



XAP TECHNOLOGY

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NT5 CoreView Documentation

Client: XAP

Subject: List of product features

Reference:

Document revision history

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1 INTRODUCTION

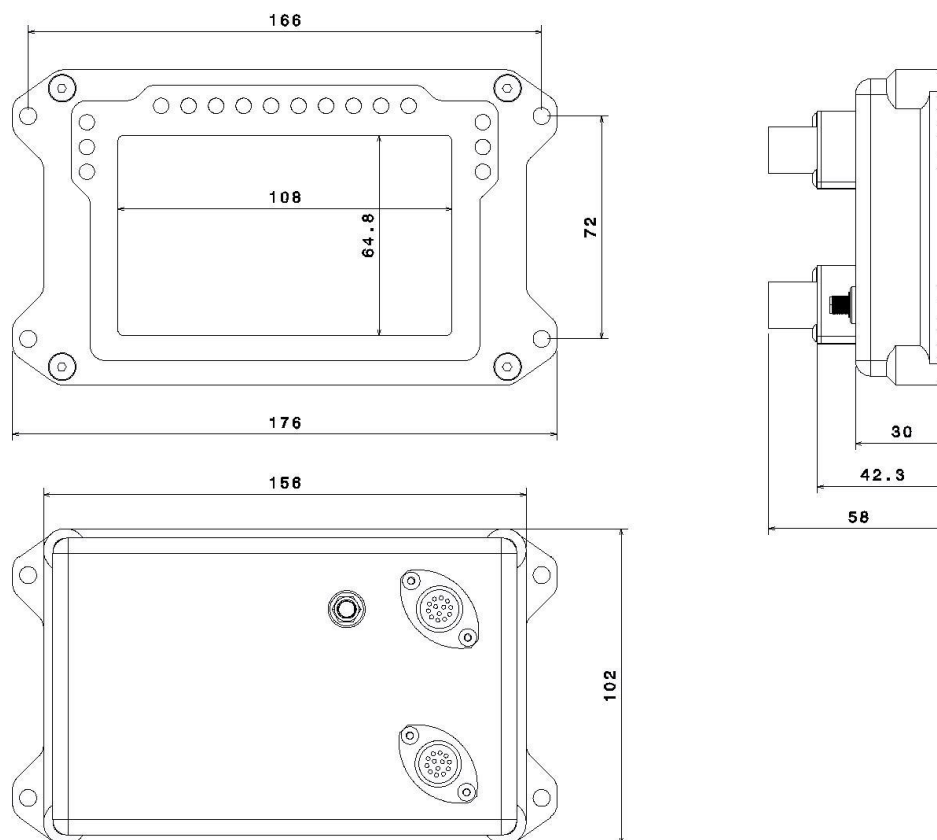
This document provides a comprehensive description of all features available on the NTX dashboard with a CoreView configuration.

2 GENERAL INFORMATION

2.1 Specifications

Data	
Material	Aluminium
Weight (approx.)	750 g
Display	5 " TFT
Resolution	480 x 800 pixels
Brightness	1000 Cd/m2
Contrast ratio	600
Analogue inputs (0-5 V range)	Up to 13
Digital inputs (0-5 V range)	2
Engine speed LEDs	10 RGB
Alarm LEDs	6 RGB
CAN	2, with optional termination
CAN protocol	Cosworth, DTA, EcuMaster, Erace, HalTech, Life, Link, MaxEcu, MBE, Mectronic, Motec, OBD2
USB	Full speed
Temperature	-20°C to 80°C
Supply voltage	8 to 70V
Current consumption	0.5A
Memory	4 Gbytes/1kHz
Ingress protection rating	IP65

2.2 Dimensions



2.3 Connections

The NTX dashboard has the following connections:

1. One 13-pin main connector: 8STA 2 10-35 PN (mating harness connector: 8STA 2 10-35 SN)
2. One coaxial GPS antenna connector (option)
3. One 37-pin connector (option): 8STA 2 14-35 SN (mating harness connector: 8STA 2 14-35 PN)



EXTERNAL PIN OUT

NT5

NT5-1xx SPEC B

Revision

Spec B

Date emiss.

