



XAP SWX User Manual



Vers.	Date	Description	Auteur
001	30/04/19	Document creation	D.CHARBONNEAU
002	01/07/2019	Led number corrected	D.CHARBONNEAU
003	25/07/2019	CAN protocol	D.CHARBONNEAU

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1 INTRODUCTION

The new XAP SWX has a powerful colour dash board coupled with a 4 Gigabytes on board data logger.

With an aluminum housing enclosed and fitted with autosport connectors, the SWX can be used at the highest levels of motorsport.

An integrated 4.3" TFT colour display with 480x272-pixel resolution ensures perfect readability in all environments. It is completely programmable with the new XAP Dash Editor software.

The main display includes 10 fully configurable alarm/RPM RGB leds.

The internal 3-axis accelerometer and gyroscope combined with the 20Hz GPS allow highly accurate positioning, enabling analysis of on track performance and trajectory, as well as real time lap time estimation, available only with GPS option.

The additional inputs (Digital, GPS, 2 CAN bus) allow the material to be used on all racing car applications.

An ambient light sensor keeps the backlight at optimum brightness levels.

An additional ambient pressure sensor will optimize your engine management.

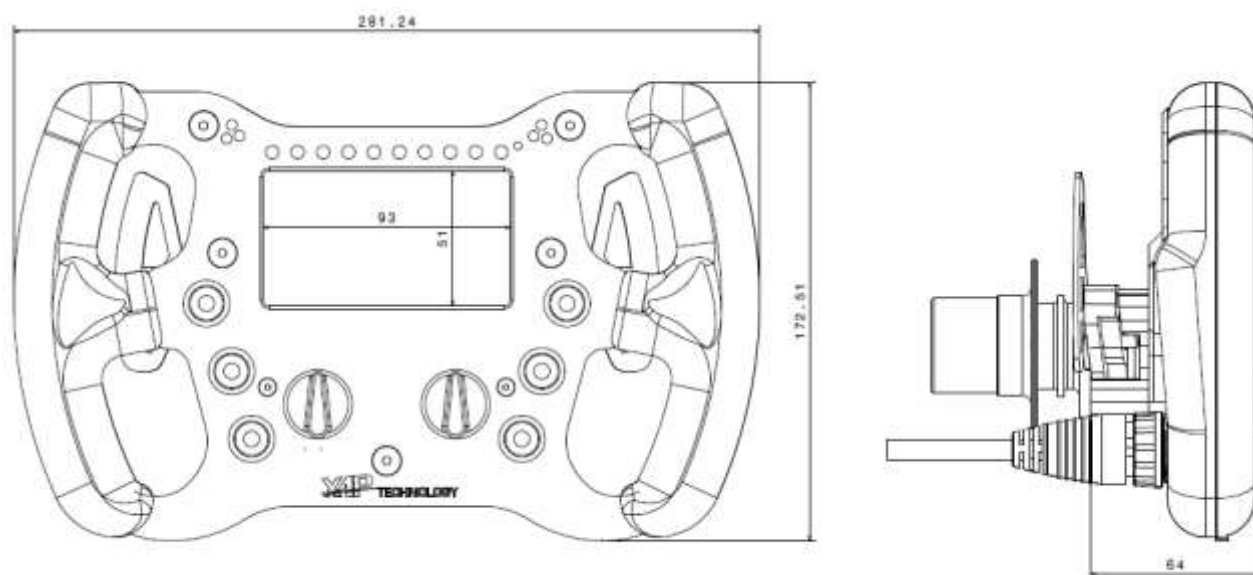
2 GENERAL INFORMATION

2.1 Specifications

SWX_1220 GENERAL CHARACTERISTICS

Feature		Comment
Dimension		see drawings
Connector		Amphenol 451 02YS14-19P50
Screen		4,3" TFT color 480x272
Luminosity		By sensors or CAN control
Com Lines	CAN	2
	WIFI	1
	USB	1
Logic Platform	MCU	STM32F746 à 200Mhz, 1MB Flash memory, 320KB SRAM
	GPU	STM32F746, 16MB SDDRAM for frame bufer
Inputs	Rotary	2
	Paddle	2 (3 optionnal)
	Switch	6
Outputs	Paddle Signal	3
	Switch Radio	1
Misc	Bar/Alarm Led	10
	Dimming sensor	1
	DataLogger	4Gbyte
	Ambient Pressure	1
	Predictive LapTime	1
	GPS	72-channel u-blox M8 engine GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1, Galileo E1B/C SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN

2.2 Dimensions



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2.3 Pinout

The SWX is equipped with autosport connectors and a GPS antenna connector (located on the back side optional):

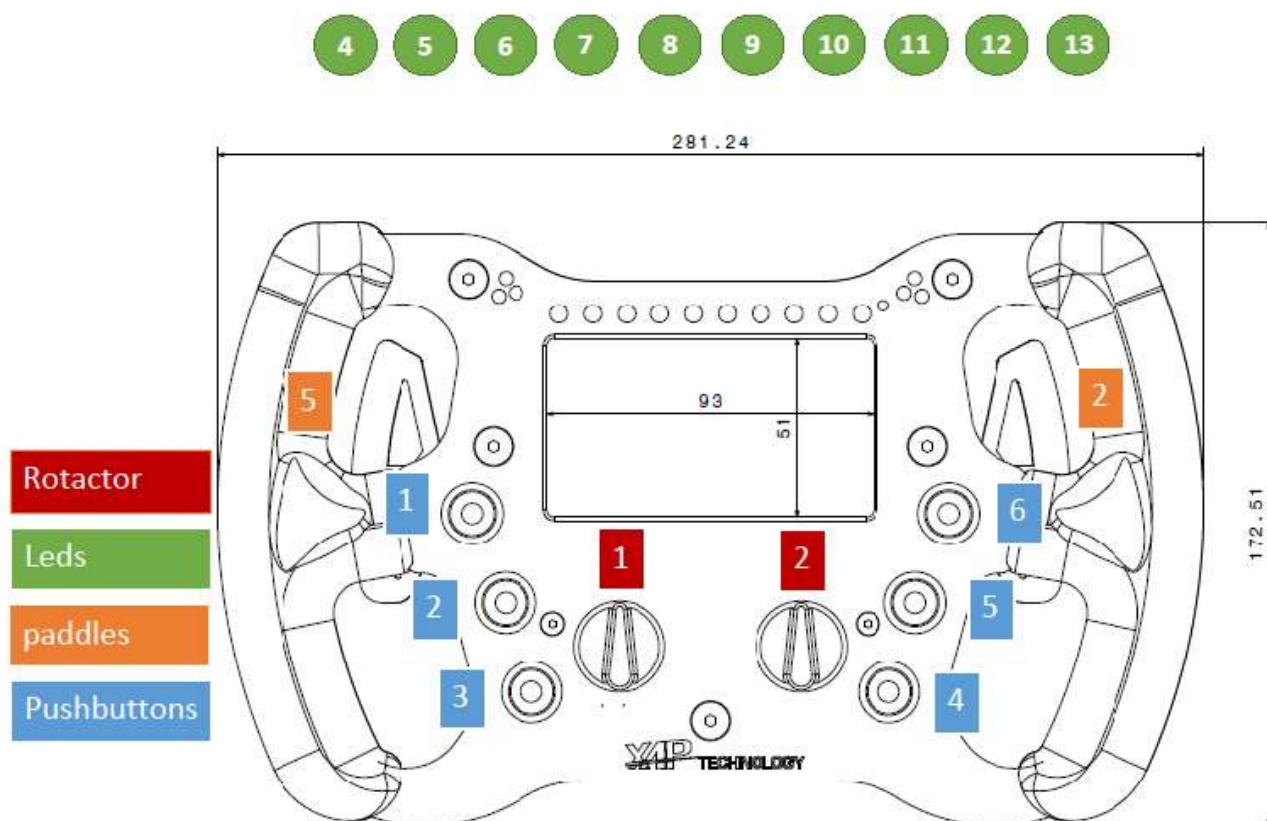
1. the 19-pin main connector: 45102YS14-19P50 (loom connector 45106RT1419S50)
2. the GPS antenna coaxial connector (SMA type).

