Chrome

LITE-PLUS-PRO
User manual

I2M
Electronics Engineering

Version 2.2

Table of Contents

Definitions & Abbreviations

Definition	Abbreviation
Thin-Film Transistor	TFT
Gigahertz	GHz
Light-Emitting Diode	LED
Red, Green & Blue	RGB
Revolutions Per Minute	RPM
Global Positioning System	GPS
Hertz	Hz
Controller Area Network Bus	CANBUS
Gigabyte	GB
Circuit Pit Area	BOX
Racing Circuit	RACE
Universal Serial Bus	USB
Random Access Memory	RAM
Computer Numerical Control	CNC
Danas Dynamic Setting	DDS
A term for IEEE 802.11x.	Wi-Fi
Portable Document Format	PDF
Tire Pressure Monitoring System	TPMS
Oxygen	O2
Positive & Negative Terminals	+/-
Original Equipment Manufacturer	OEM
32 bit File Allocation Table	FAT32
Extended File Allocation Table	exFAT
Kilo Ohm	kOhm
Plug and Play	P&P
Tire Pressure Sensor	TPS
Traction Control	TC
Compressed File Format	ZIP
Press the bottom right button	DN
Press and hold the bottom right button for 2sec	LDN
Press the top right button	UP
Press and hold the top right button for 2sec	LUP

Introduction

The Chrome *"Lite/Plus/Pro"* dash is true innovation and excellence in the field of aftermarket dashboards for motorcycles. Combining a true color TFT display and an onboard processor, this system guarantees total flexibility to the engineer and end user. As a result, the Chrome has been designed with a main screen that is most suitable for its users, providing the correct spacing for each indicator. The use of a color screen also makes it possible to immediately make visible some errors such as battery errors, fuel and oil levels including the reserves. At the same time this technology allowed for intuitive menus with a large amount of information. The TFT display chosen by I2M srl for the Chrome range of dashes was specifically to provide improved visibility in direct light, treated with an anti-reflective coating it eliminates unpleasant side effects of the sun. The Chrome *"Plus/Pro"* now also allow the user to select special screens and functions such as an analogue tachometer.

In order to create the perfect combination of both display and alarm configuration, the Chrome has a total of 12 configurable LED's *(4 configurable in RGB for the Plus/Pro Units)* in order to choose the alarm configuration that is most preferred, both linked to the RPM *(the classic upper LED bar)* or for example a low tire temperature alarm were the black aluminum casing and a seven-segment gear indicator with self-controlled brightness could complete the aesthetic side of this new dashboard.

The Chrome incorporates lap timing and data acquisition with easy to navigate menus with choosing 20 pre-determined race *circuits (which can be modified with a simple import/export function)*. For each racing circuit the unit can store up to 500 laps, each divided into 4 different sectors. The system can calculate and show the user a data summary for each circuit such as; the circuit map, best lap time, the number of laps completed and the ideal lap keeping the history for the previous sessions and those of the current day to be able to view the progress of the current day quickly and efficiently. The unit in addition allows you to view the circuit map directly on the display hence enabling the user to change the finish line position and split times simply by moving the cursor along the circuit map.

The Chrome support GPS position and speed via an external 10Hz sensor, in addition it supports RPM reading, front and/or rear wheel speed and has 8 analogue channels *(10 on Plus/12 on Pro Unit's)* including motorcycles equipped with CANBUS. The unit's data acquisition allows the user to record up to 1GB of data with sampling up to 100Hz per channel. A practical menu allows you to select the desired sessions, sorted by race circuit and date. The user can delete or transfer them to a USB stick for PC analysis using the Danas software, thus drastically reducing download times.

The system has two distinct configurations, BOX and RACE. Each configuration can be adjusted by the user whether to display the tachometer, speed, temperature, both analog and digital channels, lap timing and best-lap and ideal-lap time etc. Among the different options available it is also possible to display nothing in a part/section of the display to reduce distractions whilst racing. If the system is in BOX mode, it will automatically switch to RACE mode as soon as a set target is crossed and then return to BOX configuration at the end of the session, this is done automatically. This configuration can be modified in the option menu of the visualization menu.

WARNING: in the years following the development, the manufacturers may have made electronic modifications that could compromise the correct functioning of some functions. Always check the correct operation of all functions before using the motorcycle.

Main Features

- 800 x 480 TFT color display
- 1GHz processor with 1GB of RAM & 16GB internal memory
- Billet CNC aluminum housing
- Configurable display layout with two individual modes i.e. BOX / RACE
- Trajectory detection and GPS peed at 10Hz with 66 channels in parallel
- Stopwatch function with 20x preset racing circuits at 500x laps per circuit memory
- Automatic circuit recognition, with a total of 4x sectors
- Best-lap & ideal-lap calculation, historical data analysis including current day session data
- Simple and intuitive user interface
- 20x configurable high brightness alarms (only 12x on Lite)
- 12x analogue "10 bit" inputs (only 8x on the Chrome Lite and 10x on the Plus, on motorcycles equipped with CANBUS)
- 2x independent speed Inputs
- 1x tachometer (RPM) Input
- Separate and dedicated alarms for water temperature, fuel and oil level inputs
- Automatic gear indicator (for motorcycles without CANBUS)
- Download Chrome data with a USB flash drive
- Possibility to connect a button pod/switchgear to remotely operate the Chrome menu
- DDS function (on Plus and Pro)
- Integrated lambda sensor controller (on Plus and Pro)
- Download management via Wi-Fi (on Plus and Pro)
- Video input (on Plus and Pro)
- Storage on internal 1GB memory
- 3 different path space counters, 2 operating hours and total revolutions
- Compact dimensions "172mm x 106mm x 19mm"
- Water resistant (never remove the rear rubber protection to obtain the water resistant feature. Never use high pressure water jet directly oriented on the dash).
- Absorption: about 350mA (about 100mA in stand-by). The lambda sensor can add up to 2A.

Below is a comparison of the Chrome models and their features:

*	Chrome "Lite"	Chrome "Plus"	Chrome "Pro"
Signal Inputs at 100Hz	8	10	12
Red/Green/Blue LED Alarms	✗	✓	✓
Video Input & Recording	✗	✓	✓
Danas Dynamic Setting (DDS)	✗	✓	✓
"Carbon" & "Analogue" look and feel	✗	✓	✓
WIFI Connectivity Support	✗	✓	✓
GoPro Camera Controls	✗	✓	✓
Lambda Controller	✗	✓	✓
Tyre Pressure Monitor Sensor (TPMS) Receiver	✗	✗	✓
Chromelaps Connection	✗	✗	✓
Configurable CAN-BUS	✗	✗	✓
Heart Rate Monitor Support	✗	✗	✓
Full Carbon Housing Fitment	✗	✗	✓

Before Installation

Read the manual carefully prior starting any installation activities of the Chrome unit.

Always install the Chrome unit in line with the installation requirements provided in this user manual.