07/03/2019

PRODUCT

NT5-110 120 121 131

PRODUCT REF CODE

PF0337-B/PPF0338-A/PPF0403-A/PPF0404-A

Connector:

N° pin: 13

Part number: 8STA 2 10-35 PN

Color: RED

Position: CT1

Supplier: SOURIAU

Type:

Pin	Signal	Description	Commnet / uP
1	CAN1 LOW	CAN 1	120 Ohms hardware
2	CAN1 HIGH		up to 1M
3	USB -	USB DATA -	
4	AGND	Analog Ground	
5	ANA1	Analog signal	Set to GND for switch use
6	WHEEL1/DIG1	Digital input 1	up to 100kHz
7	WHEEL2/DIG2	Digital input 2	up to 100kHz
8	ANA2	Analog signal	Set to GND for switch use
9	5V_OUT	Vref for analog sensors	up to 100mA
10	12V_IN	Vbatt	
11	GND	General Ground & Analog Gnd	
12	USB_VBUS	USB Power	
13	USB+	USB DATA +	

USB DATA F



EXTERNAL PIN OUT

NT5-1xx SPEC A

Revision

Spec A

Date emiss.

07/03/2019

PRODUCT

NT5-110 120 121 131

NT5

PRODUCT REF CODE

PF0337-B/PPF0338-A/PPF0403-A/PPF0404-A

Connector:

N° pin: 37

Part number: 8STA 2 14-35 SN

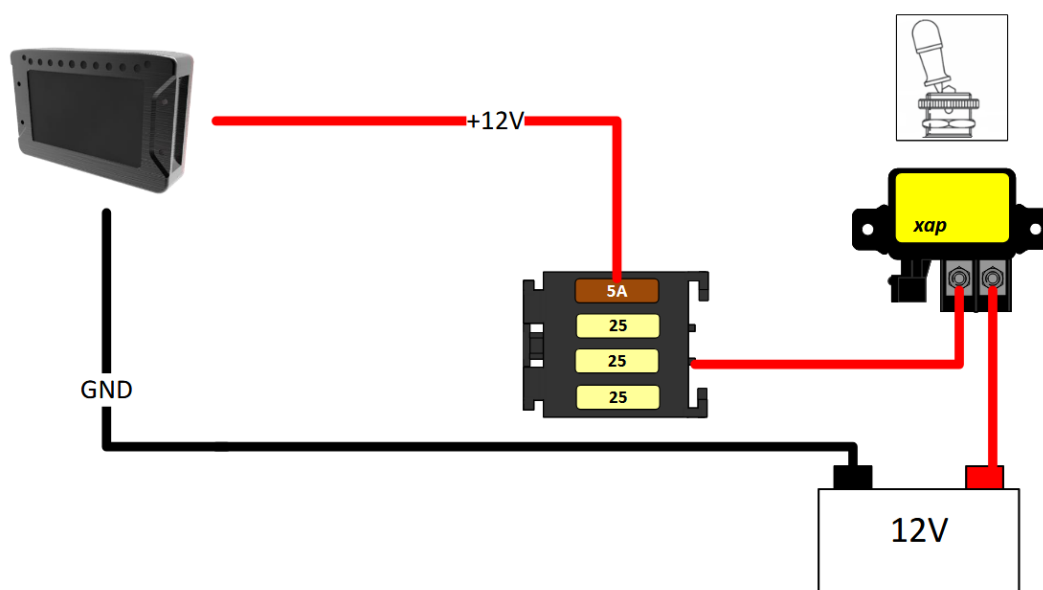
Color: RED

Position: CT2

Supplier: SOURIAU

Type:

Pin	Signal	Description	Commnet / uP
1	ANA1	Analog signal same as CT1	Set to GND for switch use
2	ANA2	Analog signal same as CT1	Set to GND for switch use
3	ANA3	Analog signal	Set to GND for switch use
4	ANA4	Analog signal	Set to GND for switch use
5	ANA5	Analog signal	Set to GND for switch use
6	ANA6	Analog signal	Set to GND for switch use
7	ANA7	Analog signal	Set to GND for switch use
8	ANA8	Analog signal	Set to GND for switch use
9	ANA9	Analog signal	Set to GND for switch use
10	ANA10	Analog signal	Set to GND for switch use
11	ANA11	Analog signal	Set to GND for switch use
12	ANA12	Analog signal	Set to GND for switch use
13	ANA13	Analog signal	Set to GND for switch use
14	5V_OUT1	Vref for analog sensors	up to 100mA
15	5V_OUT1	Vref for analog sensors	up to 100mA
16	5V_OUT2	Vref for analog sensors	up to 100mA
17	5V_OUT2	Vref for analog sensors	up to 100mA
18	12V_OUT1	12V for sensors	
19	12V_OUT2	12V for sensors	
20	WHEEL3/DIG3	Digital input 3	up to 100kHz
21	WHEEL4/DIG4	Digital input 4	up to 100kHz
22	WHEEL5/DIG5	Digital input 5	up to 100kHz
23	WHEEL6/DIG6	Digital input 6	up to 100kHz
24	WHEEL7/DIG7	Digital input 7	up to 100kHz
25	RX232_IN		
26	CAN2 HIGH	CAN 2	120 Ohms hardware
27	CAN2 LOW		
28	LIN		
29	GND	Power GND for sensors	
30	GND	Power GND for sensors	
31	AGND	Analog Ground 5V sensors	
32	AGND	Analog Ground 5V sensors	
33	AGND	Analog Ground 5V sensors	
34	AGND	Analog Ground 5V sensors	
35	AGND	Analog Ground 5V sensors	
36	AGND	Analog Ground 5V sensors	
37	AGND	Analog Ground 5V sensors	



3.1 Start-up screen

This is the first screen displayed when the dashboard starts. It remains visible for two seconds and can contain an image or company logo.

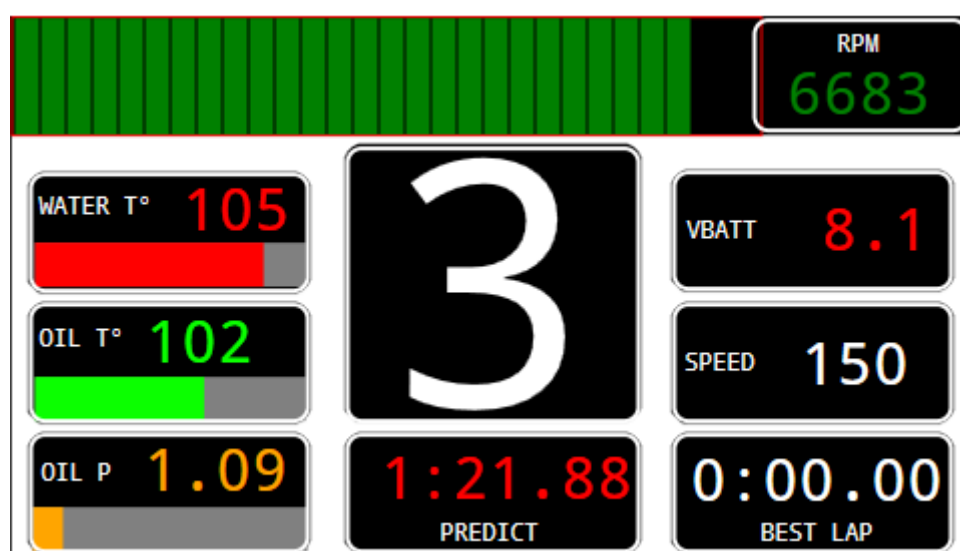
3.2 Driver screens

The dashboard includes several screens that allow the driver to view the vehicle's essential data.

These screens are available whenever the dashboard is switched on.

To move from one screen to another, press the "Dash" button on the steering wheel.

3.2.1 Driver screen - gear + GPS



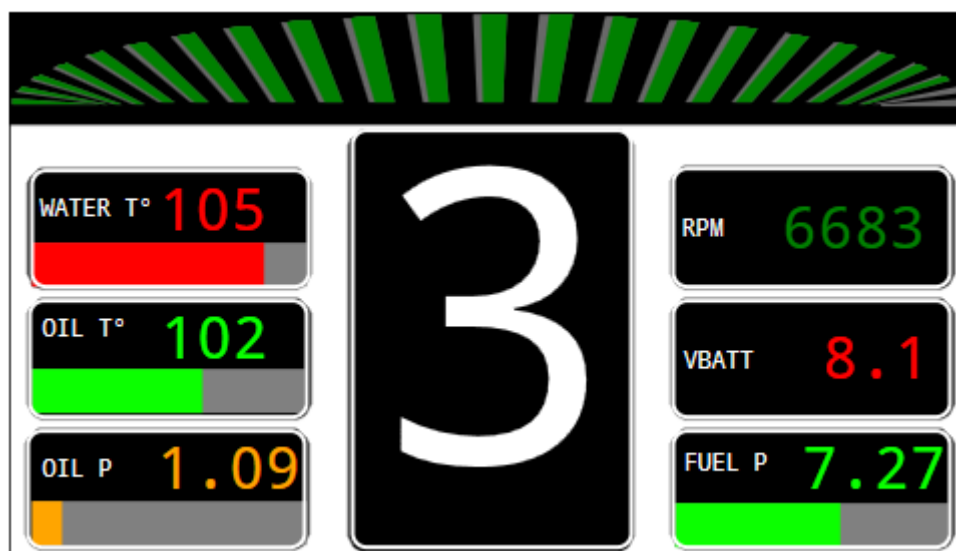
This screen displays the following data:

- RPM
- Speed in km/h
- Water temperature in °C (Water T°)
- Oil temperature in °C (OIL T)
- Oil pressure in bar (OIL P)
- Selected gear
- Battery voltage in volts (VBATT)
- Last lap time (BEST LAP), available via the GPS antenna

- Time difference between the best lap and the current lap (PREDICT)
 - If the value is negative and shown in green, the driver is ahead of their best lap.
 - If the value is positive and shown in red, the driver is behind their best lap.

These data change colour according to fixed alert thresholds (see the alert threshold section).

3.2.2 Driver screen - gear

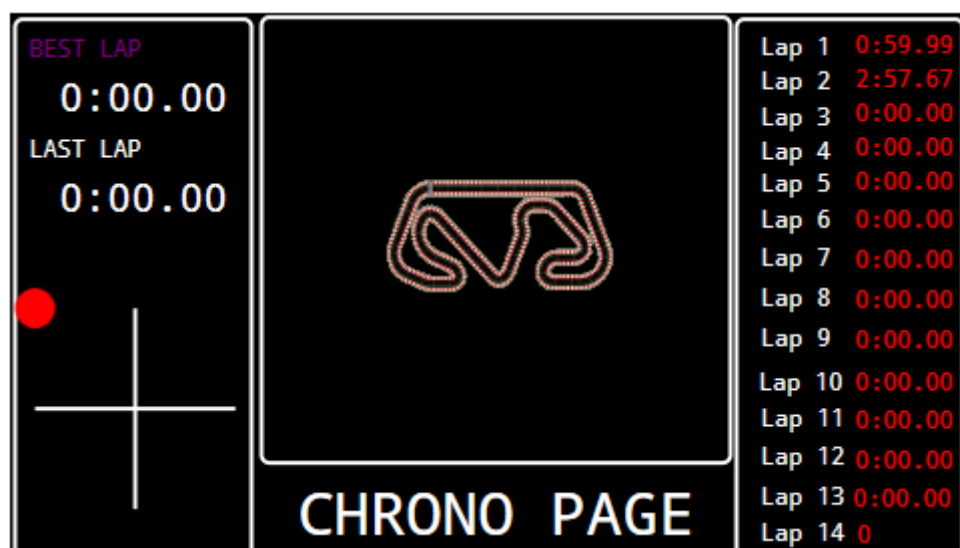


This screen displays the following data:

- RPM
- Water temperature in °C (Water T°)
- Oil temperature in °C (OIL T)
- Oil pressure in bar (OIL P)
- Selected gear
- Battery voltage in volts (VBATT)
- Fuel pressure in bar (FUEL P)

These data change colour according to fixed alert thresholds (see the alert threshold section).

3.2.3 Timing screen



This screen provides a view of data focused primarily on driver coaching. A GPS antenna is required to display the data on this screen.

This screen displays the following data:

- Best lap (BEST LAP)
- Last lap (LAST LAP)
- Times for the previous fourteen laps (Lap 1 to Lap 14)
- The track map and the vehicle's position on the track
- A G-meter showing the vehicle's lateral and longitudinal acceleration in real time

3.3 Diagnostic screens

These screens are designed to support rapid diagnosis of various vehicle systems during maintenance or racing operations.

To access these screens:

- If the dashboard is not equipped with a GPS antenna:
 - Press the "Page +" button.
- If the dashboard is equipped with a GPS antenna:
 - The vehicle speed must be below 20 km/h.
 - Press the "Page +" button.

