

Data Logger TCU

Introduction

The Cosmos software includes a built-in data logger that records transmission events while driving. This allows the tuner to analyse TCU behaviour after the event instead of trying to interpret large amounts of data in real time.

The data logger is an important diagnostic and tuning tool and is especially useful when assisting customers remotely.

The recorded log can be:

- analysed directly inside the Cosmos software
- saved together with the current map file
- sent to a remote tuner for further analysis

The Android mobile application also allows the user to record and send data logs directly from a phone.

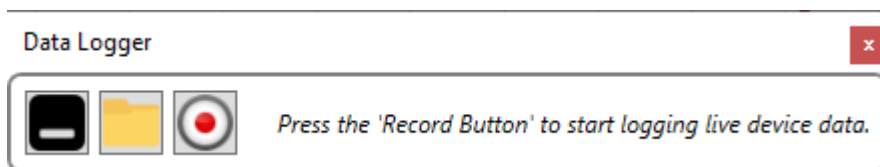
Because the logging is handled by the software or mobile device, recording is not limited by the memory size of the TCU hardware.

Opening the Data Logger

Open the data logger from the **top menu bar** of the Cosmos TCU software.



The data logger opens in a **separate window**. This is particularly useful when using a dual-monitor setup, allowing the tuner to view the data logger and the TCU tuning software at the same time.



From this window the tuner can:

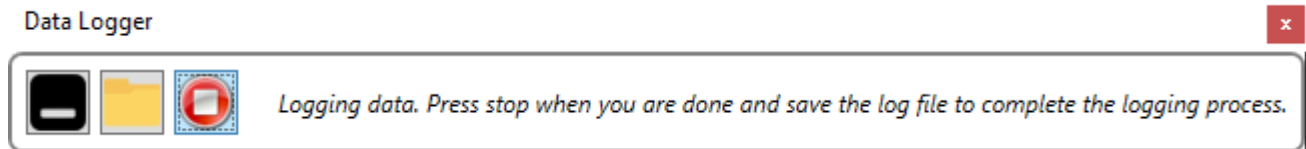
- start recording a new data log
- open a previously recorded log
- analyse or replay recorded data

Recording a Data Log

To begin recording, click the **Record** button.



The data logger will now record all relevant signals and parameters generated by the TCU.



These typically include:

- RPM
- vehicle speed
- gear position
- throttle position
- pressure and temperature signals
- transmission control states

The tuner will usually perform a driving run to capture the behaviour of the transmission during a specific event.

Examples include:

- gear changes
- kick-down behaviour
- torque converter lockup
- shift quality issues

Once the event has been captured, click **Stop** to end the recording.



Viewing the Recorded Log

When recording stops, the logger automatically opens the **Data Logger Dashboard**, where the recorded data is displayed as graphs.



The tuner can now analyse the recorded signals and determine what occurred during the driving event.

The graph allows the tuner to:

- zoom into specific sections of the recording
- move through the event timeline
- inspect signal values at any point in time

A **crossbar marker** shows the exact moment being analysed. At that point the software displays the real-time values of all recorded signals.

This makes it possible to identify the exact TCU operating condition at any moment during the drive.

Analysing an Event

To analyse a specific event:

1. Select the section of the graph containing the event.
2. Place the crossbar at the point of interest.
3. Observe the signal values at that instant.

The tuner can then return to the TCU calibration tables and adjust the map accordingly.

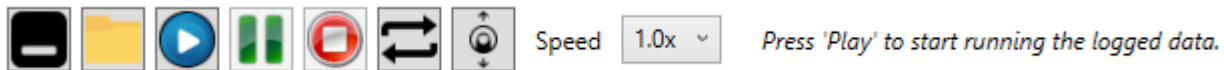
Typical adjustments include:

- shift timing adjustments
- pressure control adjustments
- torque converter lock-up tuning
- throttle related shift behaviour

After adjustments are made, the updated map can be downloaded to the TCU and tested again. This process can be repeated until the desired transmission behaviour is achieved.

Navigating the Data Logger

Top Menu Bar



The top menu bar provides access to the main data logger controls.

