

User Manual

XLog

Release 1.00





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1 – XLog in a few words

XLog is a small, versatile, light and easy to use logger that samples and records channels coming from the vehicle ECU and from the connected CAN expansions. Moreover it features an integrated GPS and an internal Lithium ion battery that keeps it recording for about 6 hours 30 minutes with the Wi-Fi on and for about 10 hours and 30 minutes with Wi-Fi off. It records data both into the internal 4GB not volatile internal memory and in the 16 GB USB-C removable memory key.

XLog allows the user to create math channels as well as a CAN Output using both the channels supplied by the vehicle ECU and these supplied by AiM CAN Expansions. In addition to all these features, the logger allows to setup a second CAN that can be used to connect sensors and other devices that communicate via CAN using existing protocols; in case the protocol is not available it is also possible to create a dedicated one.

All channels can also be displayed on SmartyCam videos when available.

AiM supported expansions are:

- LCU-One CAN
- LCU1S/LCU1S Open
- SmartyCam 3 series
- Channel Expansion
- ACC
- ACC2/ACC2 Open
- ACC3/ACC3 Open
- GPS09C Pro/GPS09c Pro Open
- Shift Light Module (normal or B version)



2 – Available kits

XLog is available in different kits.

XLog RPM 200 kit:

X08XLOGRPM200

- XLog
- 2m RPM + External power cable
- 2m USB 2.0 Type A – Type C cable
- 16GB Mini USB Drive

XLog OBDII 200 kit:

X08XLOGOBD200

- XLog
- 2m CAN/OBDII/K-Line + External power cable
- 2m USB 2.0 Type A-Type C cable
- 16GB Mini USB Drive

XLog CAN/RS232 200 kit:

X08XLOGCRS200

- XLog
- 2m CAN/RS232 + External power cable
- 2m USB 2.0 Type A-Type C cable
- 16GB Mini USB Drive

Accessories and spare parts:

- 2m RPM + External power cable **V02.589.020**
- 2m CAN/OBDII/K-Line + External power cable **V02.589.040**
- 2m CAN/RS232 + External power cable **V02.589.050**
- 2m USB 2.0 Type A-Type C cable **X90TMPC101010**
- 16GB mini USB Drive **3IRUSBD16GB**

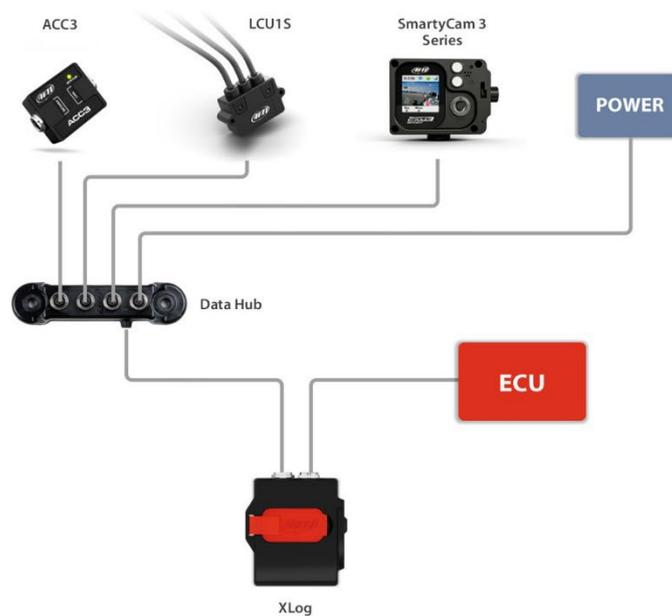
Please note: use the **2m USB2.0 Type A-Type C cable** whose part number is **X90TMPC101010** you find in the kit to connect XLog to the PC. Any connection using an USB C – USB C cable may not work properly.

3 – XLog expansions and connections

XLog supports the following AiM expansions:

- LCU1S
- LCU1S Open
- LCU1 CAN
- SmartyCam 3 series
- Channel Expansion
- ACC3
- ACC3 Open
- ACC2
- ACC2 Open
- ACC
- GPS09c Pro
- GPS09c Pro Open
- Shift Light Module (normal or B version)
- Volante GT
- Volante GT32 Standalone
- GS Dash Display