3.3.1 Diagnostic screen 1

DIAG PAGE					
RPM	6683	Pedal	100.0	Speed	150
OilP	1.09	Throttle	0	Brk FP	0
OilT	102	eWG	0	Brk RP	0
WaterT	105	CollP	0	AirT	0
FuelP	7.27	BoostP	0	Calib	12
ExhaustT	0	GearT	0	CamE	0
Lambda1	0.00	Gear	2	CamA	0
Lambda2	0.00	vBarrel	0.000	vBatt	8.1

This page allows you to check the vehicle's main engine parameters:

- Engine speed in rpm
- Oil pressure in bar (OilP)
- Oil temperature in °C (OilT)
- Water temperature in °C (WaterT)
- Fuel pressure in bar (FuelP)
- Exhaust gas temperature in °C (ExhaustT)
- Lambda 1 value
- Lambda 2 value
- Pedal position value (Pedal)
- Throttle position value (Throttle)
- Turbo wastegate position (eWG)
- Manifold pressure (CollP)
- Boost pressure (BoostP)
- Gearbox temperature (GearT)
- Selected gear (Gear)
- Gearbox potentiometer voltage (VBarrel)
- Speed in km/h (Speed)
- Front brake pressure in bar (Brk FP)
- Rear brake pressure in bar (Brk RP)
- Intake air temperature (AirT)
- Current calibration (engine map)
- Exhaust camshaft phase offset in ° (CamE)
- Intake camshaft phase offset in ° (CamA)

NOTE: depending on the engine ECU configuration, some data may be missing or incomplete because they are not transmitted by the ECU. Refer directly to the ECU manufacturer's documentation to confirm data availability.

3.3.2 Diagnostic screen 2

MIN - MAX DIAG		
RPM Max	MIN	MAX
6683		
WaterT Max	Vbatt	8.1
105		
OilT Max	OilP	1.09
102		
Speed Max	FuelP	7.27
150	AirT	0

This screen shows the minimum and maximum values of the following data since the last reset:

- Engine speed in rpm
- Water temperature in °C (Water T)
- Oil temperature in °C (Oil T)
- Speed in km/h
- Battery voltage in volts (VBatt)
- Oil pressure in bar (OilP)
- Fuel pressure in bar (FuelP)
- Intake temperature in °C (AirT)

NOTE: depending on the engine ECU configuration, some data may be missing or incomplete because they are not transmitted by the ECU. Refer directly to the ECU manufacturer's documentation to confirm data availability.

To reset these values, press and hold the "Page +" button for several seconds. A "MIN MAX RESET" banner appears on the screen to confirm that the minimum and maximum values have been reset.

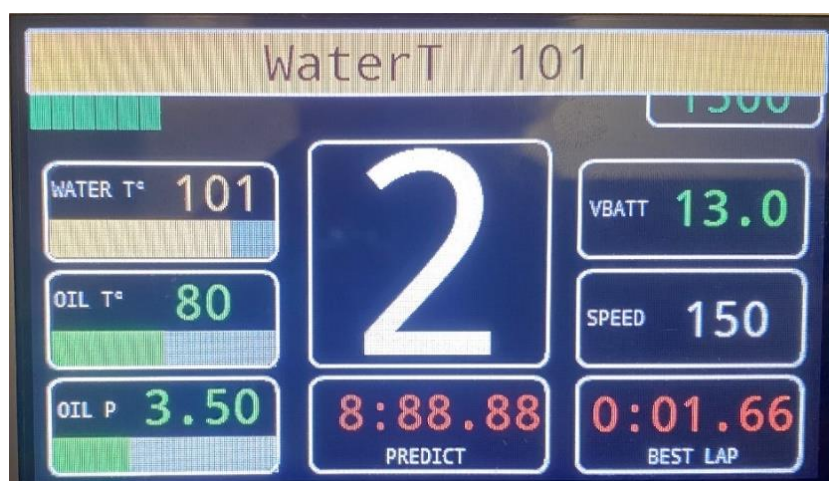
NOTE: the Min/Max reset procedure can be carried out at any time and from any screen page.

4 ALERT MESSAGES

Messages may appear on the NTX while the vehicle is in use, whether during maintenance or racing. The driver cannot acknowledge these messages; they remain displayed for as long as the alert condition is active.