> **CAUTION:**
> The Chrome unit is engineered and designed for race circuit use only, the unit is **not approved for street use**. Certain motorcycles display their headlight and turn signal indicators on their OEM dashboard, these functions will not be available, nor will it be accessible on the Chrome unit.

The Chrome unit is designed to use state of the art GPS technology to ensure lap timing and data acquisition is accurate, therefore the GPS sensor must always have a good signal. It is recommended to turn the ignition on at least 2-3 minutes prior to enable the Chrome unit to synchronize with the GPS satellites. If the circuit is one of those in the Chrome circuit library, it will automatically adjust and recognize the circuit therefore there will be no need to set this manually.

What's Inside The Box

Once you unbox your Chrome you will find the following as a standard;
- Chrome Dashboard
- 10 Hz GPS receiver
- Standard wiring harness with GPS input connector, female USB output and sensor wiring connector
- Electrical cable boot with clamp
- Wiring for lambda connection (with Plus and Pro only)
- Lambda O2 Sensor with connector (with Plus and Pro only)
- 2x TPMS sensors (with Pro only)

It is advisable to connect all signal cables (if there is no plug & play wiring harness for your motorcycle make and model) by soldering and insulating connections.

Installation

Chrome "Lite/Plus/Pro"

The Chrome unit is supplied with a generic wiring harness allowing the user to connect to the supplied GPS sensor, the motorcycle's 12V battery and any main sensors the user may want to analyze.

Start with removing the OEM dash (unplug the OEM dash connector) and any fairings, covers, fuel tank (if required) to provide enough space to route the Chrome wiring harness properly avoiding contact with the engine case, exhaust or any areas where the harness might be damaged during operation.

Connect the supplied wiring harness to the motorcycle's battery +/- terminals, do not remove the supplied protection fuse at any time during the installation, nor shorten or modify any of the supplied wiring harness.

Once the battery is connected and the supplied wiring harness has been routed (cable tied), connect the Chrome unit. Ensure that the female USB connector is stored in a dry place. Ensure once the installation is complete that all the cables pass through the rubber boot to the rear connectors of the Chrome unit, secure the boot with the supplied strap and tape the wiring to the boot limiting water and moisture ingress.

Now connect the GPS sensor to the wiring loom supplied. Route the GPS sensor to the rear of the motorcycle (the subframe). Depending on the motorcycle make and model there might be a need to drill a small hole in the top part of the tail fairing to properly route and mount the GPS sensor. Secure the GPS sensor to the top most rear part (this is to allow for better/uninterrupted GPS signal) of the tail fairing with 3M extra strong double-sided tape or equivalent (avoid any metal parts near the GPS sensor).

Note: USB flash drives must have only one partition, be formatted in either FAT32 or exFAT else the Chrome unit will be unable to connect with the flash drive. For more information on deleting/creating partitions and formatting drives please visit:
https://www.qualityology.com/tech/properly-delete-a-partition-on-usb-drive-using-diskpart/
https://www.techwalla.com/articles/how-to-format-a-flash-drive-to-fat32

Motorcycle Specific Wiring Harness, CNC Adaptor Plate (P&P Kits)

Depending on the purchase, the Chrome supplied may have included accessories like a CNC adaptor plate/dash mounting bracket and OEM to I2M P&P wiring harness. Please download the plug&play kit manual from our download webpage.

If the P&P CNC adaptor plate is included in the purchase, install the adaptor plate utilizing the OEM dash mounts on the front fairing stay. The adaptors orientation needs to be verified to insure the dash is able to mount correctly (upright). Once the adaptor plate is connected and fastened, mount the Chrome unit to the adaptor plate using the supplied fasteners, grommets, washers etc.

CAUTION:
The Chrome unit must not be fixed to elements subject to vibration such as fairings and frames. The Chrome unit is equipped with anti-vibration rubber dampers therefore it is advisable to use existing OEM anchoring dash mounts to reduce vibration to the absolute minimum. Do not remove the rubber dampers and ensure the Chrome unit is not in contact with any part of the motorcycle other than the rubber dampers at any given time. If the Chrome unit is incorrectly mounted to the motorcycle and subject to vibration it can damage the unit thus leading to malfunctions etc.

If the P&P OEM to I2M wiring harness is included in the purchase, the generic installation method would be to connect the one end to the supplied I2M wiring harness and the other to the original OEM dash connector and if necessary, to the CANBUS connector **(the 2-pole connector supplied to the 20-way connector on the rear of the Chrome unit).**

> **CAUTION:**
> For motorcycles equipped with a BUS, failure to connect this 20-Pin connector will impact the functionality of the Chrome unit as some channels might be lost (not read).

Sensor Connector Wiring Harness (P&P Kit)

Depending on the purchase, the Chrome supplied may have included accessories like a sensor connector wiring harness and some associated sensors i.e. potentiometers, inductive speed sensor, brake pressure sensor, infrared temperature sensor etc.

If the P&P sensor connector wiring harness is included in the purchase, the installation method would be to connect the harness to the Chrome unit (20-Pin BUS connection) however, it is possible to connect the sensors manually using the pinout provided in this manual. Any additional sensors need to be installed individually and always ensure that all wiring is correctly routed.

Note: Potentiometers are not supplied with fork/frame/mounting brackets, the same applies to speed and temperature sensors.

Once the various sensors (channels) are connect to the Chrome, turn on the ignition and access the Chrome "Configure Inputs" menu. Once accessed the channels can be viewed in "real time" with the first screen showing 8x analogue inputs, speed and RPM. Holding the "DN" button for a while will switch the screen showing the battery, water, oil, fuel and additional channels EXT1, EXT2 (with Plus only), EXT3 and EXT4 (with Pro only). The water temperature sensor value may need individual configuration.

Should the installation be done using the generic supplied wiring, keep in mind that signals form the OEM sensors may need a pull-up resistor to 12V or a pull-down in order for the Chrome unit to read the channel correctly. Neutral and Oil is most common for requiring a pull-up resistor (2kOhm in most cases should be enough).

Chrome Inputs

The rear of the Chrome unit is equipped with 2x Multilock connectors, one with 16 and the other with 20 pins. In addition to this there is two screwed connectors, one for video input (with Plus and Pro only) and the other for the TPMS antenna (with Pro only).

The Chrome unit is equipped with a dual power supply, one directly from the motorcycle's battery and another from the OEM wiring loom. The unit does not draw current when turned off from either one of the two power supplies. The direct power supply's main function is to ensure the unit always closed files correctly during the shutdown phase. To avoid any startup delays at the racing circuit the unit can operate in a suspended mode (sleep mode), this can be activated in the options menu. If this function is active, the unit can still be shut down by holding the "DN" button until the LED is lit above the gear indicator (then relase the down botton and wait for the completely shut down).