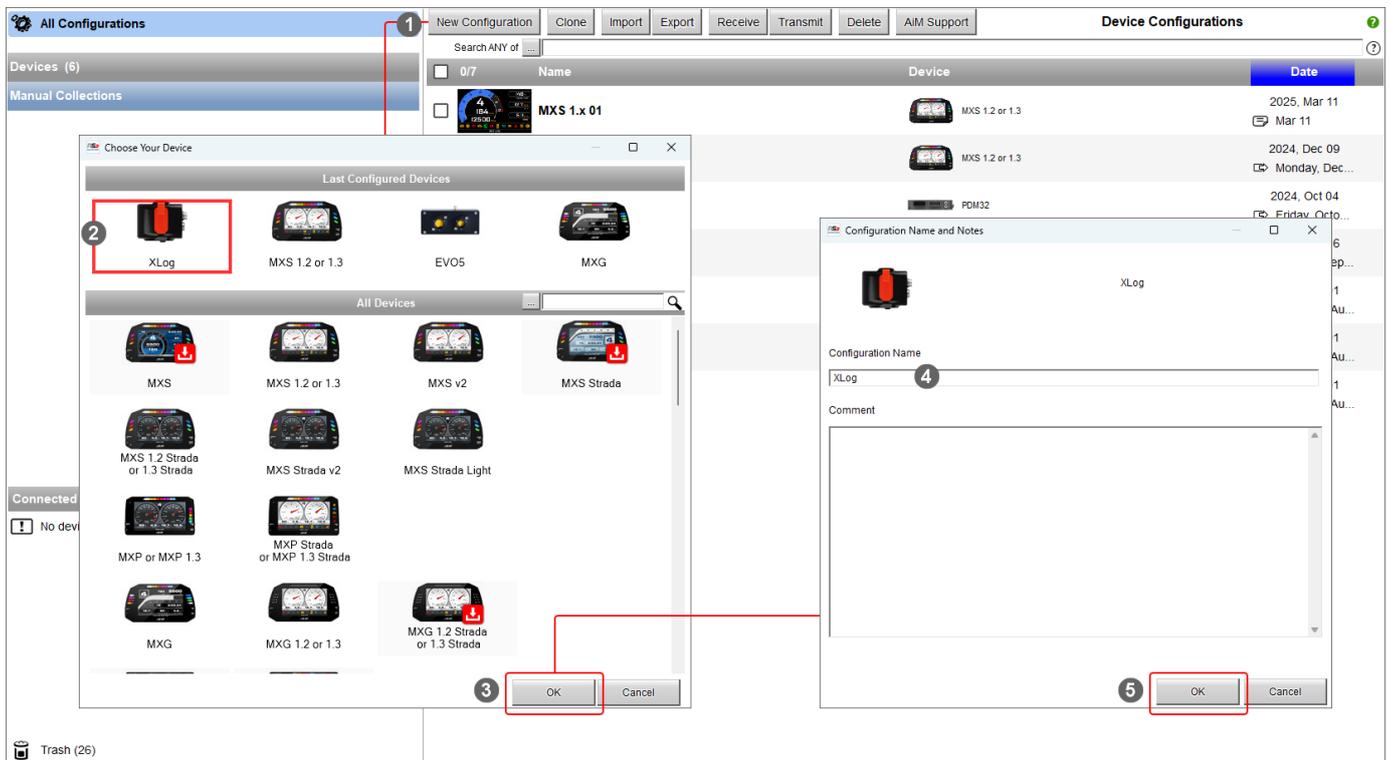
The image below shows an example of AiM CAN Network.



4 – Configuration with RaceStudio 3 software

To configure XLog follow these steps:

- run RaceStudio 3
- press “New Configuration” button on the top right keyboard (1)
- select XLog (2)
- press “OK” (3)
- name the configuration if desired (default name is XLog – 4)
- press “OK” (5).



Once the configuration created it is necessary to configure the following tabs:

- Channels
- ECU Stream
- CAN2 Stream
- CAN Expansions
- Math Channels
- Status Variables
- Parameters
- SmartyCam Stream
- CAN Output

4.1 – Channels configuration

As the configuration is created, the software enters “Channels” tab. XLog features two mutually alternative CAN connections:

- one for AiM CAN network (EXP connector to AiM CAN)
- the other for connection with non-AiM device (EXP connector to CAN2). The image below shows the two options.

Save Save As Close Transmit

EXP connector to AiM CAN
 EXP connector to CAN2

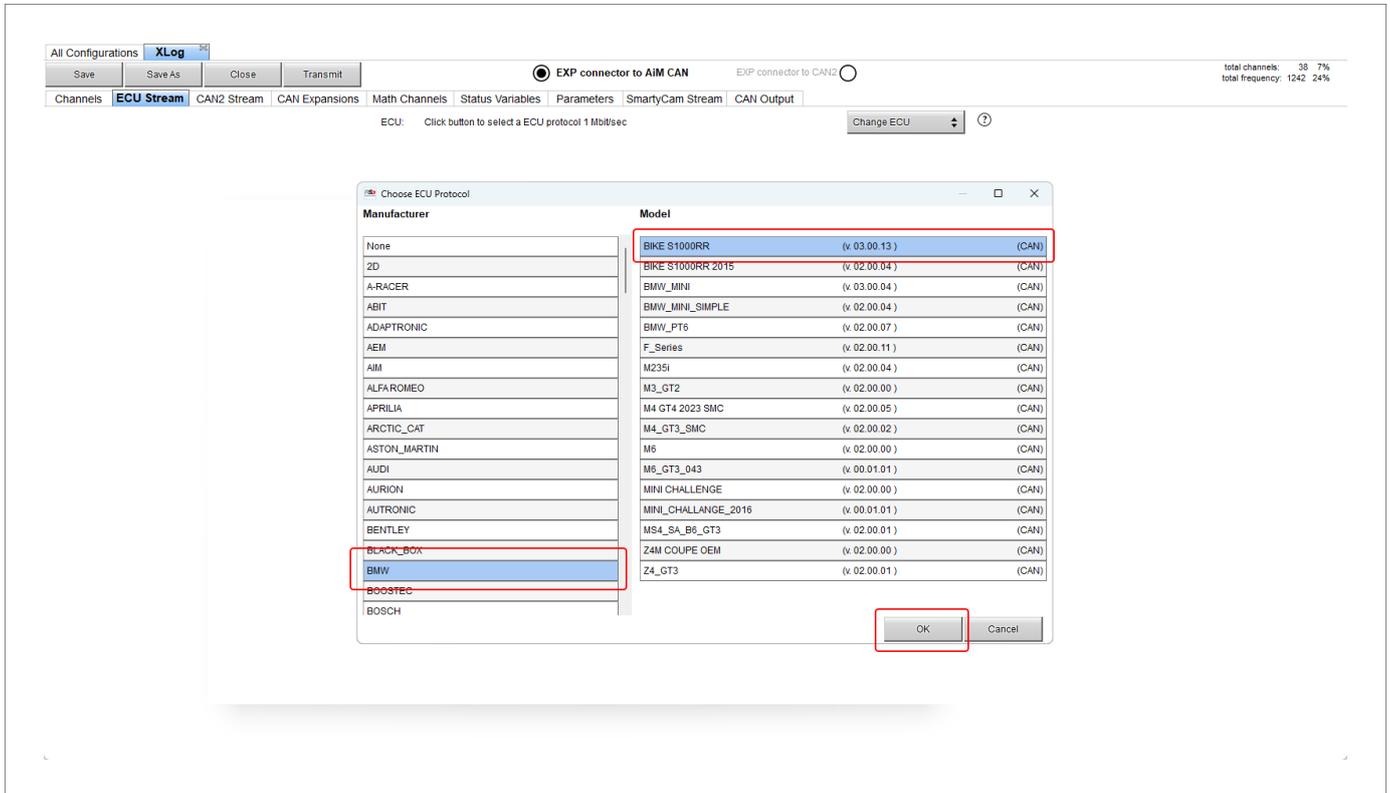
total channels: 38 7%
 total frequency: 1242 24%