Functions include:

- Minimize the data logger window
- Open an existing data log file
- Start and stop recording
- Control playback of logged data

Open a Logged Data File



To open a previously recorded log:

1. Load the **map file used during the recording**.
2. Open the corresponding **data log file**.

The **serial number of the map file must match the serial number of the data log file**.
If the files do not match, the log cannot be opened.

Always ensure the correct map file is loaded before analysing a log. Using the wrong map file may result in incorrect tuning adjustments.

Playback Controls

Play



Replays the recorded data between the selected start and stop points.

Pause



Pauses playback at the current position.

Stop



Stops playback.

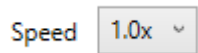
Loop On/Off



Repeats playback between the start and stop points.

This is useful when repeatedly analysing a specific event such as a gear change.

Playback Speed



Adjust Playback Speed

The playback speed control adjusts how fast the recorded data is replayed inside the TCU software.

Slower playback speeds make it easier to analyse rapid events such as:

- gear shifts
- torque converter lock-up
- pressure changes

Increasing the playback speed allows the tuner to quickly review long recordings.

Crossbar Marker



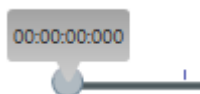
When the crossbar is moved across the graph, the value bar displays the signal values at that exact time. This allows the tuner to see the precise operating condition of the TCU during the recorded event.

This is extremely useful when diagnosing events such as:

- incorrect shift timing
- pressure control behaviour
- gear selection issues

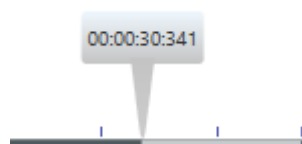
Cross Bar Limits can be placed to select an area of interest to the tuner to view. This is used for repeat viewing of the real-time data in the TCU software.

Select Start Point



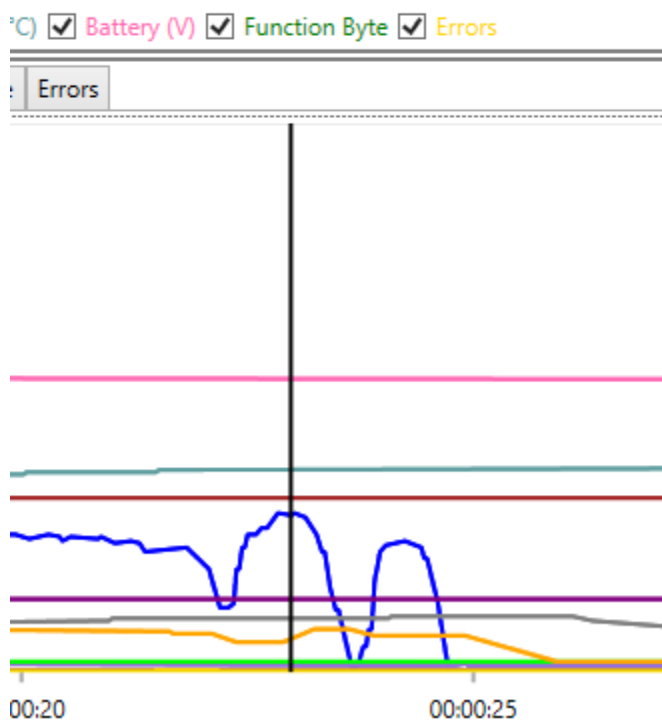
Set this point to the beginning of the event that you want to scrutinize. Playback will be starting at this point.

Select Stop Point



Set this point to the end of the event that you want to scrutinize. Playback will stop at this point.

Example: (Area selected to replay)



Middle Menu Bar

Available Fields



The tuner can select which signals are displayed in the graph.

Reducing the number of displayed signals makes it easier to focus on the relevant data.

☒ All

The **Select All / Deselect All** button allows quick selection or removal of signals.