The Chrome unit is designed to be versatile and can function without connecting all inputs i.e. GPS sensor etc. The unit comes equipped with the following inputs;

- 8x analog Inputs
- 2x EXT inputs (with Plus, and 4x on Pro)
- 2x speed inputs
- 1x RPM input
- 1x water temperature input (with onscreen fault indicator)
- 1x oil level input (with onscreen fault indicator)
- 1x fuel level input (with onscreen fault indicator)
- 1x battery input (with dedicated fault indicator, lit below 12.5V)
- 10x channels multiplexed at 1/10 of the sampling frequency
- 5V output for additional analog sensors
- 12V output for additional digital sensors
- GPS channel
- Video input (with Plus & Pro only)
- TPMS input (with Pro only)

> **CAUTION:**
> The 5V and 12V outputs can only be used to power any additional sensors that is not directly powered by the motorcycle. Do not connect the 5V or 12V outputs to any power supplies or sensors directly powered by the motorcycle. This could create a short-circuit or short to the ground, thus damaging the outputs beyond repair.

8x Analog Inputs - (0-5V to 10 bit) are mainly used to monitor throttle position, brake pressure, potentiometers and temperature sensors etc.

2x EXT Inputs – These channels are connected directly to the Analog 1 and Analog 2 inputs. Motorcycles with CANBUS (see table), channel 1 and 8 are utilized for the TPS and TC directly from CANBUS. With EXT1 and EXT2 it is therefore possible to connect these inputs if external to the motorcycle. If the motorcycle does not support CANBUS, these channels will simply mirror Analog 1 and Analog 8 inputs.

> **CAUTION:**
> When the OEM dash is removed, some pull-up resistors may be removed too. These resistors play an integral part to reding sensors correctly i.e. oil or fuel levels. If a OEM to I2M P&P harness is not used, check the signals as there might be a need to add some pull-up resistors.

2x Speed Inputs – These inputs can be connected to the OEM and inductive speed sensors for both the front and rear wheel. The number of pulses vary from motorcycle to motorcycle and therefore has to be configured in the Chrome unit's menu. (this input is not used on can bus bike).

1x RPM Input – This is a dedicated input for the motorcycles engine RPM and obtainable by accessing the signal sent by the junction box to the OEM dashboard. The number of pulses vary from motorcycle

to motorcycle and therefore has to be configured in the Chrome unit's menu. The unit is able to receive signals up to 20V only. (this input is not used on can bus bike).

1 x Water Temperature Input – (0-5V) input is used for water temperature. The unit has been preconfigured for some sensors and 12V is the maximum voltage for this input.(this input is not used on can bus bike).

1x Oil Level Input – (0-5V) input is used as an alarm if the oil level is too low. The alarm level must be configured in the alarm's management menu and 12V is the maximum voltage for this input.

1x Fuel Level Input – (0-5V) input is used as an alarm if the fuel level is too low. The alarm level must be configured in the alarm's management menu and 12V is the maximum voltage for this input.

16-Pin Connector

1	12V Battery Power Supply
2	Fuel
3	12V Ignition Voltage
4	Oil
5	Battery Ground
6	Water Temperature
7	Battery Analog Ground
8	Neutral
9	Button "UP"
10	USB Data-
11	Button "DOWN"
12	USB Data+
13	RPM (green)
14	USB Vcc (+5V)
15	Speed 1
16	GPS Data

20-Pin Connector

1	Speed 2
2	Analogue Battery Ground
3	12V Output
4	Analog 1
5	Lambda
6	Analog 2
7	Lambda
8	Analog 3
9	CAN-low
10	Analog 4
11	CAN-high
12	Analog 5
13	Lambda
14	Analog 6
15	Lambda
16	Analog 7
17	Lambda
18	Analog 8
19	Lambda
20	5V Output

Video Input Connector

For video input there is a 4-Pin screwed female connector (with Plus & Pro only) located at the rear of the Chrome unit. The connection is USB therefore enabling the Chrome to connect to a Logitech C270 webcam directly and recording video at 1280 x 720 resolution.

4-Pin Binder 768 Connector
(Part# 99-3383-00-04)

1	USB Vcc (+5V) (red)
2	USB Data- (white)
3	USB Ground (black)
4	USB Data+ (light green)

CAUTION:
Not all webcams are compatible with the Chrome unit, we strongly advise using the Logitech C270 for video input and recording purposes.

Basic Configuration

"UP" and "DN" Buttons

First turn on the ignition and allow the Chrome unit to boot, the unit has two buttons "UP" and "DN", located on the right side of the unit. These buttons can also be operated remotely from a button pod/switchgear on the handlebar of the motorcycle if connected to the supplied wiring loom connector (3 way JWPF white connector with ground in the middle). The "UP" button allow navigation to upper entries, the "DN" button to lower entries. If the "UP" button is pressed in the startup screen the "View Lap Times" menu will appear and if the "DN" button is pressed the main menu will appear.

To enter a specific menu item (one level down), hold the "DN" button (referred to as "LDN") for a while to enter the menu item or to modify a parameter. To exit the specific menu (one level up), hold the "UP" (referred to as "LUP") button for a while to exit the menu item or the modified parameter. To change the button configuration, navigate from the main menu to "Options"/ "Display".

Editing Alphanumerical Values

As shown above, the Chrome unit makes provision to edit parameter, values and names for inputs or race circuits. Changes can be made to each individual character using the "UP" and "DN" buttons, use "LDN" to change from one character to another and the "LUP" to exit the selected item.

Startup Screen

When the Chrome unit is powered up, it will depict a similar main screen as shown above. The top left part of the screen will indicate GPS connectivity. Once the GPS is connected a connection bar will appear showing GPS signal strength, if this bar fails to appear check the connection and ensure the sensor is connected to the unit (he GPS icon will appear red in color if the GPS is connected and awaiting signal positioning).

When the unit is recording data/video a small icon "REC" will appear directly under the GPS icon. Similarly, if the WiFi is connected and the heart rate monitor a small icon will appear below the "REC" for "WiFi" and a red heart below that (WiFi with Plus and Pro, heartrate with Pro only).The main screen layout is completely configurable, please refer to "Display Configuration".

OEM to I2M P&P Wiring Harness

Connecting the P&P wiring harness is the best and easiest way to connect the Chrome unit to the motorcycle. Simply connect the P&P wiring harness between the 12-Pin connector and the OEM dashboard connector then load the appropriate motorcycle make and model and you are done. Please refer to our Plug&ply kit mnual in the download webpage.

Some motorcycles may have additional connections depending on make and model, cases like these are listed below;
- **Yamaha (R1<2015 / R6<2017)**– the P&P wiring harness includes a male/female connector to be connected in series with the OEM speed and water temperature (blue cable) sensors. Both have two cables, one of which is connected to the motorcycles ground (black wire). It is advisable to use a multimeter (or similar apparatus) to verify which OEM cable is in fact ground prior to termination.
- **Suzuki <2017 & Kawasaki 400** – the P&P wiring harness includes a a blue cable to be connected to the water temperature sensor. It is advisable to use a multimeter (or similar apparatus) to verify which OEM cable is in fact ground prior to termination.
- **Motorcycles with CANBUS** – the P&P wiring harness may include a CANBUS connection, the CAN connector (2-pole AMP) must be connected to the corresponding CANBUS connector on the Chrome unit (20-Pin connector).

