED will change from solid BLUE to blinking GREEN/BLUE, indicated phone and C2 are paired.



8. The top three icons (Race Dash, Run Results and Manual Record) will now change from Gray to Green and Red. This indicates the mobile device and the CL2 are now paired.



9. If unit fails to pair, press and hold the Clear Pairing button until the LED glows purple. Disconnect, then re-connect the CL2 and repeat the prior pairing steps.



10. If a tablet is to be utilized in the vehicle, a setup change in the D3 app is necessary. Tap Settings then Tap Enable Box Connection. Change from NO to YES. Restart the D3 app. At this time, the tablet can now be paired with the CL2.



Note: Disable mobile device screen lock, after installation of D3 app.



Note: If CL2 was previous paired to another mobile device, it will be necessary to CLEAR PAIRING from the CL2, before attempting to pair with new mobile device.

Step 4. CL2 LED Status Patterns

A single LED, adjacent to the external GPS connector, provides the current status of the CL2, through a variety of colors and flashing sequences.



Blue, Solid
Ready to Pair.



Green/Red Flashing
Initiating pairing with
mobile device.



Green/Blue Flashing
1 flash per second indicates
paired and ready for use.



Green Flash
Every three second green flash
indicates CL2 is in sleep mode,
ready for data.



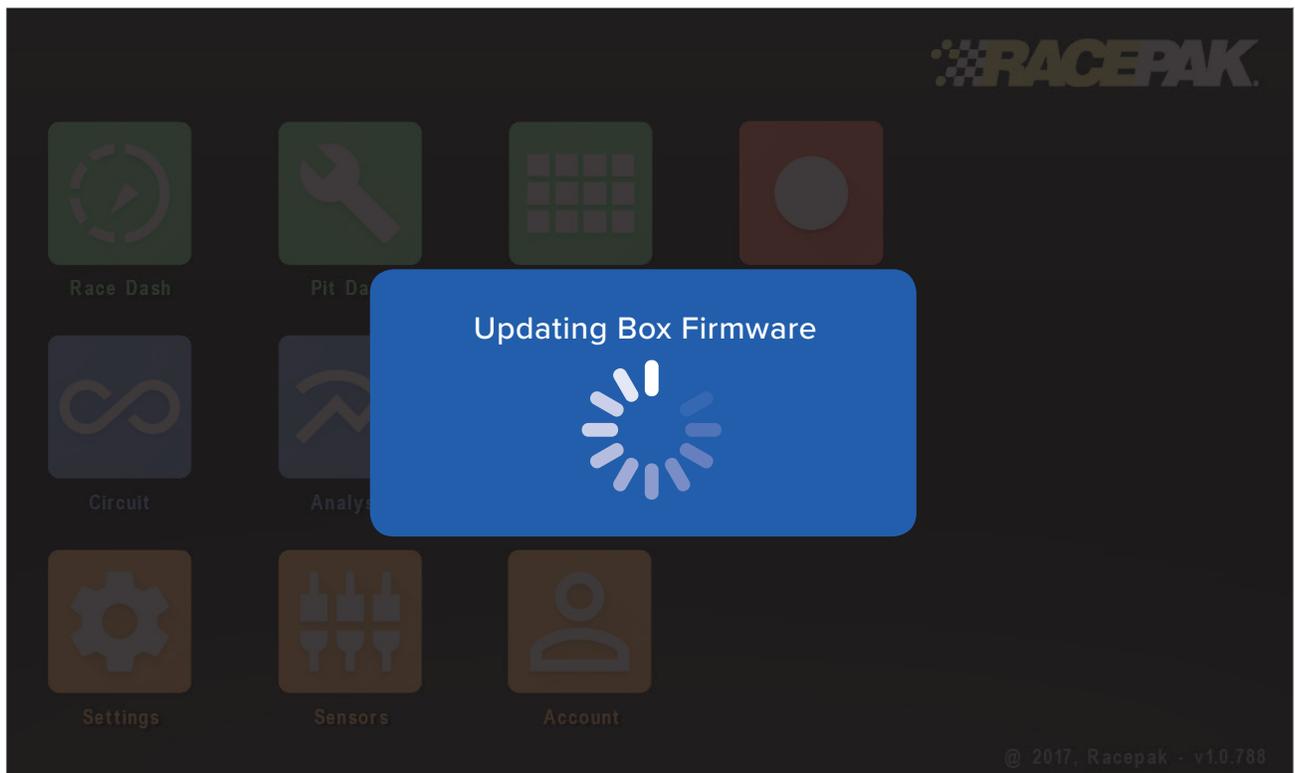
Purple, Solid
Reset pairing.