Channels
ECU Stream
CAN2 Stream
CAN Expansions
Math Channels
Status Variables
Parameters
SmartyCam Stream
CAN Output

ID	<input checked="" type="checkbox"/>	Name	Function	Sensor	Unit	Freq	Parameters
RPM	<input checked="" type="checkbox"/>	RPM	Engine RPM	RPM Sensor	rpm	20 Hz	max: 16000 ; factor: /1 ;
Acc1	<input checked="" type="checkbox"/>	InlineAcc	Inline Acceleration	Internal Accelerometer	g 0.01	50 Hz	
Acc2	<input checked="" type="checkbox"/>	LateralAcc	Lateral Acceleration	Internal Accelerometer	g 0.01	50 Hz	
Acc3	<input checked="" type="checkbox"/>	VerticalAcc	Vertical Acceleration	Internal Accelerometer	g 0.01	50 Hz	
Gyr1	<input checked="" type="checkbox"/>	RollRate	Roll Rate	Internal Gyro	deg/s 0.1	50 Hz	
Gyr2	<input checked="" type="checkbox"/>	PitchRate	Pitch Rate	Internal Gyro	deg/s 0.1	50 Hz	
Gyr3	<input checked="" type="checkbox"/>	YawRate	Yaw Rate	Internal Gyro	deg/s 0.1	50 Hz	
PAccu	<input checked="" type="checkbox"/>	GPS PosAccuracy	AiM GPS Position Accuracy	GPS	ft	auto (accor...	
Spd	<input checked="" type="checkbox"/>	GPS Speed	GPS Speed	GPS	mph 0.1	auto (accor...	
Alt	<input checked="" type="checkbox"/>	Altitude	GPS Altitude	GPS	ft 0.01	auto (accor...	

4.2 – ECU Stream configuration

Entering “ECU Stream” tab a panel where to choose the connected ECU is prompted.





Selecting a protocol the corresponding sampled channels are shown.

All Configurations **XLog** ⁵⁴

Save Save As Close Transmit

EXP connector to AIM CAN EXP connector to CAN2

total channels: 73 14%
total frequency: 1582 31%

Channels **ECU Stream** CAN2 Stream CAN Expansions Math Channels Status Variables Parameters SmartyCam Stream CAN Output

ECU: BMW - BIKE S1000RR (ver. 03.00.13) 500 Kbit/sec [?]

Enable the CAN Bus 120 Ohm Resistor

Silent on CAN Bus

Enabled Channels (Max. 120) 35 / 35

ID	✓	Name	Function	Unit	Freq
CC01	✓	RPM	Engine RPM	rpm	10 Hz
CC27	✓	Gear	Gear	gear	10 Hz
CC18	✓	HP4SpeedBike	Vehicle Speed	mph 0.1	10 Hz
CC21	✓	SpeedR	Vehicle Speed	mph 0.1	10 Hz
CC19	✓	HP4SpeedF2	Wheel Speed	mph 0.1	10 Hz
CC20	✓	HP4SpeedR2	Wheel Speed	mph 0.1	10 Hz
CC13	✓	SpeedF	Wheel Speed	mph 0.1	10 Hz
CC36	✓	LongAcc	Inline Acceleration	g 0.01	10 Hz
CC12	✓	HP4LongAcc	Inline Acceleration	g 0.01	10 Hz
CC08	✓	LatAcc	Lateral Acceleration	g 0.01	10 Hz
CC10	✓	VertAcc	Vertical Acceleration	g 0.01	10 Hz
CC09	✓	RollRate	Roll Rate	deg/s 0.1	10 Hz
CC11	✓	YawRate	Yaw Rate	deg/s 0.1	10 Hz
CC28	✓	WaterTemp	Water Temperature	F 0.1	10 Hz
CC29	✓	IntakeAirTemp	Intake Air Temperature	F 0.1	10 Hz
CC17	✓	HP4Banking	Angle	deg 0.1	10 Hz
CC02	✓	TPS	Percent Throttle Load	% 0.01	10 Hz
CC03	✓	PPS	Percent	% 0.01	10 Hz
CC30	✓	Neutral	Number	#	10 Hz
CC04	✓	Clutch	Number	#	10 Hz
CC05	✓	SideStandSw	Number	#	10 Hz
CC06	✓	BrakeF	Number	#	10 Hz
CC07	✓	BrakeR	Number	#	10 Hz
CC14	✓	ABSOF	Number	#	10 Hz
CC15	✓	HP4PotF	Number	#	10 Hz
CC16	✓	HP4PotR	Number	#	10 Hz
CC05	✓	BrakeF	Number	#	10 Hz