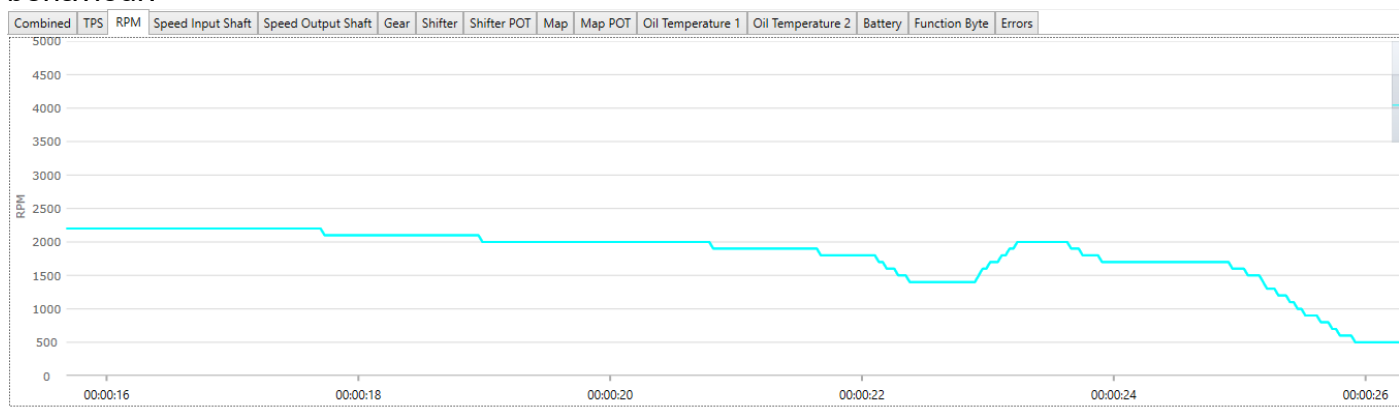
this button will select/un select all the graphs with one click.

Single Signal View

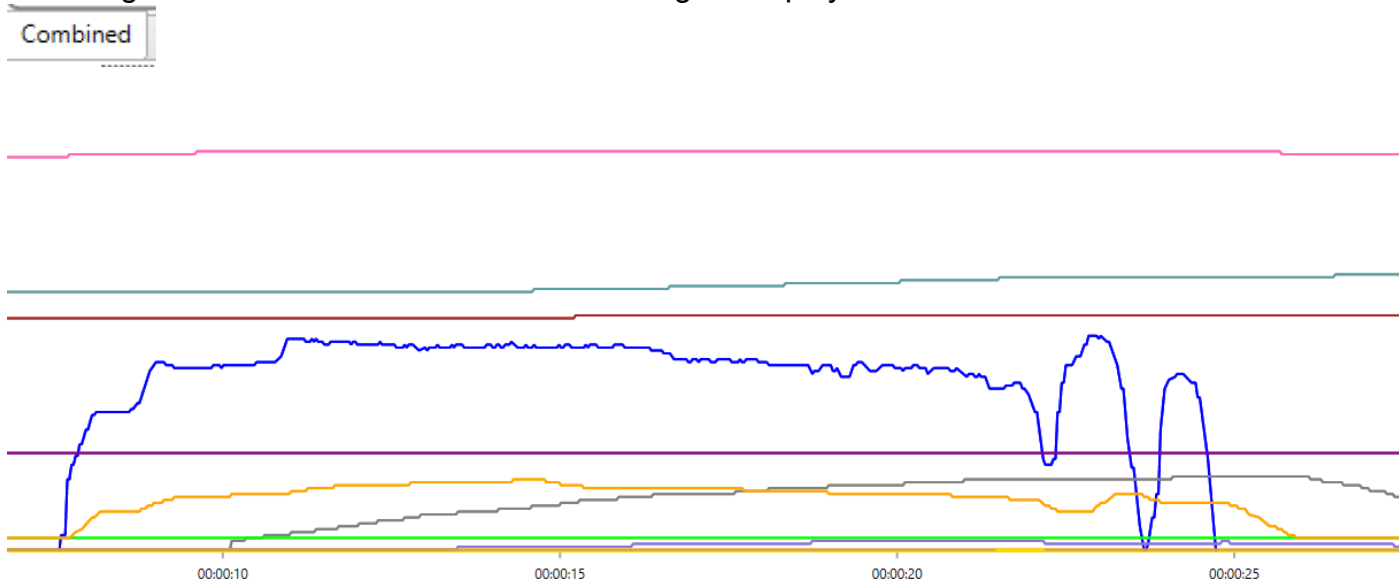
Combined	TPS	RPM	Speed Input Shaft	Speed Output Shaft	Gear	Shifter	Shifter POT	Map	Map POT	Oil Temperature 1	Oil Temperature 2	Battery	Function Byte	Errors
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Because different signals use different Y-axis scales, it is sometimes easier to view a single signal at a time.