 www.xap.fr - contact@xap.fr		EXTERNAL PIN OUT		SWX-1xxx SPEC A	
				Revision	Spec A
				Date emiss.	28/02/2019
		SWX			
PRODUCT				PRODUCT REF CODE	
SWX-1xxx				PF0601-A	
Connector:					
N° pin: 19		Part number: 451 02YS14-19P50		Color:	
Position:		Supplier: Amphenol		Type:	
Pin	Signal	Description		Commnet / uP	
1	CAN1 LOW	CAN 1		Programmed term up to 1M	
2	CAN1 HIGH				
3	USB -	USB DATA -			
4	USB_GND	SPECIFIC GND FOR USB			
5	PAL OUT1	Analog signal		0-5V linear/on-off	
6	RADIO IN	VIA link			
7	RADIO OUT				
8	PAL OUT2	Analog signal		0-5V linear/on-off	
9	NC	Not connected			
10	12V_IN	Vbatt			
11	GND	General Ground & Analog Gnd			
12	USB_VBUS	USB Power			
13	USB+	USB DATA +			
14	CAN2 HIGH	CAN 2		Programmed term up to 1M	
15	CAN2 LOW				
16	PAL_OUT3	Analog signal		0-5V linear/on-off	
17	NC	Not connected			
18	WHEEL3/DIG3	Digital input 3		up to 100kHz	
19	WHEEL4/DIG4	Digital input 4		up to 100kHz	

Note 1: Analog and digital inputs must be in the range 0-5V.

Note 2: The other interfaces (RS232, CAN bus, USB) must respect their corresponding standard.

2.4 Items location



2.5 Power-on and Reboot

After power on and reboot the screen configured as the first screen is displayed.

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2.6 The embedded diagnostic screens

As these screens are used mainly for debugging purpose, their access can be disabled by configuration.

By default, actions on embedded diagnostic screens (switching of screens, reset of values,) can be performed by a push-button connected to input Page + with DIGI1_IN (by default) but another digital input can be configured to play the same role. In the rest of this document this push-button is named the PAGE push-button.

Pressing the PAGE push-button more than two seconds displays the first diagnostic screen. Six diagnostic screens are defined:

1. The “LAPTIME INFO” screen:

In this screen are displayed the following pieces of information:

- **LapNum:** Lap number
- **Last:** previous lap time
- **Best:** best lap time
- **Curr:** current lap time
- **Predict:** prediction of the current lap time. For each lap (except for the first lap where this value is not significant), this information is updated 20 times per second. Its value is the time difference (positive or negative) between the current time at the current location on the track and the time at the same position in the best lap time.
- A table of 20 pairs Lap number / lap times. The first 20 lap times are displayed in the corresponding lines of the table. When the table is full the display of lap times restarts at the beginning of the table.

Note 1: all lap times are expressed in “minutes” : “seconds” : “hundredths of a second”.

Note 2: pressing more than two seconds the PAGE push-button reset to zero all the values of this screen.

2. The “DASH INFO” screen:

In this screen are displayed the following pieces of information:

- **DASH Type**
- **Version:** version of the firmware.
- **SN:** serial number of the Dash NT

3. The “CAN DIAGNOSTIC” screen:

In this screen are displayed the following pieces of information:

- **RX cnt:** number of frames received on CAN1.
- **TX cnt:** number of frames transmitted on CAN1.
- **RX trames/s:** number of frames received on CAN1 per second.
- **TX trames/s:** number of frames transmitted on CAN1 per second.
- **Bus state:** “Disconnected” or “Connected”.
- **CAN REC REG:** value of the Receive Error Counter.

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- **CAN TEC REG**: value of the Transmit Error Counter.
- **Last error**: code indicating the error condition of the last error detected on CAN1.
- **Reset cnt**: counter of disconnections of CAN1 since the Dash NT was turned on.
- **Stuff error**: counter of Stuff errors.
- **Form error**: counter of Form errors.
- **ACK error**: counter of Acknowledgement errors.
- **BR error**: counter of Bit Recessive errors.
- **BD error**: counter of Bit Dominant errors.
- **CRC error**: counter of CRC errors.
- **Total** : sum of the six previous counters:

Note: the six previous counters and the sum are reset to zero when the CAN1 bus state switches from “Disconnected” to “Connected”.