Step 5. Firmware Auto-Update Feature

The CL2 contains an automated firmware update feature, utilizing the vehicle mounted mobile device. No action is required from the user. Instead, if new CL2 firmware is available, automatic updating occurs when the CL2 is powered up and paired with the mobile device. The user is alerted to this action by a message on the mobile device display. Once updated, the display on the mobile device will return to the D3 home page indicating the CL2 is ready for use.



Note: Do not power down the CL2 or the mobile device during the update process.



Step 6. Mounting of Mobile Device

Given the nearly unlimited combination of vehicles utilizing the CL2, Racepak recommends the selection of a rugged mount capable of securing the mobile device for any type of motorsports situation.

Note: Phone or tablet may be utilized with the CL2.



1. For automotive applications, Racepak offers the Ram X Grip universal holder and Ram Twist Lock Suction mount.



2. Mount the phone within view and reach of the driver, as the D3 app will be used for pit and on track instrumentation.



3. Orient the phone horizontally, with the home button on the right, as viewed from the driver position.



4. A vehicle mounted tablet may also be utilized.



NOTE: Mount the phone as close as possible to the CL2. Remember, all sensor data is transmitted via bluetooth, from the CL2 to the phone.



NOTE: The D3 app can not be viewed in Portrait orientation. The phone must be mounted with the home button on the right, as viewed from the drivers position.

Step 7. First Time Track Use of the CL2

At this time, the CL2 is mounted on the vehicle, with the D3 app installed and paired with the CL2 and the CL2 is registered (cloud account not required) to your online account. It is now time to turn our attention to the use of the D3 app. Open the D3 app on the vehicle mounted mobile device. The icons are group by color, based on their function.



NOTE: The below icons are in view when Drag is selected in Settings/Motorsport Type. Icons will vary depending on the Type selected.

Green:

On-track driver information and CL2 connection status.

Red:

Manual record function.



Race Dash



Race Results



Manual Record

Blue:

Data analysis functions and cellular connection status.



Drag Analysis
(track mapping)



Weather

Orange:

Setup functions.



Log In



Settings



Sensors



Team

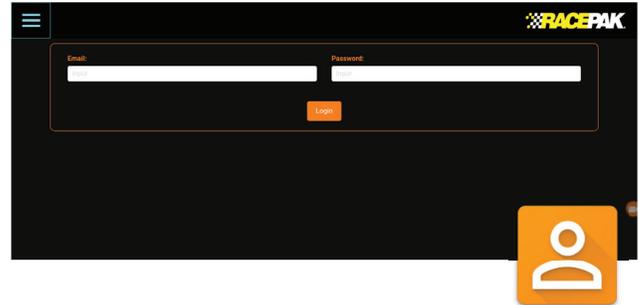
Step 8. Set Up Prior to First Run

There are actions that must be taken, in order to ensure the vehicle mounted mobile device is logged in and transmitting data to the correct device and team cloud account.

Log In:

Log In: From the homepage of the D3 app, tap the Log In icon.

Email and Password: Enter the email and password created when registering your CL2.



Team:

Driver Name: Enter the driver name for the upcoming run. This name is part of the data file naming process, so ensure the current driver name is correct for each run, to simplify the post run data analysis process.

Team receiving the data: During the CL2 registration process, a team or teams is set up, which provides a specific location to save both local data on the vehicle mounted phone and to the cloud account. Tap the down arrow to select the correct team for the upcoming outing.

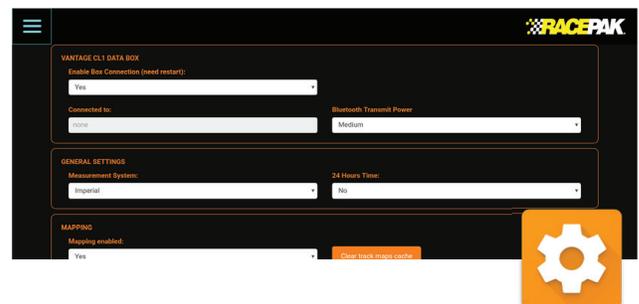
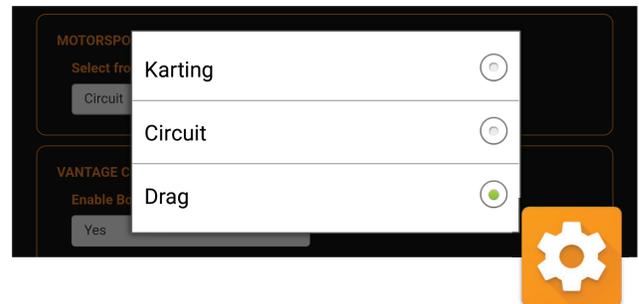
Cloud Storage: If a cloud account is in use, tap Yes. If not, tap No.