Loading Motorcycle Specific Settings

Once the installation is complete, navigate from the main menu to "Options"/ "Kind of Bike" and select the appropriate make and model motorcycle from the list. If the motorcycle, make and model is not present proceed to select only the related make i.e. "Yamaha" as most of the parameters is preconfigured, if the case and a BUS connection is present leave the pinion and crown teeth at 1-1.

Acquired Channels

Depending on the motorcycle make and model the Chrome unit might be preconfigured to load preset channels. Please refer to the channel list for more information.

Unit Configuration

Once the installation of the Chrome unit is complete and all connections have been terminated the user can personalize the unit by configuring the settings i.e. BOX, RACE, inputs, alarms etc. For configuration refer to input configuration and as a first step rename/update each channel with the desired name, minimum and maximum values and selecting manual or automatic modes.

All LED's are configurable via the "Alarms" menu, the user can configure each LED (including fuel, oil, water and battery). To configure the RPM LED's simply select "RPM Mode" and the unit will automatically configure the 7x white LED's to illuminate through the selected RPM range. It is recommended to;
- Configure the RPM range for the LED alarm
- Navigate to the "Alarms" menu and deactivate, then reactivate the RPM mode (this configuration requires the unit to be restarted)
- Return to the display menu once complete and select the RPM range i.e. for a V-Twin with lower revolutions it is best to set the maximum to 12,000RPM (the same as the OEM dashboard).

The RPM limiter function can be accessed via the "Overrun Flashing" menu, by activating this function the LED's will start flashing once the last RPM alarm limit is exceeded.

Gear Indicator

To configure the gear indicator on your Chrome unit (motorcycles not equipped with a BUS and/or no BUS signal for gear selection) follow this simple procedure;

- Ensure the speed and RPM inputs have been configured
- Go to the "Data Acquisition" menu, change the following parameters; Recording: ACTIVE, Sampling Frequency: 100Hz, Lower Speed: 20km/h, Autostart Channel: SPD1
- Remove all the files from the download page of the data acquisition menù
- Now start the motorbike, change gears from N,1,2,3,4,5,6 maintaining 20sec intervals (ensure that the REC icon is active on the startup screen)
- Upon completion, kill the ignition and select the "Inputs & Special Functions/Configure Inputs/Configure gears (no CAN)"
- Once done you can configure the gear acquisition again if required

The Chrome unit calculates gear indication referring to sessions of the day. Ensure that all the gears are properly engaged and that the data calculation is done on the same day and location.

Adding a New Circuit

There are two options available for adding new circuits to the Chrome unit;
1) Update the Danas circuit library
2) Modify existing circuit on the Chrome unit

Update the Danas circuit library
To update the current Danas circuit library, open Danas on your personal computer and navigate to "Online/Configure Chrome Circuits". The list will have all the circuits available, add new circuits with the "+" icon (always ensure that the complete list has a minimum & maximum of 20x circuits).

Once all circuits have been selected move the "*CircuitInOut.ccr*" file to a USB flash drive (FAT32/exFAT formatting with 1 partition only). Now connect the USB flash drive to the Chrome unit and import the circuits via the "Chronometer/Export & Import/Import Cicuits from USB" menu.

> **CAUTION:**
> The circuits must be exactly 20x in total, do not import less than or greater than 20x circuits as this will cause the unit to malfunction.

Modify existing circuit on the Chrome unit
- In the Chrome units menu select "Chronometer/Select Circuit" to open the circuit list, proceed to select the required circuit or select a circuit that is FREE/can be replaced.
- Proceed to navigate to "Chronometer/Circuit Details/Update Name" to change the circuit name and to manually select the finish line position, change "Update Finish Line Position" to "UPDATE", ensure the units position is on the finish line prior to confirmation. Alternatively, select the "AUTO" function for automatic configuration.
- When the "AUTO" function is selected, the system will automatically set the finish line position when the motorcycle exceeds a 150km/h thus starting the lap timer at that point. The AUTO function is reset when you turn off the dash.
- Once the session is finished, the user can move the finish line and/or split positions on the "MAP" in the "Update Finish Line Position" selection.

Exit Standby Mode and Shutdown
If the standby time has been configured the Chrome unit will turn off the display and some peripherals (not the GPS) in order to reduce power consumption. The unit will automatically shut down after the set standby time has lapsed. If the user would like to turn off the unit prior, follow the below instructions;
- Turn off the Chrome unit
- Wait until the LED in the bottom right corner flashes
- Press the DN button until the red LED above the gear indicator illuminates
- Release the DN button
- After 2-3 seconds the upper white LED will flash, this indicates that the Chrome has successfully shut down

Software & Firmware Updates

Prior to updating any software and/or firmware on the Chrome unit, verify if it is required;
Go to the menu "Options" and verify if the currently installed version is older than the latest version available on the I2M website.

Software Update "Quick Links"
- Chrome "Lite/Plus" - http://www.i2m.it/download/softwarePlusLite.zip
- Chrome "Pro" - http://www.i2m.it/download/softwarePro.zip

Firmware Update "Quick Links"
- Chrome "Lite/Plus" - http://www.i2m.it/download/firmwarePlusLite.zip
- Chrome "Pro" - http://www.i2m.it/download/firmwarePro.zip

If an update is necessary, please proceed as follow;
- Connect a USB flash drive to a personal computer (FAT32/exFAT formatting with 1x partition only)
- Download the required firmware and/or software version from the I2M download portal
- Extract the ZIP files to the USB flash drive (do not extract both the firmware and software files at the same time to the USB flash drive, this will need to be done individually i.e. first copy the firmware file [*.hex], then delete this file from the USB flash drive and copy the extracted software files to the USB flash drive without folders, only files)
- Connect the USB flash drive to the Chrome unit
- Proceed to the "Options" menu and select "Update Software/Firmware from USB"
- Once selected the update will commence (Firmware updates take 3-5min to complete where software updates are instant)

> **CAUTION:**
> Do not turn off the motorcycle's ignition (remove power from the unit) at any point in time whilst the update is in progress, this could cause the unit to malfunction.

- **Set the "Standby Time After Shut Down" to 0 hours** (if otherwise set) in the "Options" menu
- Shut down the Chrome unit completely
- Restart the unit, then navigate to the "Options" menu to verify if the update was successful (the firmware and software versions should reflect the update versions)

Chrome Menu

Startup Screen

In the startup screen, press the DN button to open the Chrome unit's main menu. This menu includes the main system functions i.e. Chronometer, Display View, Data Acquisition, Video & WiFi, Counters, Inputs & Special Functions, Alarms and Options. To select a menu item press LDN or to return to the startup screen press LUP. Some menù name could have be modified in recent software updates.

Note: *This user manual has been developed for the Chome "Lite/Plus/Pro" hence some functions described below might not be available depending on the purchase made.*


The main menu consists of the following;
- Chronometer →
- Display View →
- Data Acquisition, Video & WiFi →
- Counters →
- Inputs & Special Functions →
- Alarms →
- Options →

Each of the above items have their individual sub-menu (sub-directory) tree, these have been mapped individually for quick reference below to avoid the user having to browse through directories on the Chrome unit thus familiarizing themselves with the Chrome interface.