4. The “GPS DIAGNOSTIC” screen:

In this screen are displayed the following pieces of information provided by the GPS module:

- **Year, Month, Day , Hour, Min, Sec**: date and time (UTC).
- **ns**: fraction of second, range -1e9 ... 1e9 (UTC)
- **xAccel, yAccel, zAccel**: x-axis, y-axis, z-axis accelerometer specific forces.
- **GPSFix**: the four values of this information are:
 - 0: no fix.
 - 1: dead reckoning only.
 - 2: 2D-Fix.
 - 3: 3D-Fix.
 - 4: GPS + dead reckoning combined.
- **Lat, Lon**: latitude and longitude.
- **Height**: height above ellipsoid.
- **hMSL**: height above mean sea level.
- **gSpeed**: ground speed (2-D).
- **HeadMot**: heading of motion (2-D).
- **HeadVeh**: heading of vehicle (2-D).
- **xGyro, yGyro, zGyro**: x-axis, y-axis, z-axis gyroscope angular rates.
- **ANT**: x-axis, y-axis, z-axis distances between the GPS antenna and the Dash NT.
- **Speed**: speed (3-D).
- **VRP**: x-axis, y-axis, z-axis distances between the Vehicle Reference Point (VRP) and the Dash NT.
- **Fix Status Flags**:
 - 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.

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- F_TOWSet: 1 = valid GPS time of week
- F_vHeadV: heading of vehicle is valid.
- F_esf_st:
- F_esf_er:
- F_vGyroX:
- F_vGyroY:
- F_vGyroZ:
- F_vAcclX: compensated x-axis acceleration data validity (0: not valid, 1: valid)
- F_vAcclY: compensated y-axis acceleration data validity (0: not valid, 1: valid)
- F_vAcclZ: compensated z-axis acceleration data validity (0: not valid, 1: valid)

5. The “GPS MSG LOG” screen:

In this screen are displayed the following pieces of information:

- **LOG state:** “paused” or “running”. In the “running” state the scrolling of information in the central area is stopped. Quickly double-pressing the PAGE button changes the state.
- **TX cnt:** number of frames transmitted on the SPI by the microcontroller of the Dash NT to the GPS module. This counter is reset to zero when the Dash NT is powered off.
- **RX cnt:** number of frames received on the SPI by the microcontroller of the Dash NT from the GPS module. This counter is reset to zero when the Dash NT is powered off.

In the central area of the screen are scrolling (for debugging purpose) significant bytes of the messages exchanged between the microcontroller and the GPS module.

6. The “PADDLE DIAG” screen:

In this screen are displayed the following pieces of information:

- **Paddle Value:** “display in real time the value in mV of the paddle, the background colour informs the status, RED: OFF, BLUE: ON.
- **Paddle Min/Max:** “displays on the side of each paddle, the Min and Max value.
- **Switch on/off:** “status of the switch

7. The “ROTARY DIAG” screen:

In this screen are displayed the following pieces of information:

- **Rotaries position:** “display in real time the position learned of each rotary

When an embedded diagnostic screen is displayed, pressing the PAGE push-button more than two seconds returns to the current configured screen.

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2.7 Connecting to a PC

Important: to protect the PC against electrical surges it is highly recommended to connect to the PC through a USB hub, or use our USB isolator.

The material behaviour is slightly different depending on what we call its internal USB connection mode. Two distinct USB connection modes are considered: the nominal USB mode and the HID mode.

In both modes, disconnecting the USB port, makes the material to restart. Changing the mode can be done as follows:

- Keep the PAGE push-button pressed connect to the USB port of a PC.
- The PAGE push-button can then be released.

2.7.1 The nominal USB mode

In this mode:

- After reboot, and if the CAN is not connected, the message “CAN DISCONNECTED” is displayed in the center of the first screen. This message is displayed as well in each type of configured screen but is not displayed in the embedded diagnostic screens.
- When our material is connected to the USB port, the message “USB CONNECTED” is displayed in the center of the “DASH INFO” embedded diagnostic screen. The PAGE push-button is inoperative as long as the material remains connected through USB (no other screen is accessible).
- When connected to the USB equipped with the Dash Editor software following functions can be performed:
 - download a configuration file from the PC.
 - download a GPS configuration file from the PC.
 - download a license file from the PC.
 - download the material firmware from the PC.
 - download a XAP configuration folder from the PC.
 - upload a configuration file to the PC.
 - upload an acquisition file to the PC.
 - download a track timing file from the PC.

All these functions are described in the Dash Editor User Manual.

Note: After each of these functions has been performed the USB port of the Dash NT must be disconnected (what makes it restart and enter its nominal mode of operation).

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2.7.2 The HID mode

In this mode:

- After reboot, and if the CAN is not connected, the message “CAN DISCONNECTED” is displayed in the center of the first screen. This message is displayed as well in each type of configured screen but not displayed in the embedded diagnostic screens.
- When the material is connected to the USB port of a PC or to the CAN the message “CAN DISCONNECTED”, if present, disappears. When the CAN is disconnected from the CAN this message is displayed again.
- Download/upload actions from/to the PC equipped with the Dash Editor software are not available.