Settings:

Motorsports Type: **IMPORTANT!** Tap the down arrow, then tap drag. If the incorrect type is selected, data will not display correctly.

Vantage CL2: Enables communication between the vehicle mounted mobile device and the CL2. Tap Yes for the vehicle mounted and CL2 paired device. Tap No when using a mobile device for remote data analysis, as the device should not be paired with a CL2.



Step 8. Set Up Prior to First Run

Connected to: When paired with a CL2, the CL2 serial number will appear.

Bluetooth transmit power: Tap and set to Medium. If there are connectivity issues, a higher setting can be selected. Be aware that higher settings will decrease data bandwidth and possible data issues.

Hardware Version: Displays latest hardware version loaded in CL2.

Bootloader version: Displays latest bootloader version loaded in CL2.

No data timeout: Indicates the time period after the Engine RPM (or wakeup channel) stops, until the CL2 returns to sleep status.

Max sleep time: Indicates the maximum time the CL2 data will remain in sleep mode, without a wakeup signal, before completely shutting off.

Measurement System: Defines measurement values (imperial or metric) for sensor data.

24 Hour Time: 24 or 12 hour. Time is used in the data file naming process.

Menu autoselect unique options:

Send notifications: Enables / disables new data upload notification messages sent to remote mobile devices running D3 app.

Use chart shading: Turns on and off shading graphed data channel traces.

Display min/max labels: Turn off or on minimum and maximum values on data graph.

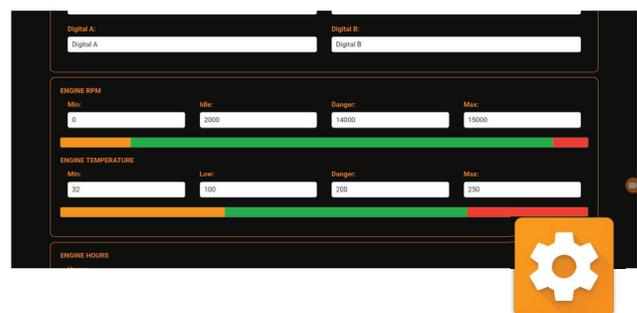
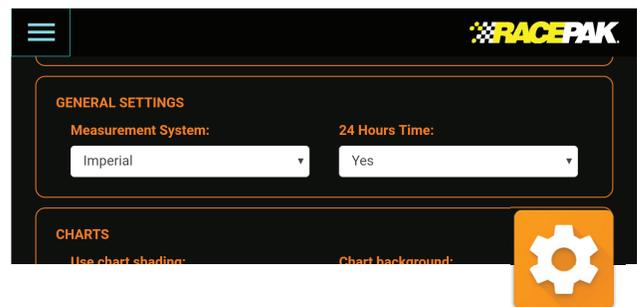
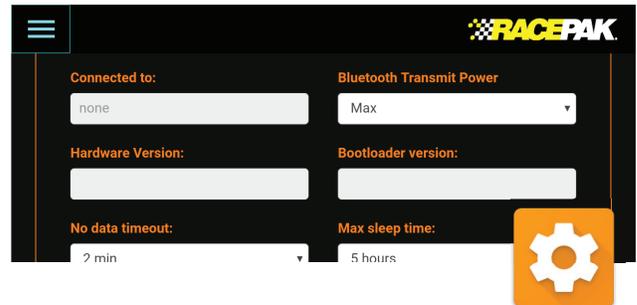
Colors on data overlays: Turns on or off automated data graph trace coloring.

Chart Background: Toggles data graph area from black to white.

Mapping – Mapping Enabled: Tap Yes to enable track mapping.

Finish-line extends (unknown tracks): Changes projected finish line distance in the event track is wider than current setting, resulting in no lap time data.

Min/Max settings: Defines numeric display colors for each defined channel, when viewed on Live Data page and Shift Light settings.