Chronometer
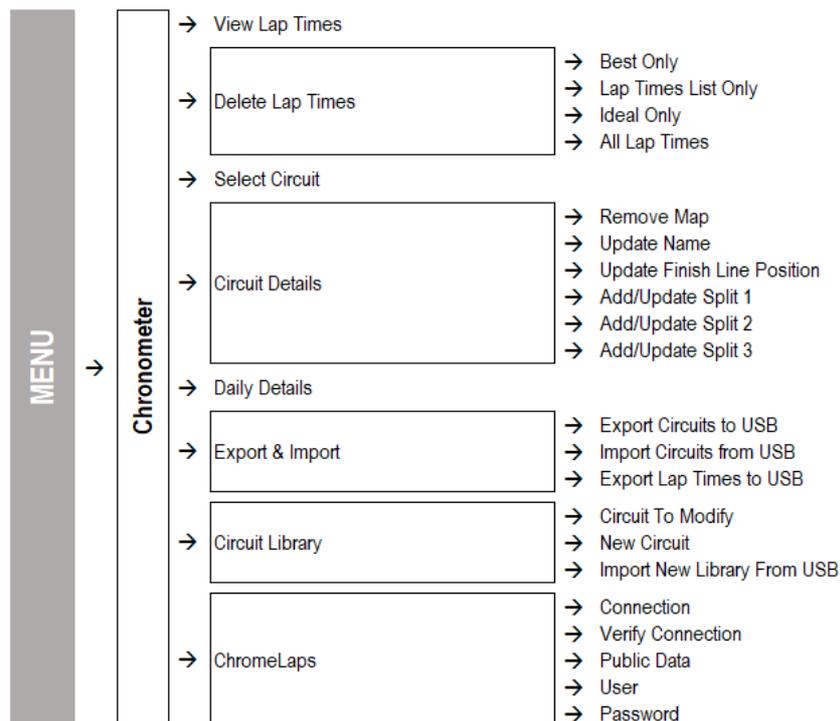
(Chronometer sub-menu tree)

The Chrome unit includes a GPS chronometer with a resolution of 1/100s, based on a 10Hz MTK GPS processor with 66x parallel channels. During startup, once the GPS signal is calibrated, the system identifies where it is located among the 20x stored circuits then proceeds in identifying coordinates for the finish line of the identified race circuit. If the coordinates don't match with any of the stored circuits, the message "Circuit Not Found" will appear on the startup screen.

> **CAUTION:**
> The circuit identification is only performed during the startup (boot). If the unit is turned
> on before reaching the race circuit, the user has to restart, or manually set the desired circuit.

Thanks to the "Chronometer" menu it is possible to display the lap times, erase them and configure all the chronometer options. As for the other menus, press the LDN to enter the submenu, or press the LUP to return to the previous menu.

View Lap Times

It is possible to display the stored lap times from the "Chronometer" menu by pressing the LDN button or the UP button from the startup screen. The lap times performed in the selected circuit are shown in this menu (if no circuit is selected a blank screen appears). Lap times are automatically divided by sessions and each session lists the date and the starting time of the session itself. The displayed lap times are divided into three columns, corresponding to the four split sectors of each lap, and for each lap the best speed is reported. The all-time best lap and ideal time for the current circuit are shown in the lower part of the screen.

ATTENTION: If the position of the split times on the map is changed, the previously stored laptimes still remain referred to the old position.

ATTENTION: The best and ideal lap displayed in the lower part of the screen refers to the selected circuit and not only to the shown times. As will be discussed in the section that describes the cancellation, it is possible to delete lap times leaving the best and ideal lap stored, or vice versa. In both cases, it would be reasonable to have no more correspondence between the all-time best lap and the best lap in the list.

Delete Lap Times

The "Delete" menu allows to select which information has to be deleted. Indeed, it is possible to delete only the best time relative to the selected circuit, or the list of times, the ideal time or all the times stored in the memory. Keep the DN button pressed to select an option, then follow the instructions on the screen to confirm the cancellation.

Select Circuit

The "Circuits" menu shows the list of the circuits stored inside Chrome. Chrome is able to store up to 20 different circuits. For each one the best lap, the number of stored laps and the higher speed are collected in a table. Thanks to the automatic identification of the circuit, Chrome recognizes the circuit where it is located. Using this menu, it is also possible to choose a different circuit. Press the UP and DN buttons to scroll through the circuits, keep the DN button pressed to select the circuit, keep the UP button pressed to return to the previous menu.

Circuit Details

In the "Circuit detail" menu the information about the loaded circuit is reported. In this menu the number of stored laps, best and ideal lap times and highest speed are shown. The maps, which are automatically generated by the system, are displayed on the left part of the screen. If there is no corresponding map stored in the memory, Chrome starts to draw the map the first time the finish line is crossed and it stops when the finish line is crossed again. If the lap is not completed, the map will not be saved. It is possible to remove the auto generated maps selecting the "remove map" function.

The configurable parameters for the circuit are shown in the lower part of the screen. The name of the circuit can be changed using the first line: this option makes possible to modify each letter of the name. Keep the DN button pressed to switch character, press the UP and DN buttons to scroll through the letters and keep the UP button pressed to exit. The finish line and splits can be set by using the three subsequent entries. It is possible to select one of these options to manually set the finish line (in this case the finish line has to be crossed without stopping) or, if the map is available, to set the finish line or the splits by choosing the desired position on the map. Indeed, it is possible to move the cursor, through the map, using the UP and DN buttons until the desired position. The "Auto" option automatically sets the finish line when the 150 Km/h speed is exceeded. The first split can be set only if the finish line was stored. Similarly, the second split can be set only if the first split was stored.

WARNING: do not use space or special characters in circuit names

Daily Details

The "Daily details" menu summarizes the current day performance. Therefore, it is possible to analyze the number of performed laps, the highest speed, the best and ideal laps and the spread between the latter and the all-time best and ideal laps.

Export & Import

Thanks to this menu it is possible to manage the downloading/uploading of data collected during the chronometer functions. It is possible to download the stored circuits by using a USB flash drive in order to save the new finish line in a file compatible with Danas. Similarly, it is possible to load a circuit list by using a USB flash drive, replacing the circuits stored in Chrome. The file must be generated by selecting the proper option in the Danas software and then transferred using a USB flash drive. Choosing "export lap times to USB", a .txt file, including the total and split lap times and the highest speeds, all organized in sessions, is generated (this file is not compatible with Danas).

Circuit Library

Through the "Circuits library" menu each of the 20 circuits stored in memory can be changed. Simply choose the circuit to change in the first row. The new circuit voice allows to choose which circuit shall replace the current one. The circuit will be chosen among those in the library. The latter can be extended by simply importing it from a USB key. It is possible to download directly the update file from the download area of the www.i2m.it/en website.