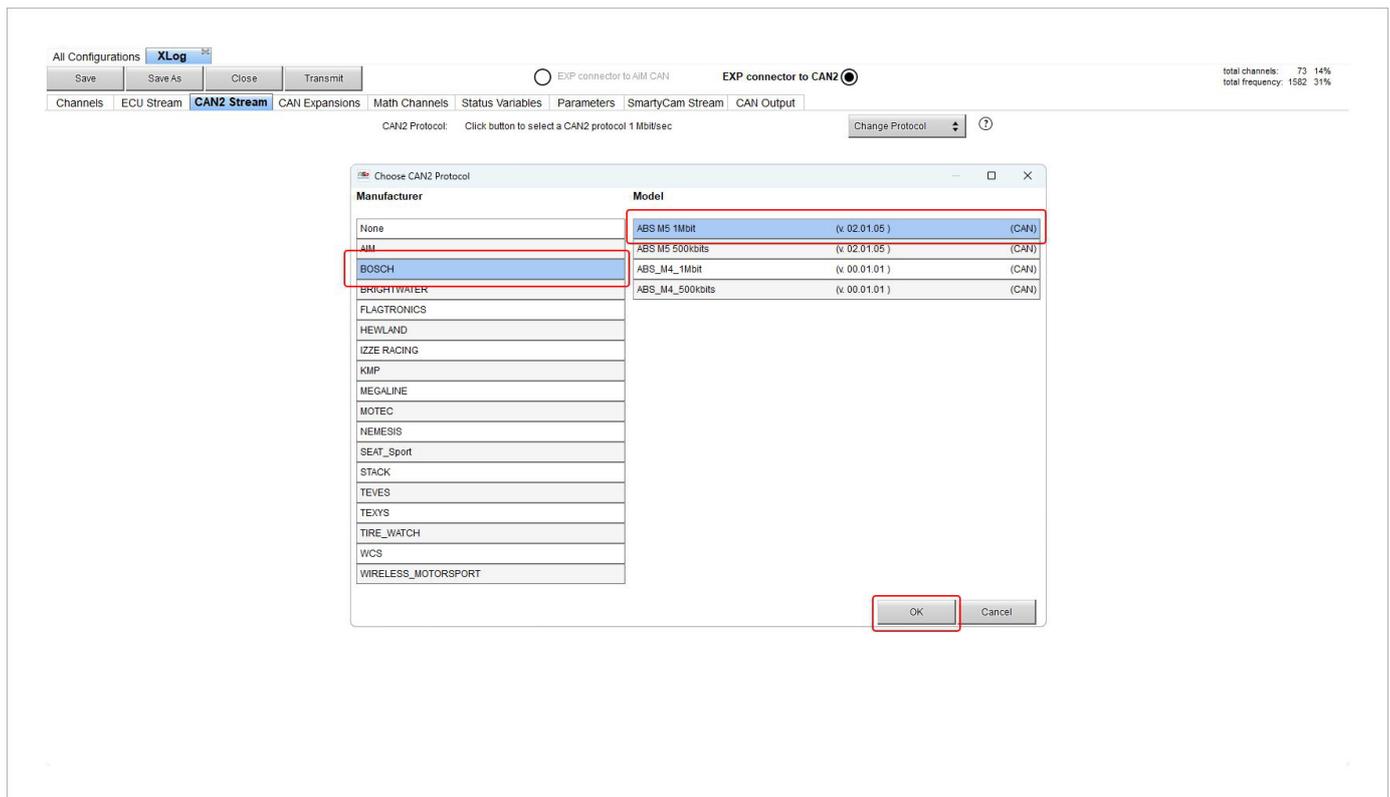
4.3 – CAN2 Stream

For this tab to work properly it is necessary to set XLog CAN network as “EXP connector to CAN2” as shown below.



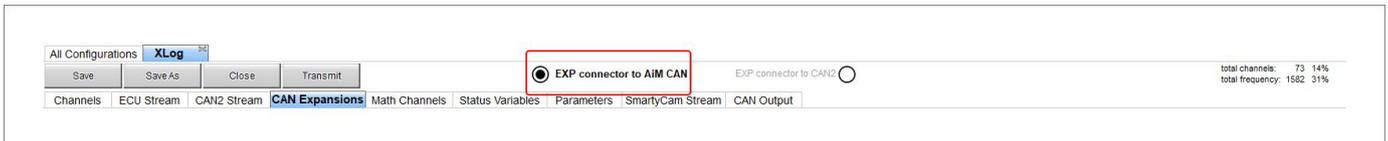
Please remember that, as said before, this setting implies that no AiM CAN expansion can be connected to the network.

Once verified the setting shown here above press “Change Protocol” button and the related panel is prompted: select the device you are connecting to your vehicle.



4.4 – CAN Expansions configuration

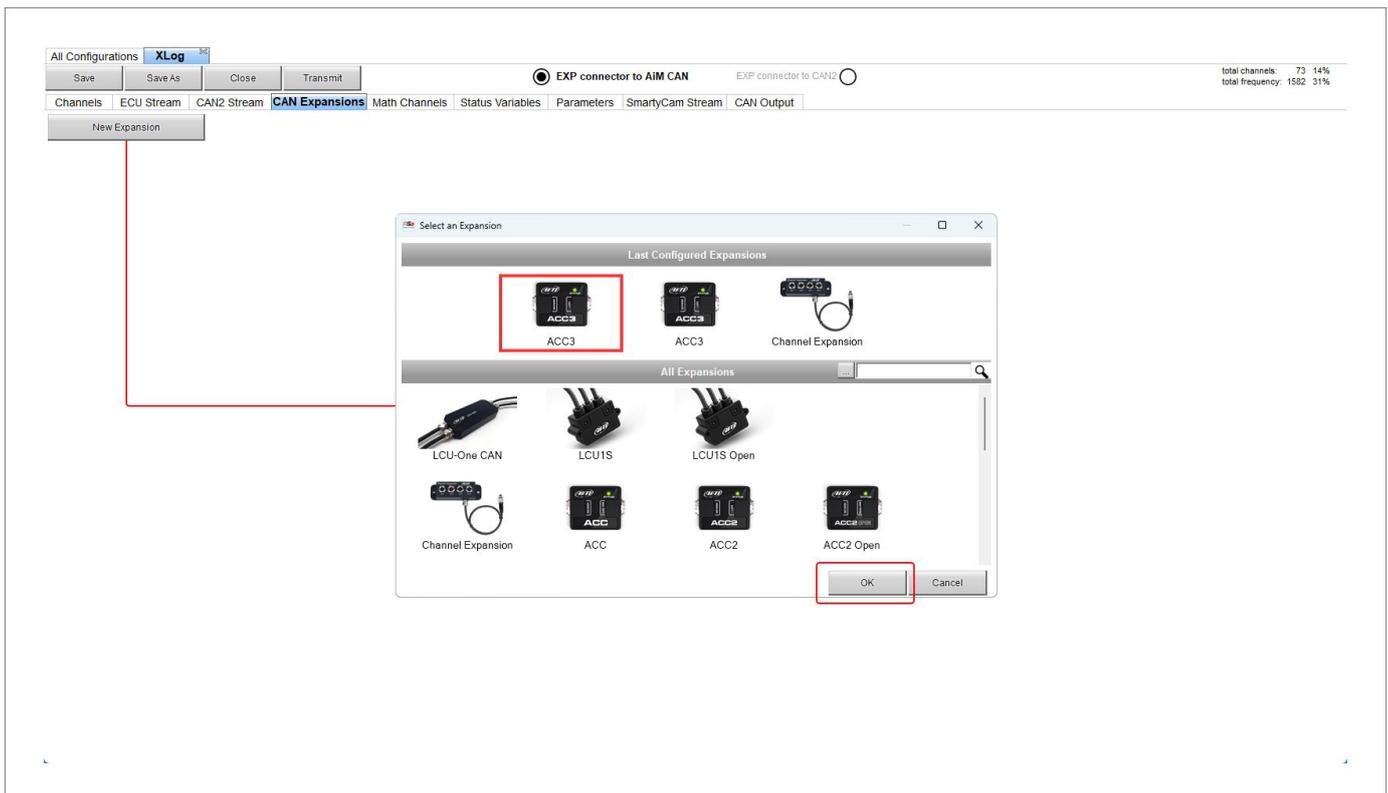
For this tab to work properly it is necessary to set XLog CAN network as “EXP connector to AiM CAN” as shown below.