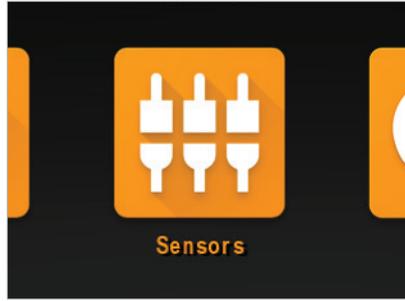


Step 9. Set Up Prior to First Run - OBD2

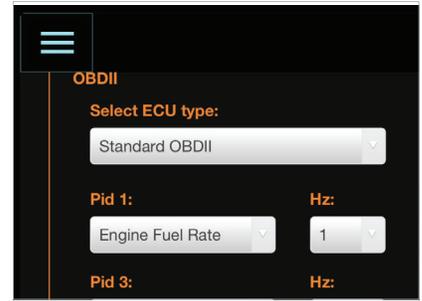
Up to 12 OBD2 inputs are available for viewing / recording. **NOTE: OBD2 splitter cable cannot be used with the CL2.**



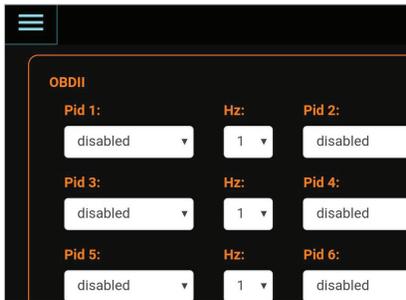
1. Connect the CL2 to the vehicles OBD2 port



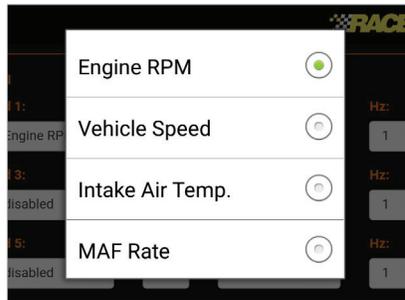
2. With the phone paired to the CL2 via Bluetooth, tap the Sensors icon on the D3 home page.



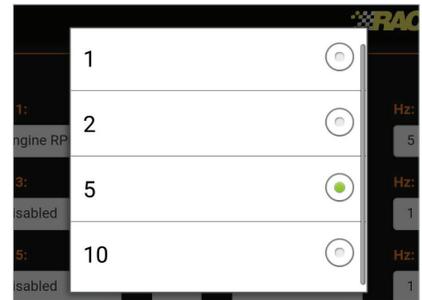
3. Under OBDII/Select ECU type, tap the down arrow and Standard OBD2.



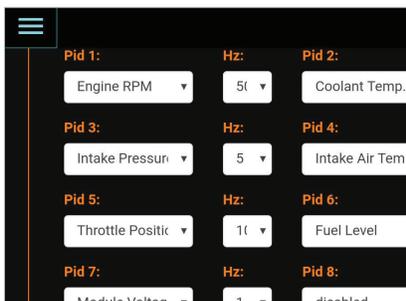
4. Available OBD2 channels are year, make and model dependent. Up to 12 channels may be selected.



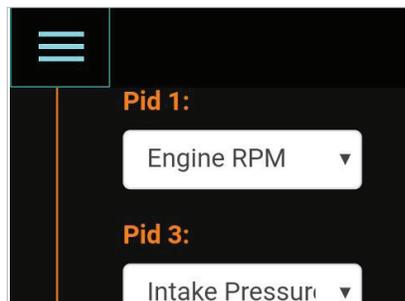
5. Using the down button beside of Pid 1, select the desired OBD2 sensor input channel.



6. Next, tap the Down arrow beside the Hz input area, and select the desired sample rate per second, for the channel. Note: Available sample rates vary, based on selected channel. Do not sample each channel at the maximum rate.



7. Repeat the process for additional OBD2 inputs.



8. Upon completing all proگرامing functions, tap the Home page icon in the upper left corner of the screen.



Note: Do not use OBD2 splitter with CL2.

Note: Engine RPM channel must be selected, in order to wake up CL2 for use.

Step 10. Set Up Prior to First Run – EFI Data Channels

The CL2 interfaces with the following aftermarket ECU's, providing up to 12 EFI sensor inputs.