2.8 Resetting the GPS module

To reset the GPS module of the material the following procedure must be applied:

1. Power off the material.
2. Press the PAGE push-button while powering on.
3. Keep the PAGE push-button pressed until the message “GPS RESET” is displayed.

2.9 Resetting to zero the minimum and maximum values

To reset to zero the minimum and maximum values of all the data recorded, the following procedure must be applied:

1. Maintain the PAGE button pushed until the message “MIN MAX RESET” is displayed in the bottom of the screen (this message disappears after 3 seconds).

Screens will go through this

STANDARD → DIAG Screen → MIN/MAX reset

2.10 Materials and cleaning advices

In a way to guaranty correct sealing of the material, it must remain closed in any case. Only XAP staff is allowed to open it to ensure correct re-sealing of the product after servicing.

We recommend using alcohol for each element cleaning. All others cleaning solvents can be too aggressive.

To avoid any screen scratch we also recommend using a soft cotton wipe.

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2.11 Resetting to zero the minimum and maximum values

To reset to zero the minimum and maximum values of all the data recorded, the following procedure must be applied:

2. Maintain the PAGE button pushed until the message “MIN MAX RESET” is displayed in the bottom of the screen (this message disappears after 3 seconds).

Screens will go through this

STANDARD → DIAG Screen → MIN/MAX reset

3 CAN PROTOCOL XAP -> SYSTEM

3.1.1 Frame 0x410 : General informations

Basic Parameters

ID Hex (Dec)	Rate	Format
0x410(1040)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	Software version	XAP_SOFT_V	U8 [1/bit]	
1	Running counter	XAP_CNT	U8 [1/bit]	Increments every frame
2	Light Sensor	XAP_LS	U12[1/bit]	12 bits conversion [0 – 4095]
3				
4	Current Page Number	XAP_STW_CURR_PN	U8[1/bit]	
5	Reset source	XAP_RST_SRC	U8[1/bit]	0x01:Alim / 0x02:Pin μ / 0x03: WatchDog
6	Session Num		U8[1/bit]	
7	Temperature		U8[1°/bit]	

3.1.2 Frame 0x411 : Paddles 1,2,3 &4 ANA Values

Basic Parameters

ID Hex (Dec)	Rate	Format
0x411(1041)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	<i>Paddle 1 ANA value</i>	XAP_STW_PDL1	U12[1/bit]	12 bits conversion [0 – 4095]
1				
2	Paddle 2 ANA value	XAP_STW_PDL2	U12[1/bit]	12 bits conversion [0 – 4095]
3				
4	<i>Paddle 3 ANA value</i>	XAP_STW_PDL3	U12[1/bit]	12 bits conversion [0 – 4095]
5				
6	<i>Paddle 4 ANA value</i>	XAP_STW_PDL4	U12[1/bit]	12 bits conversion [0 – 4095]

7				
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3.1.3 Frame 0x412 : Rotary and buttons

Basic Parameters

ID Hex (Dec)	Rate	Format
0x412(1042)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	Push Buttons & Paddles	XAP_STW_PB_PDLL	U16[bitmap]	See table below
1				
2	Rotary 1 position	XAP_STW_R1	U8[1/bit]	1 to 10, 0 if faulty position
3	Rotary 2 position	XAP_STW_R2	U8[1/bit]	1 to 10, 0 if faulty position
4	<i>Rotary 3 position</i>	<i>XAP_STW_R3</i>	<i>U8[1/bit]</i>	<i>1 to 10, 0 if faulty position</i>
5	Thumbwheels 1 position	XAP_STW_THB1_P	U8[1/bit]	1 to 6, 0 if faulty position
6	Thumbwheels 2 position	XAP_STW_THB2_P	U8[1/bit]	1 to 6, 0 if faulty position
7	Output State	XAP_OUTPUT_STATE	U8[bitmap]	BIT0: Radio, BIT1: OUT1, BIT2: OUT2