Selecting a single signal will display it using its full-scale range, making it easier to analyse its behaviour.

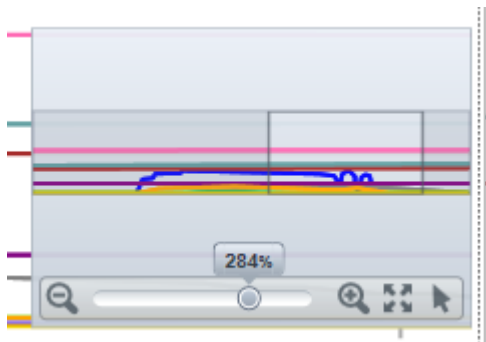


Selecting **Combined View** restores the multi-signal display.



Navigation Window Controls

The navigation window is there to assist the tuner in viewing and navigating to the data in the log. Advanced zoom controls allow the tuner to view small sections of a large data log.



Navigation Window Location

These settings will move the navigation window to a desired place on the graph pallet. It may be over a piece of the graph that you would like to view. It can be moved to 6 different positions.



☒ Show Navigation Window

Navigation Panel Options

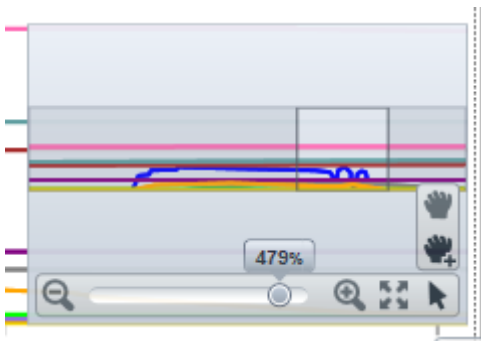
Horizontal Alignment

Right

Vertical Alignment

Top

Navigation Window Explanation



The highlighted block inside the navigation window represents the section of the log currently displayed in the main graph.

You can drag this block left or right to move quickly to another part of the whole data log. This feature is especially useful when analysing long data logs.

Reset



This button will restore zoom to 100% of the data log.

Mouse Navigation Modes



Pan Mode (Top Hand)

In **Pan Mode**, the graph can be moved left or right by dragging it with the mouse.

This allows the tuner to scroll through the recording while maintaining the current zoom level.

When the graph is moved, the active block in the navigation window will also move across the total log view.

Alternatively, you can drag the active block directly inside the navigation window to reposition the view.

Zoom Mode (Bottom Hand)

In **Zoom Mode**, the mouse can be used to zoom into a specific section of the graph.

To zoom in:

1. Click and hold the left mouse button.
2. Drag across the area of the graph you want to analyse.
3. Release the mouse button.

The selected area will expand to fill the graph window.

You can also adjust the zoom level using the mouse scroll wheel.

The navigation window will show the new zoom position relative to the full recording.

Arrow Key Control



Enable / Disable current position adjustment with arrow keys

This option Enable / Disable crossbar movement with the arrow keys.

Option OFF

The **zoom window** will move left or right using the keyboard arrow keys.

Option ON

The **crossbar position** will move left or right using the keyboard arrow keys.