AEM	Fuel Tech 300 v1	Fuel Tech 400 v1	Holley Dominator
Fuel Tech 250 v1	Fuel Tech 600 v2	Haltech v2 Protocol	Megasquirt
Fuel Tech 500 v2	Fuel Tech 350 v1	Fast XFI	
Motec Set 3	Haltech v1 Protocol	Fuel Tech 500 v1	



Note: Optional Racepak OBD2 to EFI adapter PN: 28120-2002 is required.
In addition to OBD2 to EFI adapter, a second EFI interface cable is required, part number:
 FuelTech: PN 280-CA-EFIXFI
 Holley: PN 280-CA-EFIHOL
 FAST XFI: PN 280-CA-EFIXFI
 All Others: 280-CA-EFIXFI
 Note: OBD2 and EFI inputs can not both be utilized at the same time.



1. Determine mounting location of OBD2 to EFI adapter. Will be dictated by overall length of Interface Cable.



2. Connect the OBD2 to EFI adapter to the CL2.



3. Connect the interface cable to the OBD2 EFI adapter.

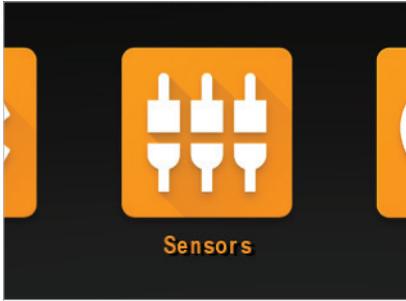


4. Connect the opposite end of the interface cable to the ECU. Connector varies based on ECU.

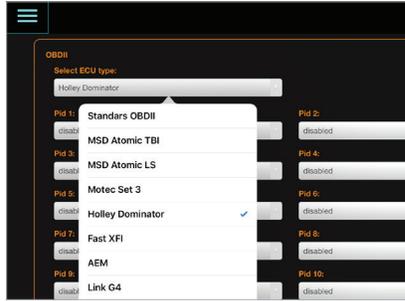


5. Connect black wire to chassis ground. Connect red wire to switched 12V vehicle power - Recommended to use same power source as EFI unit.

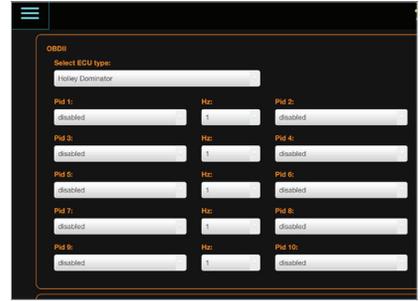
Step 10. Set Up Prior to First Run – EFI Data Channels



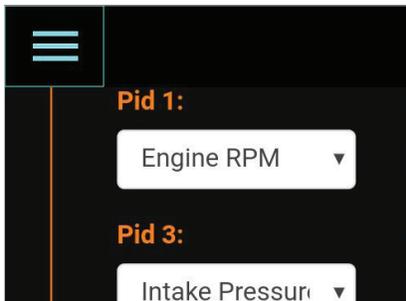
4. With the mobile device paired to the CL2 via Bluetooth, tap the sensors icon on the D3 app homepage.



5. Tap the down button under Select ECU Type, tap and select the desired ECU.



6. Up to 12 ECU channels and desired sample rate (Hz) can now be programmed, one at a time, using the down arrow under each PID input area.



7. Upon completing all programming functions, tap the Home page icon in the upper left corner of the screen.

Step 11. Pit & On Track Driver Information

Through the use of Engine RPM and GPS speed, the CL2 and D3 app detects and automates the display of driver information based on the drivers needs, at that time.

Pit Dash:

Upon starting of the engine, the Pit Dash will automatically display or can be manually accessed from the home page of the D3 app. This allows the driver or team to quickly verify the real time values and status of the CL2 and mobile device.

BOX: Indicates connection status between CL2 and mobile device.

RED – No connection.

GREEN – CL2 and mobile device are paired.

GPS: Indicates GPS status of CL2.

RED – No CL2 GPS connection (check antenna connection).

GREEN – GPS satellites are acquired, with number and strength noticed in the GPS Satellites box.

Cloud: Indicates connection between the vehicle mounted mobile device and user’s cloud account.

RED – No connection

GREEN – Mobile device connected to cloud account via cellular service.

Note: Below inputs must first be programmed as outlined in previous section, in order to display data.

Engine Temp: Indicates real time values of water temp via OBD2 or EFI.