These messages are divided into several categories:

- Messages requiring the team's attention are displayed in the top third of the screen.



- Messages requiring immediate action are displayed full-screen.



4.1 Messages requiring the team's attention

The following messages require attention:

- "OilP + Value": displayed when the oil pressure is between 1 and 1.5 bar or between 7 and 9 bar, and the engine speed is above 800 rpm
- "OilT + Value": displayed when the oil temperature is between 130 and 135°C and the engine speed is above 800 rpm
- "Water T + Value": displayed on the dashboard when the water temperature is above 100°C
- "Fuel P + Value": displayed on the dashboard when the fuel pressure is between 2.3 and 3.5 bar and the engine speed is above 800 rpm
- "VBatt + Value": displayed on the dashboard when the battery voltage is above 15 volts or below 11 volts

4.2 Messages requiring immediate action

- "OilP Alarm + Value" is displayed full-screen on the dashboard when:
 - Oil pressure is below 1.5 bar.
 - Oil pressure is above 9 bar.
 - Engine speed is above 800 rpm.
- "OilT Alarm + Value" is displayed when the oil temperature exceeds 135°C.
- "WaterT Alarm + Value" is displayed full-screen on the dashboard when the water temperature is above 105°C and the engine speed is above 800 rpm.
- "FuelP Alarm + Value" is displayed full-screen when the fuel pressure is below 2.3 bar and the engine speed is above 800 rpm.
- "Vbatt Alarm + Value" is displayed full-screen when the battery voltage falls below 10 volts.

NOTE: the alert thresholds above can be adjusted using the DashEditor PC software (see the related documentation).

5 ADDITIONAL FEATURES

5.1 LEDs and engine speed

To support timely gear changes and maximise engine performance, LEDs built into the display indicate the optimum time to change gear.



The system consists of 10 LEDs. Their colours according to engine speed are described below:

LED number	Activation threshold (rpm)
4	5500
5	5700
6	5900
7	6100
8	6300
9	6500
10	6700
11	6900
12	6950
13	7000

NOTE: the LED activation threshold can be changed using the DashEditor PC software.

5.2 GPS antenna positioning

If the product is equipped with GPS, position the antenna as follows:

Priorité

IMU à l'antenne	X (cm)	-100	Y (cm)	0	Z (cm)	100
IMU au VRP	X (cm)	-200	Y (cm)	0	Z (cm)	-50

The diagrams show the following dimensions:

- Side View:**
 - IMU-TO-ANTENNA LEVER-ARM: $X = -1.50 [m]$, $Z = 1.04 [m]$
 - IMU-TO-VRP LEVER-ARM: $X = -2.20 [m]$, $Z = -0.75 [m]$
- Top View:**
 - IMU-TO-ANTENNA LEVER-ARM: $X = -1.50 [m]$, $Y = -0.80 [m]$
 - IMU-TO-VRP LEVER-ARM: $X = -2.20 [m]$, $Y = -0.60 [m]$

As a general rule, this position is the point vertically aligned between the right-hand edge of the driver's seat and the roof.

The GPS antenna position setting cannot be changed.

5.3 Data logging

If the product has a data-logging licence, the following channels are logged:

Channel name	Frequency
OilP	20Hz
OilT	5Hz
WaterT	5Hz
FuelP	20Hz
Exhaust T	5Hz
Lambda 1	5Hz
Lambda 2	5Hz
Pedal	20 Hz
Throttle	20 Hz
eWG	20Hz
ColP	20Hz
BoostP	20Hz
GearT	5Hz
Gear	5Hz
VBarrel	10Hz
Speed	10Hz
BrakeF_P	20Hz
BrakeR_P	20Hz
AirT	5Hz
Calib	1Hz
CamE	20 Hz
CamA	20Hz
Vbatt	5Hz
RPM	20Hz

To retrieve this information, connect the display unit to the PC via USB and use the export module in DashEditor (see the DashEditor user manual for CoreView).

The logging frequency of these data cannot be changed.

6 INTERNAL DASHBOARD DIAGNOSTIC SCREENS

The internal dashboard diagnostic screens allow teams to use data that are not visible on the preceding screens.

To enter internal diagnostic mode, press and hold the "Page +" button for several seconds. You can then navigate between pages in the same way as in normal mode.

To exit this mode, press and hold the "Page +" button for several seconds.