ChromeLaps

By ChromeLaps Menu the Chrome can connect directly to our website http://chromelaps.i2m.it/en. You can choose, by the dedicated feature, if the connection is to be enabled or not. Chrome has to be connected to a wifi or an Internet hotspot. You need to register to the website and then use the login to access. The "Public Data" feature is used to choose if you allow your data to be (or not) visible on the public website area.

Display View
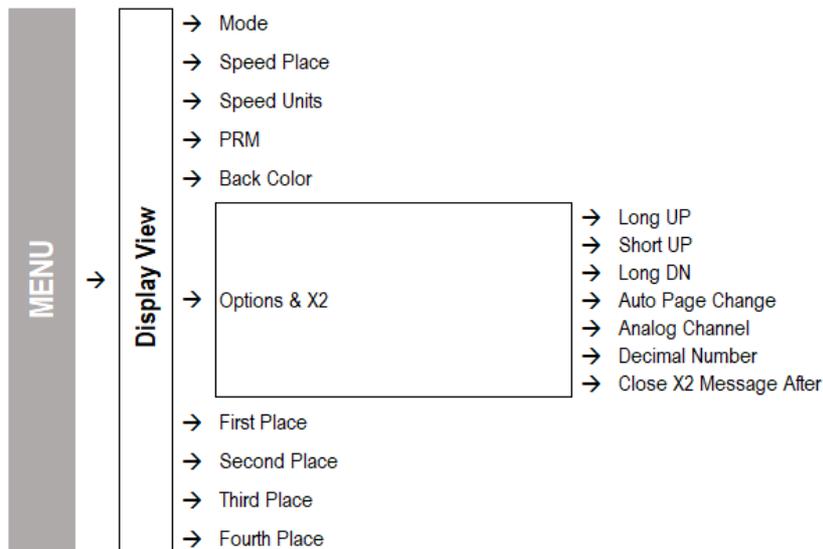
(Display View sub-menu tree)

Thanks to this menu it is possible to set the items displayed in the startup screen. Chrome has two different configurations: "BOX" and "RACE". For both configurations it is possible to choose several parameters that the system will store in memory. If the system is in "BOX" mode, "RACE" mode will be automatically set as soon as the finish line is crossed, then "BOX" configuration will be on again at the end of the session. If the "Change with VEL1" is set, the transition will occur when 60km/h are exceeded on the rear wheel.

Choose the preferred mode in the first line and all the possible options will be displayed in the subsequent lines. In the upper right part of the startup screen (the position occupied by the speedometer) it is possible to place the rear wheel speed, the GPS measured speed or the coolant temperature. The speed can be visualized in Km/h scale or in mph scale.

The "RPM" option is used to set the full-scale range and the minimum value of the tachometer, these two values are independently configurable to adapt Chrome to different motorcycles or simply to personalize the displayed information.

The background color option allows to choose from three different background colors: standard, red and green (for the Lite). The last four options identify the four positions on the Chrome startup screen: by selecting one of them, the corresponding position on the screen will be highlighted, this way it is possible to choose what has to be displayed in each position. Moreover, each position can be left empty, in order to simplify the screen. The first position is the only one that can show the water temperature, that will be displayed together with the corresponding symbol.

Data Acquisition, Video & WiFi
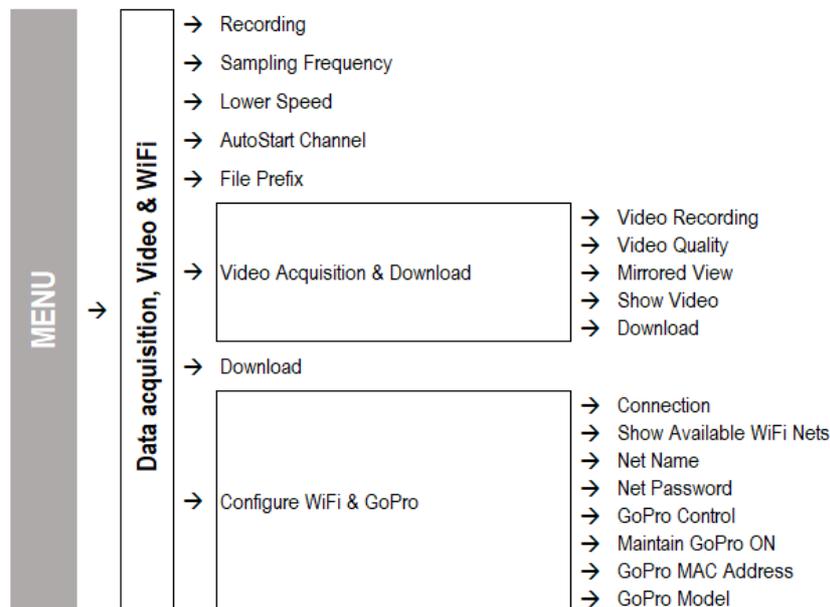
(Data Acquisition, Video & WiFi submenu tree)

Chrome features a data sampling acquisition rate up to 100 Hz per channel. Using the "data acquisition" menu it is possible to enable the recording option. The second line shows the occupied memory (in %). The sampling rate can be chosen through the subsequent line. If a high sampling rate is not necessary, it is recommended to not set values above 20 Hz to not overload the subsequent data analysis.

The next two options allow to choose when the system has to start the recording. Use the "Autostart channel" to choose between the rear wheel speed or the GPS speed, then the system will start to record when the speed will exceed the value set in "Lower speed". Using the "Download" menu it is possible to save the data on a USB flash drive or to erase the memory.

Download

The "download" menu shows all the files stored in the Chrome memory. Files are arranged by date and circuit. The date, the name of the circuit (if it can be identified by Chrome) and the file dimension are reported in the table, so that it is possible to choose which files have to be downloaded or deleted.
It is advisable to periodically delete the files in memory in order not to slow down the start-up phase of the dashboard (in which the files are scanned).

Keeping the DN button pressed, it is possible to select a file that will appear next to the "selected file" message. A specific menu can be opened by keeping the DN button pressed again: through this menu it is possible to save the file in a USB flash drive or to delete it, or save or delete all the files.

Downloaded files can be opened with Danas, moreover, the files don't included the lap times that are calculated by Danas in the finish line is present in the Danas list or manually added. For further information, please refer to the Danas user manual. Video Acquisition & Download In this menu you can setup video recording options on Chrome Plus. Video is recorder through the USB plug on the back (but it is possible to use also the usb plug dedicated to data download). Like data acquisition, video acquisition can be activated or deactivated, used memory is shown and the estimated remaining recording time at current resolution.

If you don't activate video recording, you can use the Rearview mirror function, a customizable function of on View options Menu. In the rearview Mirror it is possible to choose the as is view or the reversed view. Otherwise Show Video enables the real-time view of camera to correctly frame what desired. Download is to download your videos or to delete them.
A cam icon appears below the GPS icon in when a video is been recorded. Configure WiFi & GoPro Chrome Plus allows a WiFi connection towards an existing net. You should plug to the USB port a TP-

LINK TL-WN725N, then activate the connection setting net name (or choosing among the available ones) and password. It is also possible to use this WiFi connection to download data by the appropriate Danas function (in the on line menu) if the PC is connected to the same WiFi.