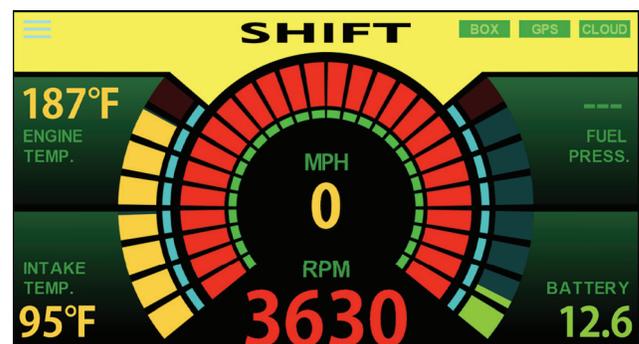
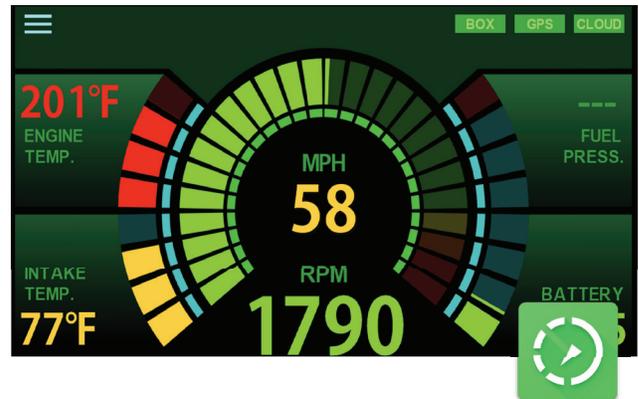
Intake Temp: Displays Intake temperature as provided by OBD2 or aftermarket EFI.

Engine RPM: Displays real time value of Engine RPM.

Battery: Indicates battery status of the vehicle to which the CL2 is connected.

Fuel Pressure: Displays Fuel Pressure as provided by OBD2 or aftermarket EFI.

Shift Light: Shift light will display based on values programmed under Settings - ENGINE RPM.
 Max Value: Turns on shift light - Min Value; Resets shift light.
 Example: If Max is 7000 and Min is 6500, shift light will turn on at 7000 rpm and turn off if Engine RPM drops below 6500 at shift. Adjust up or down according to needs.



Step 11. Post Run Immediate Results



Note: On Track dash page will vary, depending upon Motorsport Type selected in Settings on the D3 app.

Race Results page:

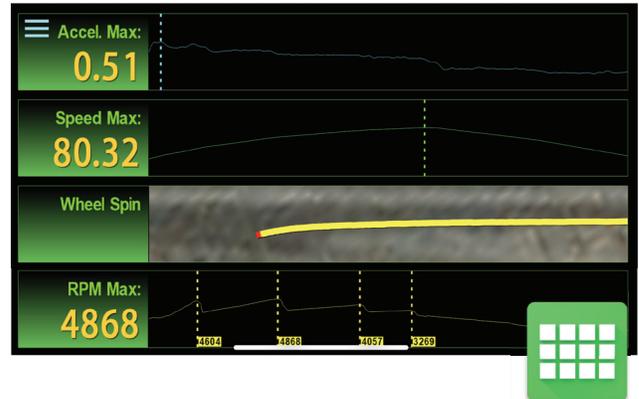
Upon complete of a drag strip run, and when the vehicle is stationary for 10 seconds, the Race Results screen is automatically presented for viewing.

Accel Max: Maximum Accel G value for the run is displayed, along with a graphical view.

Speed Max: Maximum speed value for the run is displayed, along with a graphical view.

Wheel Spin and Drag Strip Track Map: Wheel spin (detected by comparing GPS MPH to vehicle speed obtained from OBD2 or EFI) is noted in Red, overlaid on top of the yellow driving line, down the dragstrip.