6.1 Lap Time screen

This screen shows:

- Times for the previous 20 laps
- Total number of laps completed on the track
- Last lap time
- Best lap time
- Current lap time
- Predictive time delta between the best lap and the current lap

LAPTIME INFO		
LapNum	0	LAP 1 0:00.00
Last	8:88.88	LAP 2 0:00.00
Best	0:00.00	LAP 3 0:00.00
Curr	0:00.00	LAP 4 0:00.00
Predict	+8:88.88	LAP 5 0:00.00
		LAP 6 0:00.00
		LAP 7 0:00.00
		LAP 8 0:00.00
		LAP 9 0:00.00
		LAP 10 0:00.00
		LAP 11 0:00.00
		LAP 12 0:00.00
		LAP 13 0:00.00
		LAP 14 0:00.00
		LAP 15 0:00.00
		LAP 16 0:00.00
		LAP 17 0:00.00
		LAP 18 0:00.00
		LAP 19 0:00.00
		LAP 20 0:00.00

DOUBLE PRESS TO RESET LAPTIMES

To reset the lap times, press the "Page +" button on the steering wheel twice. A confirmation message then appears. Press and hold the "Page +" button to confirm deletion.

6.2 Dash Info screen

This screen provides general information about the dashboard, including:

- Electronic board type
- Microcontroller serial number
- Product software version
- Name of the configuration currently loaded

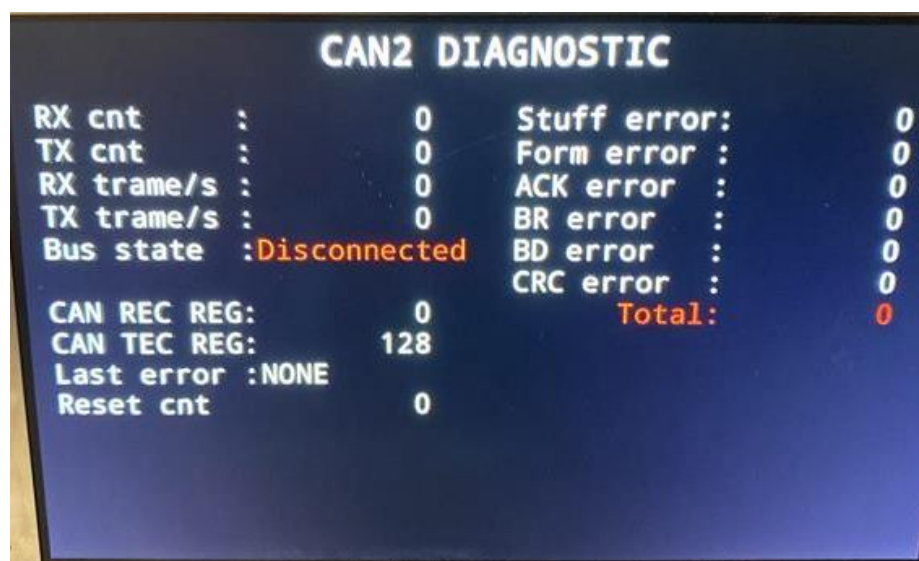


6.3 CAN diagnostic screen

This screen is used to diagnose the various CAN errors present on the bus.

As the display unit has two CAN buses (one for the ECU and one for marshalling), two separate screens are provided.





The data on these two screens are as follows:

- RX cnt: number of frames received on CAN1.
- RX frames/s: number of frames received on CAN1 per second.
- TX frames/s: number of frames transmitted on CAN1 per second.
- Bus state: "Disconnected" or "Connected".
- TX cnt: number of frames transmitted on CAN1.
- CAN REC REG: receive error counter value.
- CAN TEC REG: transmit error counter value.
- Last error: code indicating the condition of the last error detected on CAN1.
- Reset cnt: number of CAN1 disconnections since the Dash NT was powered on.
- Stuff error: stuff error counter.
- Form error: form error counter.
- ACK error: acknowledgement error counter.
- BR error: Bit Recessive error counter.
- BD error: Bit Dominant error counter.
- CRC error: CRC error counter.
- Total: sum of the preceding six counters

Note: the final six counters and their sum are reset when the CAN1 bus state changes from "Disconnected" to "Connected".