Push buttons & Paddle switches Bitmap table

Bit	Meaning
0	=1 if Push Button 1 is pressed =0 if not
1	=1 if Push Button 2 is pressed =0 if not
2	=1 if Push Button 3 is pressed =0 if not
3	=1 if Push Button 4 is pressed =0 if not
4	=1 if Push Button 5 is pressed =0 if not
5	=1 if Push Button 6 is pressed =0 if not
6	=1 if Push Button 7 is pressed =0 if not
7	=1 if Push Button 8 is pressed =0 if not
8	=1 if Push Button 9 is pressed =0 if not
9	=1 if Push Button 10 is pressed =0 if not
10	=1 if Paddle 1 is pressed =0 if not
11	=1 if Paddle 2 is pressed =0 if not
12	=1 if Paddle 3 is pressed =0 if not
13	=1 if Paddle 4 is pressed =0 if not
14	=1 if Paddle 5 is pressed =0 if not

15	=1 if Paddle 6 is pressed =0 if not
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3.1.4 Frame 0x413 : Paddles 5&6 ANA Values, 1&2 detection threshold

Basic Parameters

ID Hex (Dec)	Rate	Format
0x413(1043)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	Paddle 5 ANA value	XAP_STW_PDL5	U12[1/bit]	12 bits conversion [0 – 4095]
1				
2	Paddle 6 ANA value	XAP_STW_PDL6	U12[1/bit]	12 bits conversion [0 – 4095]
3				
4	Paddle 1 threshold	XAP_STW_PDL1	U12[1/bit]	12 bits conversion [0 – 4095]
5				
6	Paddle 2 threshold	XAP_STW_PDL2	U12[1/bit]	12 bits conversion [0 – 4095]
7				

3.1.5 Frame 0x414 : Paddles 3, 4, 5 & 6 detection threshold

Basic Parameters

ID Hex (Dec)	Rate	Format
0x414(1044)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	Paddle 3 threshold	XAP_STW_PDL3	U12[1/bit]	12 bits conversion [0 – 4095]
1				
2	Paddle 4 threshold	XAP_STW_PDL4	U12[1/bit]	12 bits conversion [0 – 4095]
3				
4	Paddle 5 threshold	XAP_STW_PDL5	U12[1/bit]	12 bits conversion [0 – 4095]
5				
6	Paddle 6 threshold	XAP_STW_PDL6	U12[1/bit]	12 bits conversion [0 – 4095]

7				
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4 CAN PROTOCOL SYSTEM -> XAP

Behavior of the LED frames:

- If there is a LED order (another value than 0 on RGB LED values)
 - The specified LED will be forced by RGB values in the frame
- If there is no LED order (0 on the RGB LED values)
 - The specified LED will have the “**DASH EDITOR**” behavior

4.1.1 Frame 0x400 – 0x408 : LED Specification, dimming

Basic Parameters

ID Hex (Dec)	Rate	Format
0x400 (1024)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	LED 0 RED Value	LED_0_R	U8	
1	LED 0 GREEN Value	LED_0_G	U8	
2	LED 0 BLUE Value	LED_0_B	U8	
3	LED 1 RED Value	LED_1_R	U8	
4	LED 1 GREEN Value	LED_1_G	U8	
5	LED 1 BLUE Value	LED_1_B	U8	
6	LED Push Buttons	LED_PB	U16	Bit0 to Bit9 : PB1 to PB10 led state, Bit10 to Bit15 unused
7				

Basic Parameters

ID Hex (Dec)	Rate	Format
0x401(1025)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	LED 2 RED Value	LED_2_R	U8	
1	LED 2 GREEN Value	LED_2_G	U8	
2	LED 2 BLUE Value	LED_2_B	U8	
3	LED 3 RED Value	LED_3_R	U8	
4	LED 3 GREEN Value	LED_3_G	U8	
5	LED 3 BLUE Value	LED_3_B	U8	
6	NA	NA	NA	
7	NA	NA	NA	

Basic Parameters

ID Hex (Dec)	Rate	Format
0x402(1026)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	LED 4 RED Value	LED_4_R	U8	
1	LED 4 GREEN Value	LED_4_G	U8	
2	LED 4 BLUE Value	LED_4_B	U8	
3	LED 5 RED Value	LED_5_R	U8	
4	LED 5 GREEN Value	LED_5_G	U8	
5	LED 5 BLUE Value	LED_5_B	U8	
6	NA	NA	NA	
7	NA	NA	NA	