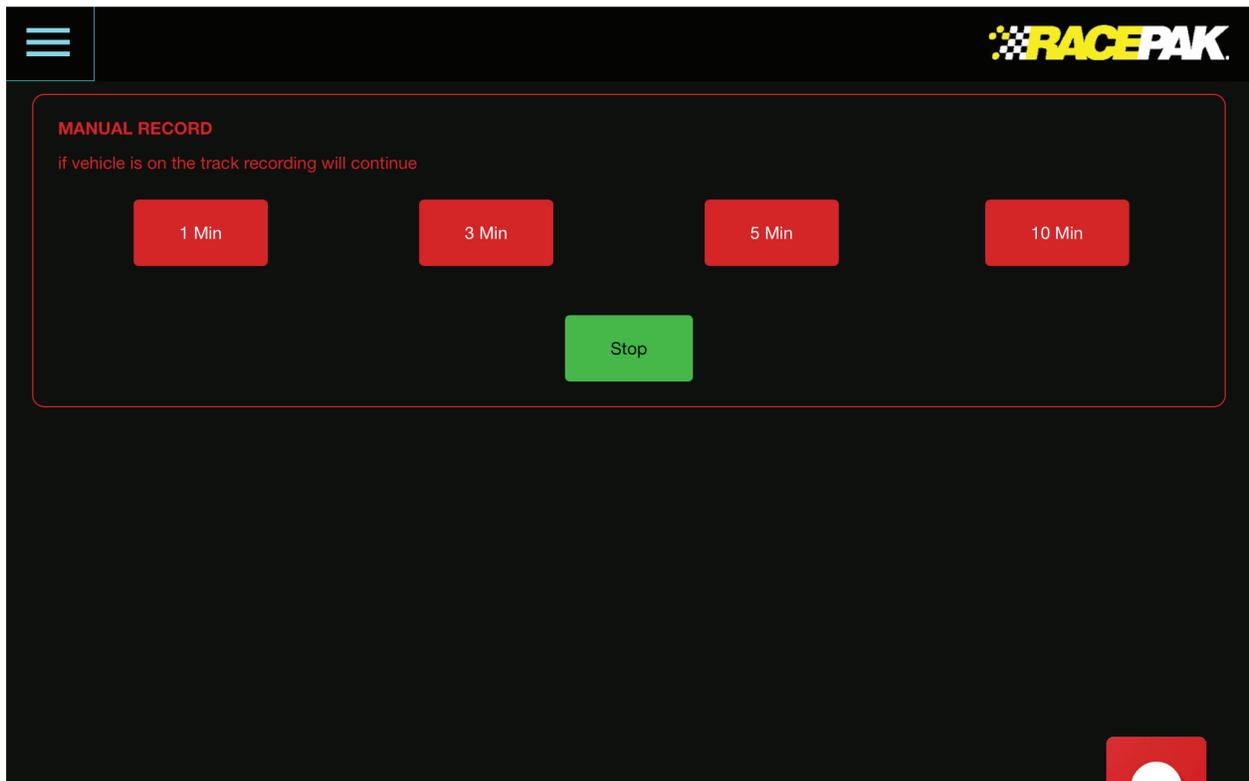
RPM Max: Maximum Engine RPM during the run, along with each shift point, is noted in graphical format.



Step 12. Manual Data Streaming

Optional Racepak Cloud Service

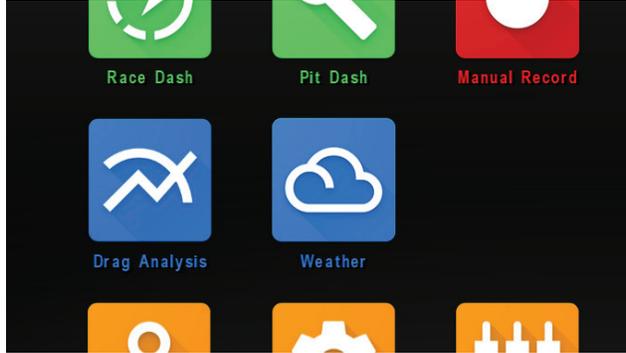
For pit, dyno or other situations requiring streaming of data when, the vehicle is not moving, to the users optional cloud account, a Manual Record feature is available on the home page of the D3 app icon.



1. Tap Manual Record from the D3 app home page.
2. Tap the desired time to upload data to the cloud.
3. Live data can now be viewed on a remote, internet connected device running the D3 app.
4. To stop, select the Manual Record icon again, from the home page of the D3 app.

Note: Always stop manual recording, before starting a run.

Step 13. Data Analysis Features



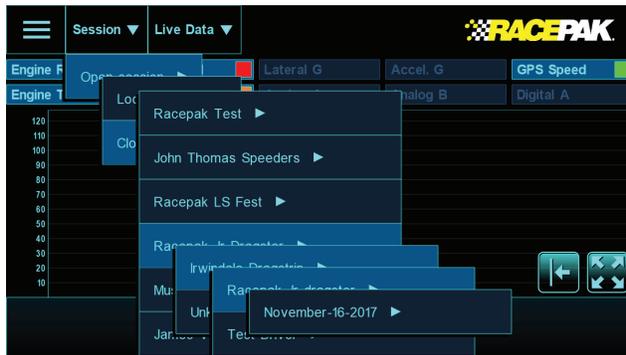
Analysis:

The Drag Analysis page of the D3 app provides the ability to view recorded data from either a cloud account or data saved to the actual mobile device. To begin, tap the Drag Analysis icon from the homepage of the D3 app.