In order to control a GoPro cam (Hero3, Hero3+, Hero4) you should activate the dedicated function (and in case of a Hero4 you should also set the mac address – you can copy it without the dash from the info file in the GoPro sd). Chrome Plus will turn on the GoPro at turn on end will start recording synchronous with data recording. Gopro should have an active WiFi and all the automatic shut down disabled.
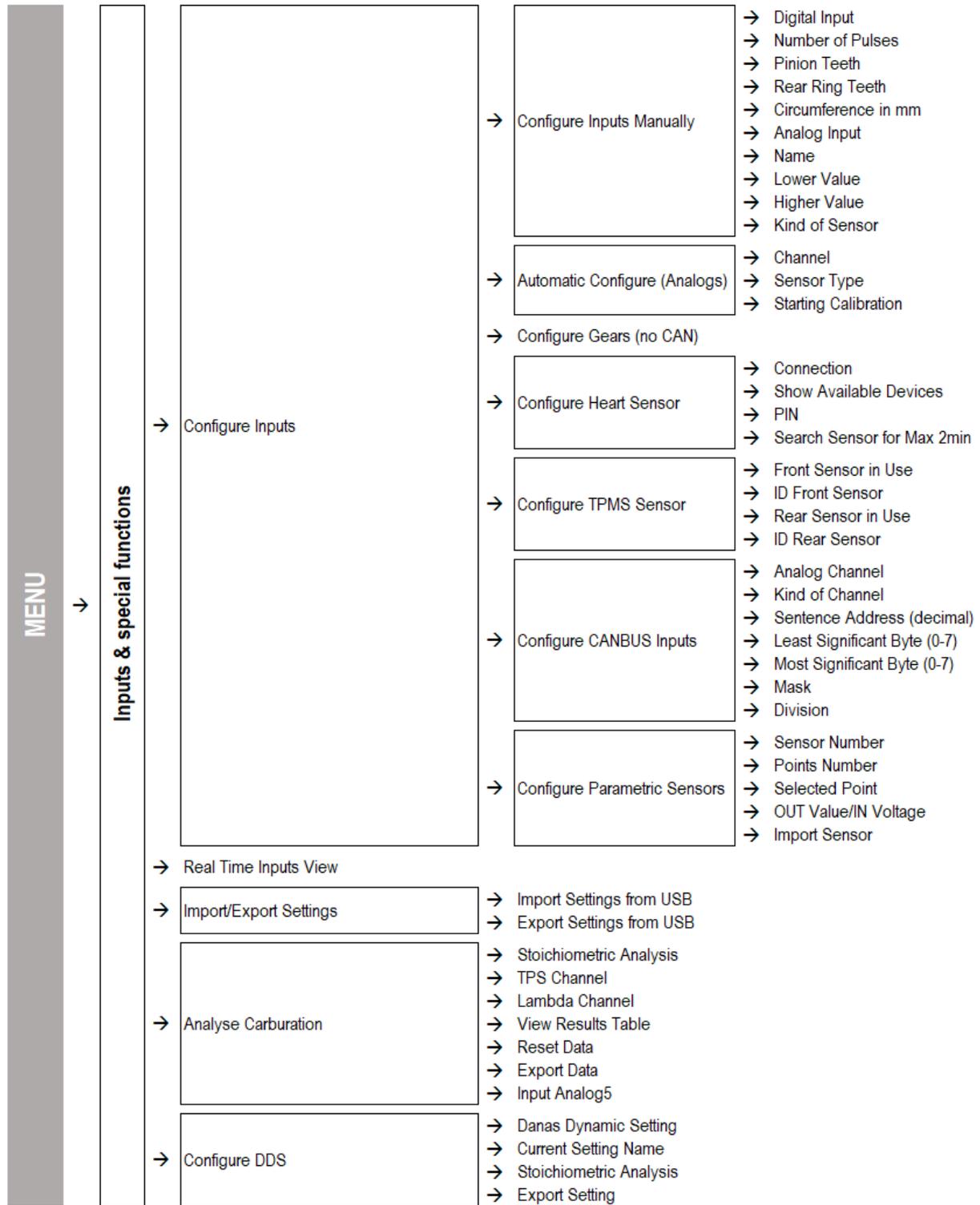
Counters
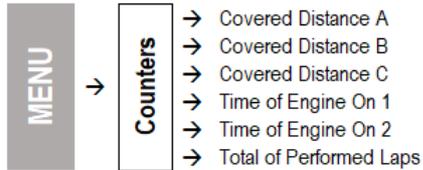
(Counters submenu tree)

Chrome features three different covered-distance counters, two time-of-engine counters and a total of performed laps counter. Choose a counter and keep the DN button pressed to erase that value.

Inputs & Special Functions

(Inputs & Special Functions submenu tree)

Through this menu it is possible to configure all the Chrome inputs. Use "configure inputs" to manually set each analog and digital input and use "automatic configuration (analogs)" to set the most common sensors for the analog inputs. "Calculate gears ratio" allows to calculate the gears.
The latter are calculated by using the ratio between "speed 1" (which should be placed on the rear wheel) and the RPMs. Both inputs must be correctly configured before proceeding with the computation.

The system will calculate the gears with the data that will be acquired during the day on the selected circuit.

ATTENTION: do not change the circuit between the acquisition and the calculation. Therefore, it is necessary to start the data acquisition and record a session that includes all the gears for at least 10s each (see the appropriate section). It is possible to check if the chosen settings are correct looking at the "real time" menu.

Entering the page of the "Real Time" inputs, it is possible to switch to the next page by keeping the DN button pressed. The second page is only a diagnostic page that allows to see the value of voltage and temperature before and after elaboration. This page also includes the absolute values of the oil and gasoline inputs. The latter input can be used to display the variation of the gasoline signal level sensor when the content in the fuel tank varies.

Configure Inputs Manually

Using this menu it is possible to configure analog and digital inputs. Select "digital input" to scroll through "RPM", "SPD1" and "SPD2". "RPM" needs only the number of pulses. The pulse number represents the number of signals the sensor receives for each crankshaft revolution. Usually this number is equal to 1 (e.g. Suzuki) or 2 (e.g Yamaha). For Ducati 1098 or 1198, using the signal from the pick up sensor, this number should be set to 24.

Also the speed requires the number of pulses. Similarly to RPMs, this number identifies the number of pulses read by the sensor for each wheel or pinion revolution, according to the position where the sensor is placed. If the sensor is placed on the wheel, the number of teeth of both crown gear and pinion must be set to 1. If the sensor is placed on the pinion (or inside the gear) it will be necessary to set the correct number of teeth of both crown gear and pinion, to obtain the correct speed. For both speeds, the wheel circumference must be set.