Please remember that, as said before, this setting implies that ONLY AiM CAN devices can be connected to the network.

AiM CAN Expansions allow the user to increase the number of available channels. To add an AiM CAN expansion:

- press “New Expansion” button and the related panel is prompted
- select the expansion to be connected
- press “OK”



Here below an ACC3 has been selected. Each expansion needs to be configured through the dedicated panel. Please refer to the single user manuals for further information.

All Configurations | **XLog** | Save | Save As | Close | Transmit

EXP connector to AiM CAN | EXP connector to CAN2

total channels: 78 15%
 total frequency: 1672 33%

Channels | ECU Stream | CAN2 Stream | **CAN Expansions** | Math Channels | Status Variables | Parameters | SmartyCam Stream | CAN Output

New Expansion

All

0ACC3

Expansion Name (7 Characters Max) :
 Expansion Serial Number (S.N.) :

Get Expansion Serial Number

Total number of thermocouples to use:

● 4 analog channels 0-5 V/0-12 V

ID	<input checked="" type="checkbox"/>	Name	Function	Sensor	Unit	Freq	Parameters
Ch01	<input checked="" type="checkbox"/>	0ACC3 Channel01	Voltage	Generic 0-5 V	mV	20 Hz	
Ch02	<input checked="" type="checkbox"/>	0ACC3 Channel02	Voltage	Generic 0-5 V	mV	20 Hz	
Ch03	<input checked="" type="checkbox"/>	0ACC3 Channel03	Voltage	Generic 0-5 V	mV	20 Hz	
Ch04	<input checked="" type="checkbox"/>	0ACC3 Channel04	Voltage	Generic 0-5 V	mV	20 Hz	

4.5 – Math channels configuration

As for any other AiM logger it is possible to add Math channels choosing them in a wide library. This can be done using the channels provided by the vehicle ECU or adding and configuring optional custom sensors.

To create math channels; available options are:

- Bias: considering a relation between two mutually compatible channels it computes which one is prevailing (typically used for suspensions or brakes);
- Bias with threshold: it needs the user to set a threshold value for the considered channels; once these threshold are both exceeded the system makes the calculation;
- Calculated gear: it calculates the gear position using engine RPM and vehicle speed
- Precalculated gear: it calculates the gear position using Load/Shaft ratio for each gear and for the vehicle axle too
- Linear correction: typically used when a channel is not available in the desired format or if it is wrongly tuned and cannot be tuned again
- Simple operation: to add or subtract from a channel CAN value a constant value or another channel value
- Division Integer: to get the integer part of the division
- Division Modulo: to get the remainder part of the division
- Bit composed: to compose 8 flags in a bit-field measure.

Each option asks the user to fill in a proper panel.

The screenshot shows the 'Math Channels' configuration window in the software. The window title is 'Select a Mathematical Channel'. It contains a table with the following data:

Channel	Description
Bias	To calculate the bias of two channels VALUE = CH1 / (CH1 + CH2)
Bias with Thresholds	To calculate the bias of two channels only if they are greater than specified values VALUE = CH1 / (CH1 + CH2) [if both thresholds are exceeded, else 0]
Calculated Gear	To calculate the gear position from engine rpm and vehicle speed
Precalculated Gear	To calculate the gear position from engine rpm and vehicle speed, specifying the gear ratio for each gear and the axle ratio
Linear Corrector	To multiply a measure by a factor then add an offset value VALUE = (a * CH) + b
Simple Operation	To add to or subtract from a channel value a constant value or another channel value e.g. VALUE = (CH1 + CH2)
Division Integer	To get the integer part of the division VALUE = integer(CH / a)
Division Modulo	To get the remainder part of the division VALUE = CH % a
Bit Composed	To Compose 8 flags in a bit-field measure VALUE = I1 * I2^2 + I3^4 + I4^8 + I5^16 + I6^32 + I7^64 + I8^128

At the bottom of the window, there are 'OK' and 'Cancel' buttons.

4.6 – Status Variables configuration

As any AiM logger XLog allows to set different Status Variables. To do so press “Add Status Variable” button and **first of all fill** in Name and display label. Status variable values can also be recorded enabling the related checkbox.