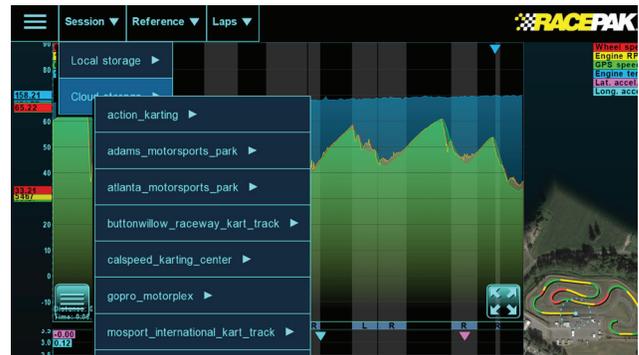
Graph Area:

The Drag Analysis page provides the ability to graph, overly and compare data from single or multiple run files.



To Open a Data File or Files:

1. Tap Session, then select either either Local or Cloud storage, then Team / Track / Driver / Date / Time of data file. Repeat procedure for additional data files.



Data Channels:

Active data channels will be loaded, along with automatic zeroing of the start point of the data.



Track Map:

Track Maps are automatically loaded from the Racepak D3 cloud data base, based on the location of the vehicle as determined by the mobile phone mounted on the jr dragster

Vehicle position relative to cursor position in graph area is indicated by a circle, and will move with the movement of the cursor, in the graph area.

Step 13. Data Analysis Features



Open or Close Graphed Data Channels:

1. Tap any active data channel button, on the channel name.
2. Data channel will graph if not open and closed if currently open.



Change Graphed Channel Color:

1. On currently graphed data channel, tap color icon on right side of channel button.
2. Touch desired color in now open Channel Color window.



Zoom:

1. Touch and pinch graph area data will zoom in and out relative to area pinched.

2. To return to original graph area, tap the icon.

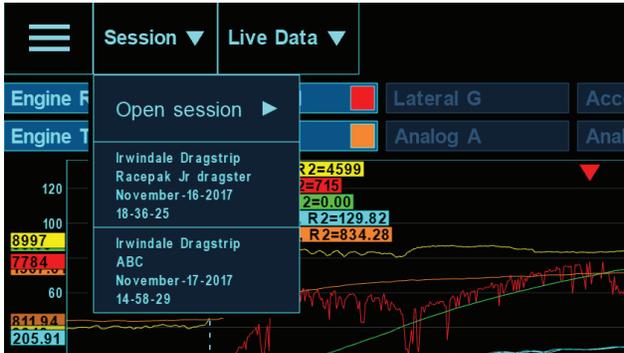


Min Max Values:

1. Minimum and maximum data values for graphed channels are noted by colored arrows in the top and bottom portion of the graph area.

2. Maximum values are noted at the top of the graph area, with the arrow color corresponding with the color of the graphed data channel.

Step 13. Data Analysis Features



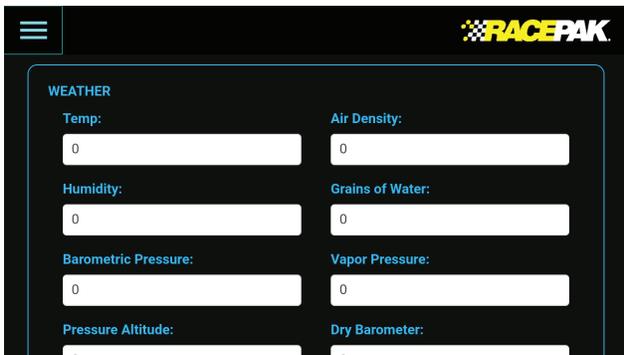
View Currently Opened Data File Details:

1. Tap Session on currently open file. Data file details will be presented



Close or Open Current Data File:

1. Tap Session, then file details area.
2. Tap Visible to temporarily remove graphed data.
3. Tap Unload to close out currently open file.



To Enter Weather Information for Current Data File:

1. Tap Weather icon on D3 app home page.
2. Enter relevant weather data in individual input areas.
3. Weather data will be saved with currently open data file.



View Weather Information:

1. Tap Sessions, then file details area of currently open file.
2. Tap Weather.
3. Weather details entered from Weather icon on home page will be presented.