"SPD1" must be coupled with the rear wheel to read the correct gears. Use the option "analog input" to select one of the 8 inputs. For each input it is possible to choose the name (selecting each character), the minimum and the maximum value. The minimum value is the one shown on the display when the input is equal to 0V. The maximum value is the one shown when the input is equal to 5V.

Automatic Configure (Analogs)

Thanks to this menu it is possible to configure all the typical motorcycle sensors, in a very easy way. Use the first line to select the channel that has to be configured, use the second line to choose the sensor type, for example a linear potentiometer, a pressure sensor, a Throttle Position Sensor etc.. During the calibration, the system will explain all the options step by step. As an example, for the TPS calibration, the system will ask to close the throttle and confirm, than to open it and confirm.
Among the channels that can be configured, there are also those of oil and fuel warning lights. In both cases, the system prompts to make two measurements, for example, considering the fuel level, in reserve and full tank. The software will then identify the threshold as the central value between these two values. In the case of gasoline it is recommended to use as measurements two conditions near to the reserve to set a precise value. As an example, choose as the first measurement a condition in which a liter of fuel is still missing until the original warning light switch off. Made this first step, add two liters to make the second measurement. In this way, the central value will be exactly the correct reserve level. This method is even more important for bikes which fuel level sensor is not a linear sensor.

Configure Heart Sensor

This menu is for Chrome Bluetooth connection settings. To use Bluetooth connection you need to plug the antenna, then by the menu you can turn on/off the connection, search for available devices and connect to the desired one. If you need to connect to a **Polar WearLink PWL Heart Rate Monitor** leave PIN equal to 0000.The last feature is for choosing if the Chrome has to give up the search if no device is found in 2 minutes.

Configure TPMS Sensor (only PRO)

This menu is for configuring TPMS sensors. You need to insert the ID code for each sensor, you can find the correct ID on the sensor sticker. For each sensor you can display pressure, temperature and battery charge.(a charge over 95% is to be considered as full charge) To install a TPMS sensor please refer to the dedicated manual downloadable from our website. Ext3 and Ext4 channels are configured by default for reading the presence of RF signal of the two sensors. For this reason its values goes up to 100 every time a signal is sensed and then goes back rapidly to 0.

Configure CANBUS Inputs (only PRO)

This menu is for the input settings for each of the 12 100Hz inputs. For each inputs you can choose to leave the default bike setting (please refer to the table at the and of this manual) or you can set the input on a specific CAN value. If this is the case, you need to set the sentence from which to read 2 bytes values and the eventual multiplying factor and the mask. Please keep in mind that all Chrome channels are 10bit.

Analyze Carburation

Through this menu the tracing of carburetion can be enabled. Firstly, choose which channel is connected to the TPS and which to the Lambda probe. Please note: both channels must be already configured, the TPS must be between 0 and 100 with the throttle closed and open, and the Lambda probe must show the correct stoichiometric ratio or lambda value (by appropriately configuring the minimum and maximum values of the respective channel).
It is then necessary to enable tracing. The analysis will be active all the time the equipment stays on. At the shutdown data will be erased. The collected data can be analyzed directly from the special screen on the Chrome "Table Display results" to have a raw idea or can be exported and analyzed on a PC with Danas to a precise mesurement.
By this menu it is possible to choose if analog5 channel is used as a regular input or as a signal for the internal lambda controller.

Configure DDS

Chrome Plus features the new DDS (danas Dynamic System). The system could change some parameters such as maps and TC levels corner by corner along the track. The configuration file is created in Dnas with the DDS menu and then transferred to Chrome Plus. Then when this feature is activated Chrome will set all the parameters depending on your position on the track. Position is calculated by the distance travelled after the finish line (it is set to zero entering the menu or when enabling the launch control). This feature is currently available on ZX10R >=2016 and R1 15-19.

Alarms
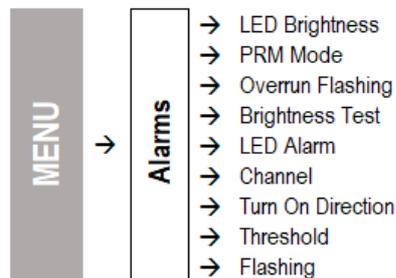
(Alarms submenu tree)

Using the "alarms management" menu it is possible to set the behavior of each LED included in Chrome. The brightness of the LEDs can be chosen among three different levels: low, medium and high. Use the "brightness test" function to check the chosen light intensity. "RPM" mode automatically sets the upper LEDs, the system will split the range set in the "RPM" menu in equal parts. The upper LEDs will be turned on when the RPMs rise, one by one, and will be completely powered on when the RPMs reach the maximum. The threshold of each LED is still configurable. Choosing the "single RPM LED", only one LED will be on. For a low number of RPMs the LED turned on will be the one on the left, then, it will move on the right step by step when the RPMs increase.

Setting the "overrun flashing" function all the LEDs set as RPMs will start to flash when the higher threshold is exceed, this function can be used as an overrun or gear alarm. Use the configuration lines on the bottom of the screen to set the alarms for each LED (if "RPM" mode is selected the upper LEDs cannot be selected). The "LED alarm" function allows to choose the LED that will be highlighted on the screen. The channel identifies the analog or digital channel coupled with that alarm LED. The "turn on direction" points out if the LED has to be turned on when the channel value is greater or lower than the threshold value. Using the "auto" function the system shows the user how to configure the threshold. If the chosen channel is a tire temperature sensor it is possible to set the "temperature" option in the "turn on direction" option so that the threshold can be directly shown in degrees. In this case, if the temperature is lower than the set degree value the LED will turn on.

On the cannel line you can view not only real LEDs but also warning lights for fuel, water, oil and battery so you can follow your preferences in setups.

Options
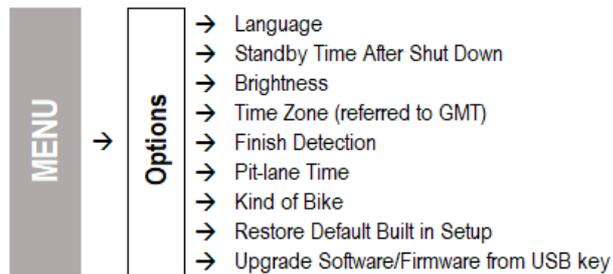
(Options submenu tree)

The "Options" menu shows general information about the system. It is possible to see the installed firmware version, choose the language (if more than one language is installed), choose the display brightness and the time zone.

Particular attention must be paid to the "standby time after shutdown" option. The system requires about 10s seconds to complete the power-on. This time can be reduced by switching Chrome in standby mode instead of turning it off, this way the time needed by Chrome to power on from the standby mode is reduced to zero. When the system is in standby mode it absorbs about 150mA, therefore, the system can stay in standby mode for no more than 10-12 hours. In order to preserve the battery charge, use the "standby time after shutdown" option to choose the maximum standby mode time. After this time the system will be automatically turned off.

The "Finish detection" option allows to enable the crossing of the finish line function, not via the GPS but via the signal from an external transponder. To read the external transponder the appropriate interface for the transponder has to be connected.