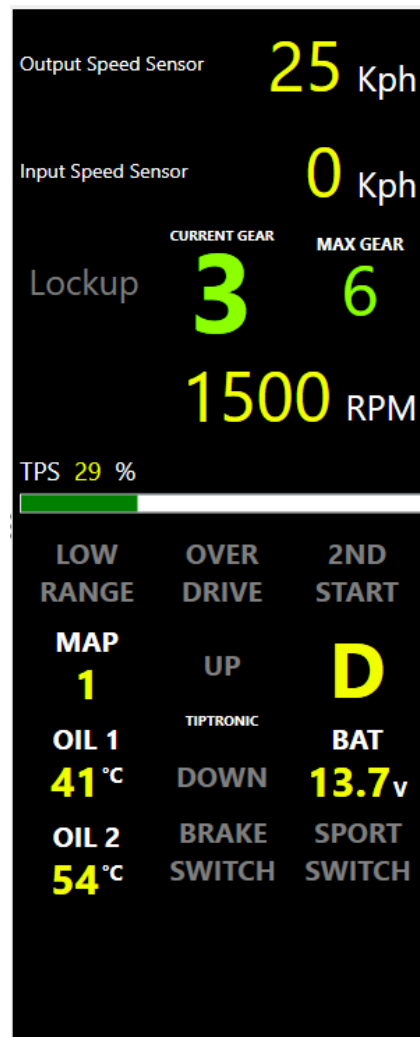
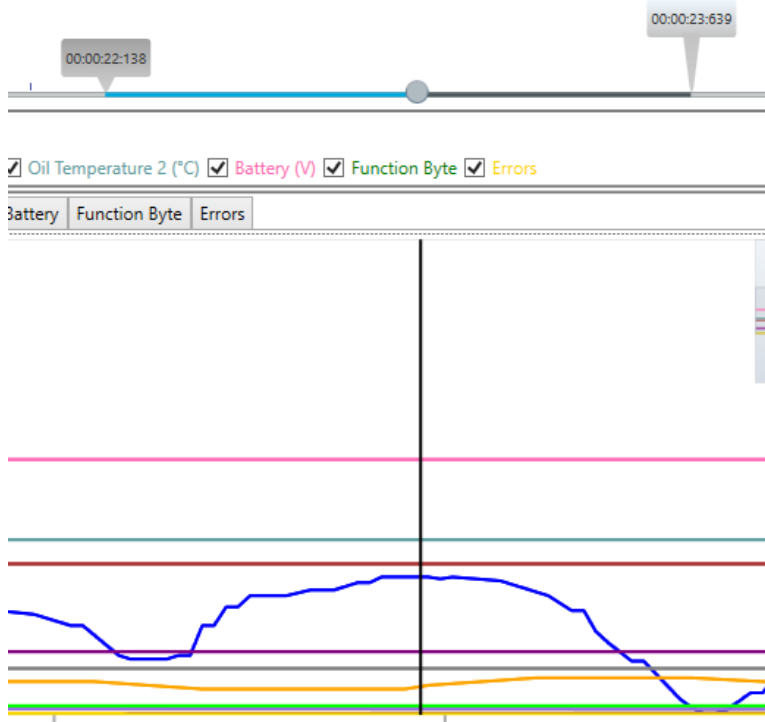
This allows precise navigation without using a mouse.



At the bottom of the graph is the actual time of the recording and the position of that graph at that time. This shows how long the event lasted during the recording.

TPS 0 % RPM 0 Speed In 0 Kph Speed Out 0 Kph Gear 0 Shifter D Shifter D Map 1 Oil Temperature 1 0 °C Oil Temperature 2 0 °C Battery 0 V Lockup Off Down Shift Off Low Range Off Over Drive Off Second Gear Start Off Brake Switch Off Sport Switch Off

The bottom value bar is all the real time values displayed at the crossbar interval. This is handy to see each signal value at the same point of an event.



If you put the crossbar on a specific point then you will see that the software indicates exactly what the real-time values was at that point. You can then go to the graphs or profiles and make adjustment accordingly. If you press play on the datalogger then the actions will play back in the software. Then you can see events exactly as it happened when you took the recording. After you made adjustment, you can save an offline modified map or connect to the TCU and download the adjusted map. Then save it and test the action again.

Data Log Examples

Example: Analysing a Harsh Gear Shift

The data logger can be used to analyse transmission behaviour during events such as gear changes. This example demonstrates how the logger can help identify the cause of a harsh shift.

Step 1 – Record the Event

Start the data logger and perform a short driving test where the harsh gear change occurs.

Typical signals to monitor include:

- Engine RPM
- Vehicle Speed
- Throttle Position
- Selected Gear
- Line Pressure

Stop the recording once the event has been captured.

Step 2 – Locate the Event

Open the recorded log and locate the gear shift event using the graph.

Use the **navigation window** and **zoom tools** to narrow the view until the shift event is clearly visible.