Status variables can be **activated/deactivated** using:

- the same conditions for both actions
- distinct conditions for activation and deactivation
- multiple output values each with its own condition

They **can work** as:

- Momentary: when operating condition occurs output sets to “Active” status; as soon as it is released output comes back to its resting “not active” status; labels can be edited
- Toggle: when operating condition occurs output sets to “Active” status even after releasing the button; when pressed again output comes back to its resting “not active” status; labels can be edited
- or Multiposition: each status corresponds to an operating condition.

When the status variable is set as Multiposition the different positions – as well the time threshold (if desired) – need to be set. On the contrary activation/deactivation conditions, possibility to record values and condition type are the same of Momentary and Toggle working mode.

Each condition can be:

- always True
- always False
- custom

The screenshot shows the 'Status Variable Settings' dialog box within a software application. The application window title is 'All Configurations XLog'. The main menu includes 'Save', 'Save As', 'Close', and 'Transmit'. The current configuration is 'EXP connector to AIM CAN'. The 'Status Variables' tab is active, showing '35 variables currently available'. The dialog box contains the following fields and options:

- Name:** [Empty text field]
- Display Label:** [Stat]
- Record values:**
- Sampling Frequency:** 10 Hz
- Same condition for activation and deactivation:** A dropdown menu with three options:
 - Same condition for activation and deactivation
 - Distinct conditions for activation and deactivation** (highlighted with a red box)
 - Multiple output values each with its own condition
- Generate Square Wave:**
- Duration of status On (1):** 0.5 sec
- Duration of status Off (0):** 0.5 sec
- Work As:** Momentary, Toggle, Multiposition
- Use timing:** Time threshold between short and long status: 0.5 sec
- Rest Status:**

Label	Value
S0	0
- Active Status:**

Label	Value
S1	1
- Long Status:**

Label	Value
S2	2
- Activated:** when following condition is verified for at least 0 sec
- Deactivated:** when following condition is not verified for at least 0 sec
- Condition list:** A list containing 'Always FALSE' with an 'Add' button.
- Deactivated condition list:** A list containing 'Always FALSE' with an 'Add' button.
- Buttons:** Save, Cancel

To set a custom condition:

- press “Add” button in “Status Variables” tab
- select the custom option (1)
- a selection panel is prompted: select the channel whose status determines the condition of the status variable you are setting (2)
- press “OK” (3)
- set the condition (4)

The image shows two dialog boxes from the software interface. The top dialog, titled "Condition", has radio buttons for "Always TRUE" and "Always FALSE". A dropdown menu is open, showing various comparison operators: "greater than", "less than", "between values" (highlighted with a red circle and the number 4), "equal to", "different from", "Hysteresis Up to Down", and "Hysteresis Down to Up". The "greater than" operator is currently selected, and the value "1000" is entered in the "rpm" field. The bottom dialog, titled "Select Channel", has a table with two columns: "Source" and "Channel". The "WaterTemp" channel is selected under the "Math Channels" source. The "OK" button is highlighted with a red box and the number 3. A red line connects the "between values" option in the Condition dialog to the "WaterTemp" channel in the Select Channel dialog, with the number 2 indicating this step.

Source	Channel
ECU	RPM
Lap Channels	Gear
GPS	HP4SpeedBike
Accelerometer	SpeedR
Gyro	HP4SpeedF2
Internal	HP4SpeedR2
Math Channels	SpeedF
ACC3 Exp	LongAcc
	HP4LongAcc
	LatAcc
	VertAcc
	RollRate
	YawRate
	WaterTemp
	IntakeAirTemp



Once the condition is set press “Save”.

The screenshot shows the 'Status Variable Settings' dialog box. The 'Name' field is 'Water Temp' and the 'Display Label' is 'Water'. The 'Record values' checkbox is checked, and the 'Sampling Frequency' is set to 10 Hz. The 'Distinct conditions for activation and deactivation' dropdown is set to 'Distinct conditions for activation and deactivation'. The 'Generate Square Wave' checkbox is unchecked. The 'Duration of status On (1) (sec)' is 0.5 and the 'Duration of status Off (0) (sec)' is 0.5. The 'WorkAs' radio buttons are set to 'Momentary'. The 'Use timing' checkbox is unchecked, and the 'Time threshold between short and long status (sec)' is 0.5. The 'Rest Status' table has one row with Label 'S0' and Value '0'. The 'Active Status' table has one row with Label 'S1' and Value '1'. The 'Long Status' table has one row with Label 'S2' and Value '2'. The 'Activated' condition is 'when following condition is verified for at least 5 sec' with the condition 'WaterTemp less than 140 F'. The 'Deactivated' condition is 'when following condition is verified for at least 0 sec' with the condition 'WaterTemp between values (194: 203) F'. The 'Save' button is highlighted with a red box.



Once the condition is set and saved, mousing over it is shown in “Status Variable” tab and can be edited clicking on it. The conditions are shown bottom of the panel as highlighted below.

Rest Status

Label	Value
S0	0

Active Status

Label	Value
S1	1

Long Status

Label	Value
S2	2

It is activated (ON) when:
(WaterTemp less than 140 F)
is verified for at least 5 sec;

It is deactivated (OFF) when:
(WaterTemp between values (194 ; 203) F)
is verified

4.7 – Parameters configuration

Parameters tab allows to set:

GPS Lap Detection (1): to set the seconds the lap time is hold on the display (at present GS Dash display is available in CAN Expansion tab); available options are:

- **Hold lap time for:** this is the number of seconds the lap time is held static on the display before resuming a dynamic views such as predictive, current or running lap time
- **Track width:** this is the width that will be considered for any GPS point set (i.e. the width for start/finish line).

Reference Speed (2):

- sets the speed to use as reference one: default setting is “GPS Speed” but if an additional speed source is available it is possible to change it enabling the left checkbox that enables the related button.

Start data recording conditions (3) allows to set the conditions that start recording. Available options are:

- **standard condition:** is RPM greater than 500 or speed is greater than 6 mph
- **custom condition:** allows to set the number of seconds the condition is verified and the condition pressing “Add” button.