- 4: combined GPS and dead reckoning.
- Lat, Lon: latitude and longitude.
- Height: height above the ellipsoid.
- hMSL: height above mean sea level.
- gSpeed: ground speed (2D).
- HeadMot: heading of motion (2D).
- HeadVeh: vehicle heading (2D).
- xGyro, yGyro, zGyro: gyroscope angular rates on the x, y and z axes.
- ANT: x-, y- and z-axis distances between the GPS antenna and the Dash NT.
- Speed: speed (3D).
- VRP: x-, y- and z-axis distances between the vehicle reference point (VRP) and the Dash NT.
- Fix status indicators:
 - F_vDate: 1 = valid UTC date
 - F_vTime: 1 = valid UTC time of day.
 - F_fReso: 1 = UTC time of day has been fully resolved.
 - F_GFixOK: 1 = fix within limits.
 - F_DifSol: 1 = DGPS used.
 - F_WKNSet: 1 = valid GPS week number.
 - F_TOWSet: 1 = valid GPS time of week.
 - F_vHeadV: vehicle heading is valid.
 - F_esf_st: inertial measurement unit validity
 - F_esf_er: inertial measurement unit validity error
 - F_vGyroX: validity of compensated gyroscope data on the x-axis (0: invalid, 1: valid)
 - F_vGyroY: validity of compensated gyroscope data on the y-axis (0: invalid, 1: valid)
 - F_vGyroZ: validity of compensated gyroscope data on the z-axis (0: invalid, 1: valid)
 - F_vAcclX: validity of compensated acceleration data on the x-axis (0: invalid, 1: valid)
 - F_vAcclY: validity of compensated acceleration data on the y-axis (0: invalid, 1: valid)
 - F_vAcclZ: validity of compensated acceleration data on the z-axis (0: invalid, 1: valid)

6.5 Internal diagnostic screen

This screen displays specific product information, including the date of the most recent service performed by XAP.



7 APPENDIX AND FREQUENTLY ASKED QUESTIONS

7.1 How do I change the page shown on the display?

To change the displayed page, simply press the "Page +" button once.

7.2 How do I check that the GPS and timing functions are working correctly?

The timing system, track map, GPS position and speed shown on the dashboard all use data from the GPS receiver.

To check that the GPS is operating correctly, open the internal diagnostic pages and locate the "GPS DIAGNOSTIC" page (see the diagnostic screen section).

Check that the "ns" value on this page increments continuously; allow up to five minutes after the display unit starts. If it does, the GPS is operating correctly.

To check that the GPS is receiving a signal correctly, confirm that the current date shown on the left-hand side of the screen is correct.

Important: in some cases, the vehicle may need to be moved completely out of the garage to receive a signal.

If the date is correct after a few minutes, check that the "Lat" and "Lon" fields match the vehicle's current latitude and longitude.

If the date is invalid, the connection between the display unit and the antenna is faulty. The cause may be the antenna itself or the antenna connection to the dashboard. During installation, tighten the antenna by hand only.

Otherwise, GPS reception is satisfactory. If timing problems persist, check the antenna position.

Position the receiver on the roll cage, vertically aligned with the right-hand side of the driver's seat.

If everything appears correct but problems persist, there are two remaining possibilities:

- The GPS antenna cable is damaged at some point (cable-tie pressure, vibration, etc.).
- The GPS must be reset. Switch off the ignition for at least eight seconds, then switch it back on while holding down the steering-wheel button. After one to two minutes, a "GPS reset" banner should appear on the screen.

7.3 How do I check that my device is connected to the CAN bus?

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Open the internal diagnostic pages and locate the "CAN 1" page.

Check that the "total" field on the right-hand side of the screen does not increase by more than 10 in one second.

Also check that the "bus state" field remains in the "connected" state.

7.4 How do I reset the Min/Max values?

To reset these values, press and hold the "Dash" button on the steering wheel for several seconds. A "MIN MAX RESET" banner appears on the screen to confirm that the minimum and maximum values have been reset.

NOTE: the Min/Max reset procedure can be carried out at any time and from any screen page.

7.5 How do I reset the lap times?

To reset the lap times:

1. Open the display unit's internal diagnostic pages by pressing the Dash button for several seconds.
2. Open the "Laptime Info" page (see Section 5 for further information).
3. Press the Dash button on the steering wheel twice. A confirmation message then appears.
4. Press and hold the Dash button on the steering wheel to confirm deletion.