Place the **crossbar marker** at the point where the shift occurs.

The value bar will now display all signal values at that exact moment.

View this point in the TCU software on the Gear Shift Profile of that gear.

Step 3 – Analyse the Signals

Observe how the signals change during the shift.

Typical behaviour during a normal gear change includes:

- engine RPM briefly dropping
- vehicle speed continuing to increase
- the gear position changing
- pressure control adjusting during the shift

If the shift is harsh, possible causes may include:

- excessive line pressure
 - incorrect shift timing
 - throttle input during shift
 - incorrect calibration values
-

Step 4 – Adjust the Calibration

After analysing the data, return to the TCU tuning software and adjust the relevant parameters.

Typical adjustments may include:

- shift pressure calibration
- shift timing adjustments
- throttle related shift behaviour

Save the updated calibration map.

Step 5 – Test the Adjustment

Download the updated map to the TCU and perform another driving test.

Record another data log and compare the results with the previous recording.

Repeat the process until the desired shift behaviour is achieved.

Tip

When diagnosing shift behaviour, it is often useful to display only the most relevant signals on the graph. This reduces clutter and makes the event easier to analyse.

Example: Analysing Late Gear Shifts

Late gear shifts occur when the transmission shifts at a higher RPM or vehicle speed than expected.

The data logger can be used to determine why the shift occurred later than intended.

Step 1 – Record the Event

Start the data logger and perform a driving test where the late shift occurs.

Ensure the following signals are visible in the graph:

- Engine RPM
- Vehicle Speed
- Throttle Position
- Current Gear

Stop the recording once the shift event has occurred.

Step 2 – Locate the Shift Event

Use the **navigation window** and **zoom controls** to locate the point where the gear shift occurs.

Place the **crossbar marker** at the moment the gear change takes place.

Observe the signal values at this point.

View this point in the TCU software on the Gear Shift Profile of that gear.

Step 3 – Analyse the Cause

Check the signals leading up to the shift event.

Possible reasons for late shifting include:

- high throttle position
- incorrect shift speed table values
- incorrect RPM threshold

For example:

- high throttle position may cause the TCU to delay the shift
 - incorrect calibration values may cause the shift to occur at higher speed
-

Step 4 – Adjust the Calibration

Open the TCU calibration tables and adjust the relevant shift parameters.

Typical adjustments include:

- vehicle speed shift points
- throttle based shift behaviour
- RPM limit values

Save the updated calibration map and download it to the TCU.

Step 5 – Verify the Change

Perform another driving test and record a new data log.

Compare the new log with the previous recording to confirm the shift now occurs at the correct point.

Example: Analysing Torque Converter Lock-Up

The data logger can also be used to analyse torque converter lock-up behaviour.

Incorrect lock-up calibration may result in:

- early lock-up
 - delayed lock-up
 - repeated lock-up cycling
-

Step 1 – Record a Driving Test

Start the data logger and drive the vehicle under the conditions where lock-up normally occurs.

Record signals such as:

- Engine RPM
- Vehicle Speed
- Throttle Position
- Gear Position
- Torque Converter Lock-Up Status

Stop the recording once the event has been captured.

Step 2 – Locate the Lock-Up Event

Use the **navigation window** to locate the point where lock-up occurs.

Zoom into this section of the graph.

Place the crossbar marker at the moment when the lock-up state changes.

Step 3 – Analyse the Behaviour

Observe how the signals change during lock-up.

Typical behaviour during lock-up includes:

- engine RPM dropping slightly
- vehicle speed remaining stable
- lock-up status changing

If lock-up occurs too early or too late, the cause may be:

- incorrect lock-up speed settings
 - throttle position conditions
 - gear dependent lock-up parameters
-

Step 4 – Adjust Lock-Up Settings

Modify the lock-up parameters in the TCU calibration tables.

Common adjustments include:

- vehicle speed lock-up threshold
- throttle position conditions
- gear dependent lock-up settings

Download the updated calibration map and test the vehicle again.

Step 5 – Confirm the Result

Record another data log and compare the lock-up behaviour with the previous recording.

Verify that the torque converter now locks up at the desired operating point.