4.8 – SmartyCam Stream

XLog can be connected to both AiM SmartyCam 2 and SmartyCam 3 through the CAN Bus to show data on SmartyCam video. The logger transmits data to the Camera in two slightly different ways according to the camera model and to the fixed setting. Available options are:

- SmartyCam 2 and SmartyCam 3 Default
- SmartyCam 3 Advanced

For XLog to transmit each channel to the connected SmartyCam 2/SmartyCam 3:

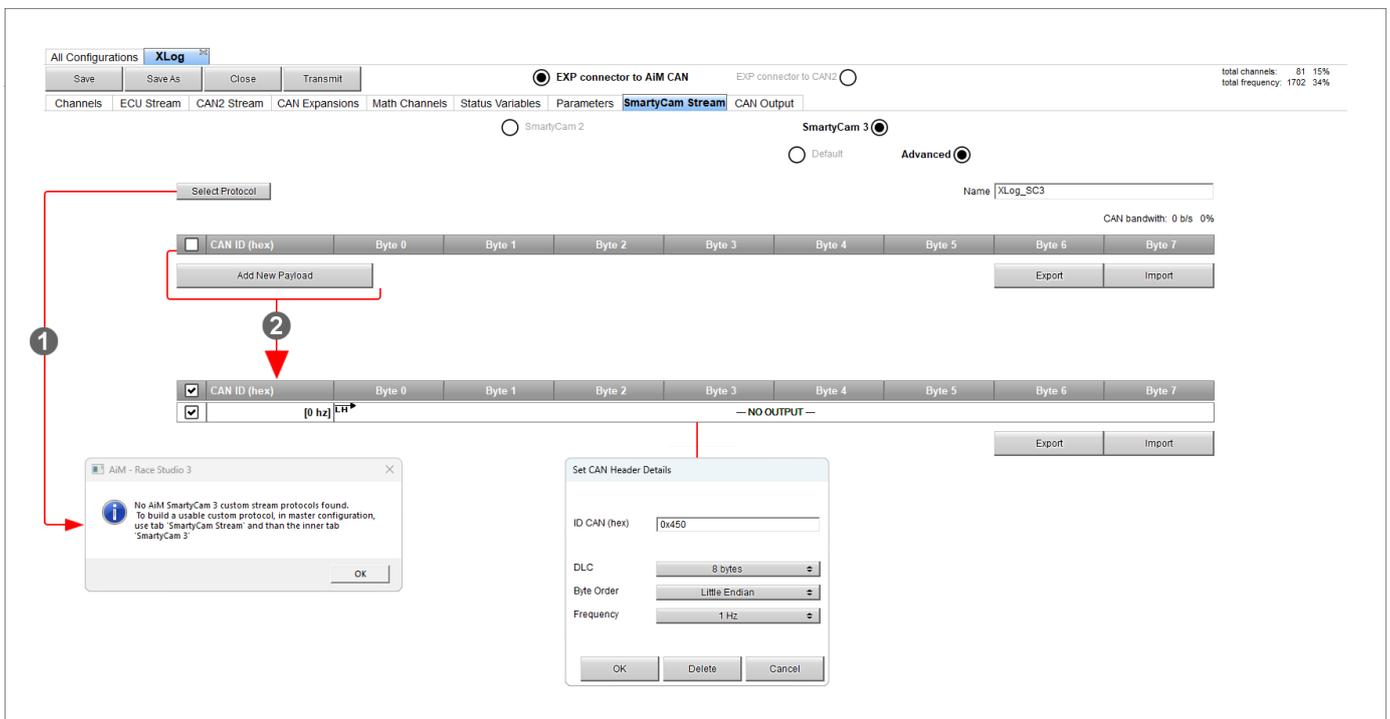
- enter “SmartyCam stream” tab
- it shows all channels and/or sensors that fits the selected function. **Please note:** if the desired channel or sensor is not in the list enable “Enable all channels for functions” checkbox and all channels/sensors will be shown.

AiM default protocol transmits a rather limited range of information, enough for a wide range of installation.

ID	SmartyCam Function	Channel
CC01	Engine RPM	RPM
CC02	Speed	GPS Speed
CC03	Gear	Gear
CC04	Water Temp	WaterTemp
CC05	Head Temp	--- Not Set ---
CC06	Exhaust Temp	--- Not Set ---
CC07	Oil Temp	--- Not Set ---
CC08	Oil Press	--- Not Set ---
CC09	Brake Press	--- Not Set ---
CC10	Throttle Pos	TPS
CC11	Brake Pos	--- Not Set ---
CC12	Clutch Pos	--- Not Set ---
CC13	Steering Pos	Steering Angle
CC14	Lambda	--- Not Set ---
CC17	Fuel Level	--- Not Set ---
CC18	Battery Voltage	Internal Battery
CC20	Heart Rate	--- Not Set ---

To transmit a different set of information a **SmartyCam 3 with advanced setting** is needed; **please note: this function is for expert users only**. Please follow this procedure:

- select SmartyCam stream tab in XLog configuration
- select “SmartyCam 3 → Advanced” option in SmartyCam Stream tab
- configure XLog in order to transmit a different SmartyCam stream; in case no SmartyCam stream protocol has been created for XLog a message is prompted (1)
- press “Add new Payload” (2)
- create your desired stream defining the required IDs fields and save it pressing “OK”
- name the protocol



4.9 – CAN Output configuration

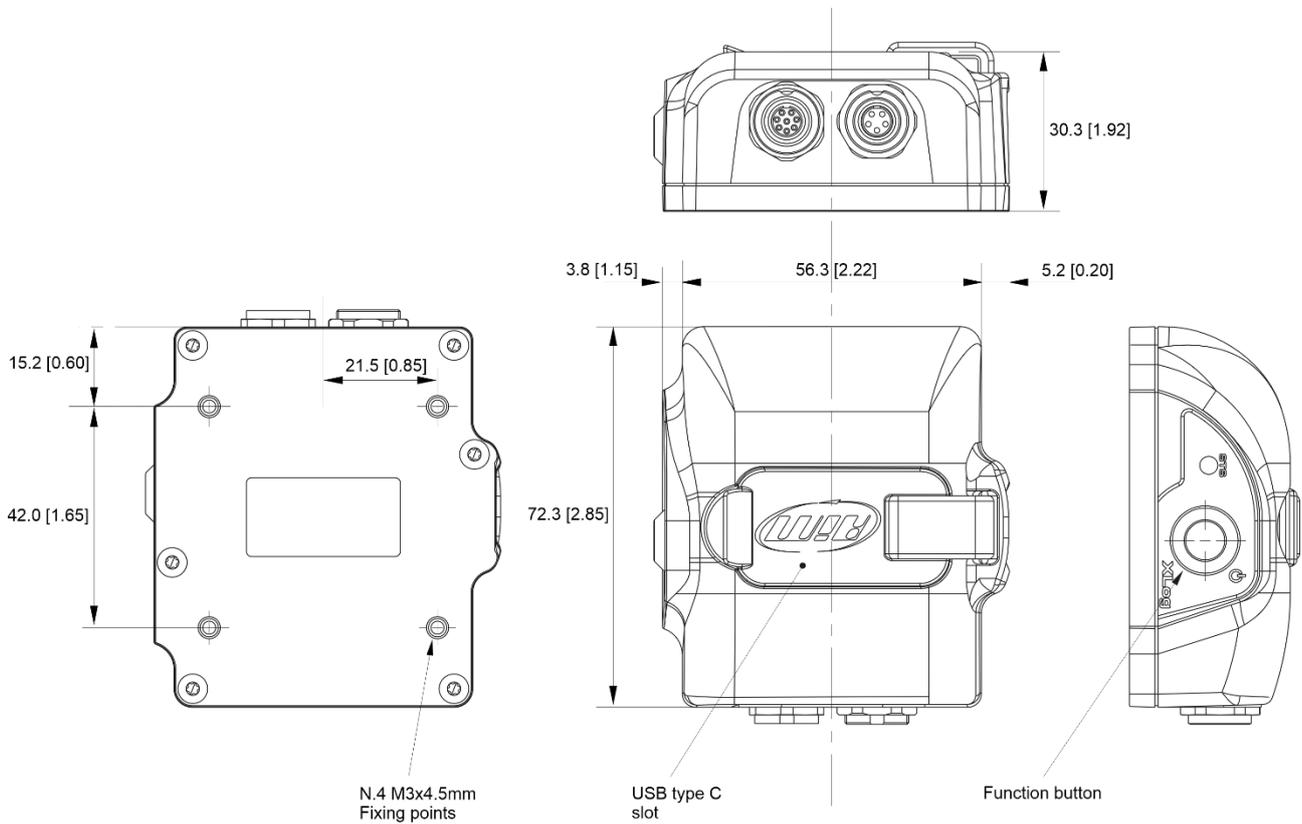
The logger can transmit a CAN data stream containing the channels required on AiM CAN bus. It works exactly as SmartyCam 3 advanced stream.

4.10 – Transmitting the configuration to XLog

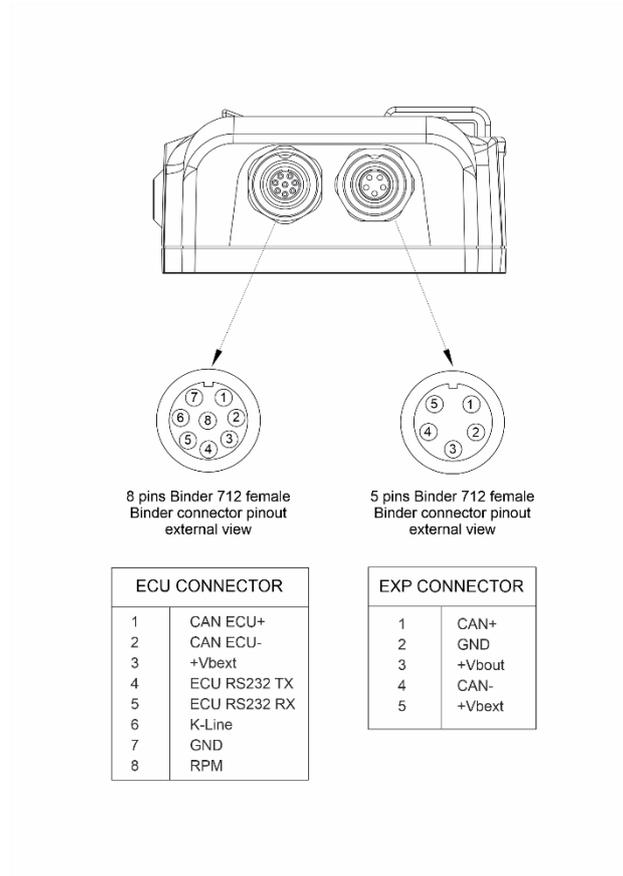
Once all the tabs set XLog configuration needs to be saved and transmitted to XLog pressing “Save” and “Transmit” buttons on the top left keyboard of configuration Tab. XLog can be connected to the PC via Wi-Fi or through the USB A – USB C cable included in the kit.

5 – Dimensions, pinout and technical characteristics

The image below shows XLog dimensions in mm [inches].



The image below shows XLog pinout.



Technical characteristics:

- Integrated track database Yes
- Inertial platform: Internal 3 axis ±5G accelerometer + 3 axis gyro
- USB connection: Yes
- Wi-Fi connection: Yes
- GPS 25Hz
- ECU connection: CAN, RS232 or K-Line
- RPM input: 1
- Pushbutton: 1
- Status LED 1
- External power 9÷15 V
- Connectors 1 socket (5 pins Binder 712) + 1 socket (8 pins Binder 712)
- Memory 4GB + removable USB-C memory card
- Battery type Rechargeable Lithium
- Dimensions 72.3x65.3x3.03 mm
- Weight 150g approximately
- Waterproof: IP65