Basic Parameters

ID Hex (Dec)	Rate	Format
0x403(1027)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	LED 6 RED Value	LED_6_R	U8	
1	LED 6 GREEN Value	LED_6_G	U8	
2	LED 6 BLUE Value	LED_6_B	U8	
3	LED 7 RED Value	LED_7_R	U8	
4	LED 7 GREEN Value	LED_7_G	U8	
5	LED 7 BLUE Value	LED_7_B	U8	
6	NA	NA	NA	
7	NA	NA	NA	

Basic Parameters

ID Hex (Dec)	Rate	Format
0x404(1028)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	LED 8 RED Value	LED_8_R	U8	
1	LED 8 GREEN Value	LED_8_G	U8	
2	LED 8 BLUE Value	LED_8_B	U8	
3	LED 9 RED Value	LED_9_R	U8	
4	LED 9 GREEN Value	LED_9_G	U8	
5	LED 9 BLUE Value	LED_9_B	U8	
6	NA	NA	NA	
7	NA	NA	NA	

Basic Parameters

ID Hex (Dec)	Rate	Format
0x405(1029)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	LED 10 RED Value	LED_10_R	U8	
1	LED 10 GREEN Value	LED_10_G	U8	
2	LED 10 BLUE Value	LED_10_B	U8	
3	LED 11 RED Value	LED_11_R	U8	
4	LED 11 GREEN Value	LED_11_G	U8	
5	LED 11 BLUE Value	LED_11_B	U8	
6	NA	NA	NA	
7	NA	NA	NA	

Basic Parameters

ID Hex (Dec)	Rate	Format
0x406(1030)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	LED 12 RED Value	LED_12_R	U8	
1	LED 12 GREEN Value	LED_12_G	U8	
2	LED 12 BLUE Value	LED_12_B	U8	
3	LED 13 RED Value	LED_13_R	U8	
4	LED 13 GREEN Value	LED_13_G	U8	
5	LED 13 BLUE Value	LED_13_B	U8	
6	NA	NA	NA	
7	NA	NA	NA	

Basic Parameters

ID Hex (Dec)	Rate	Format
0x407 (1031)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	LED 14 RED Value	LED_14_R	U8	
1	LED 14 GREEN Value	LED_14_G	U8	
2	LED 14 BLUE Value	LED_14_B	U8	
3	LED 15 RED Value	LED_15_R	U8	
4	LED 15 GREEN Value	LED_15_G	U8	
5	LED 15 BLUE Value	LED_15_B	U8	
6	NA	NA	NA	
7	NA	NA	NA	

Basic Parameters

ID Hex (Dec)	Rate	Format
0x408(1032)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	Screen backlight Dimming	SCR_BL_DIM	U8	8 light levels (0 : max, 8 mini)
1	Led Dimming	LED_DIM	U8	8 light levels (0 : max, 8 mini)
2	Push Buttons Led Dimming	PB_LED_DIM	U8	8 light levels (0 : max, 8 mini)
3	NA	NA	NA	
4	NA	NA	NA	
5	NA	NA	NA	
6	NA	NA	NA	
7	NA	NA	NA	

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4.1.2 Frame 0x409 : Page specification & button

Basic Parameters

ID Hex (Dec)	Rate	Format
0x409(1033)	100 Hz	Big Endian

Detailed Payload Description

Byte	STW Name	External Name	Calibration	Notes
0	Page control	PG_CTRL	U8	0: Pilot manual control 1 – 255: Requested automatic page 1 : Page n°1 255 : page n°255
1	button N° OUT1 OUT2	NUM_BTN_CMD_1_2	U8	See “button choice” below
2	button N° Page+ radio	NUM_BTN_PG+_RAD	U8	See “button choice” below
3	button N° Page-	NUM_BTN_PG-	U8	See “button choice” below
4				
5				
6				
7	button N° Start Training (only for F2)	NUM_BTN_ST	U8	Number between 1 & 10 0 = INACTIVE

Button choice in frame 0x409

Byte	BIT	FUNCTION	Notes
1	0-3	OUT1 button choice	Number between 1 & 10 Warning: The button will not be affected if that button is already taken. 0 = INACTIVE
	4-7	OUT2 button choice	
2	0-3	Page+ button choice	
	4-7	Radio button choice	
3	0-3	Page- button choice	
	4-7	Set to 0	

4.1.3 Frame 0x415 : All LEDs Configuration

Basic Parameters

ID Hex (Dec)	Rate	Format
0x415(1045)	100 Hz	

Detailed Payload Description

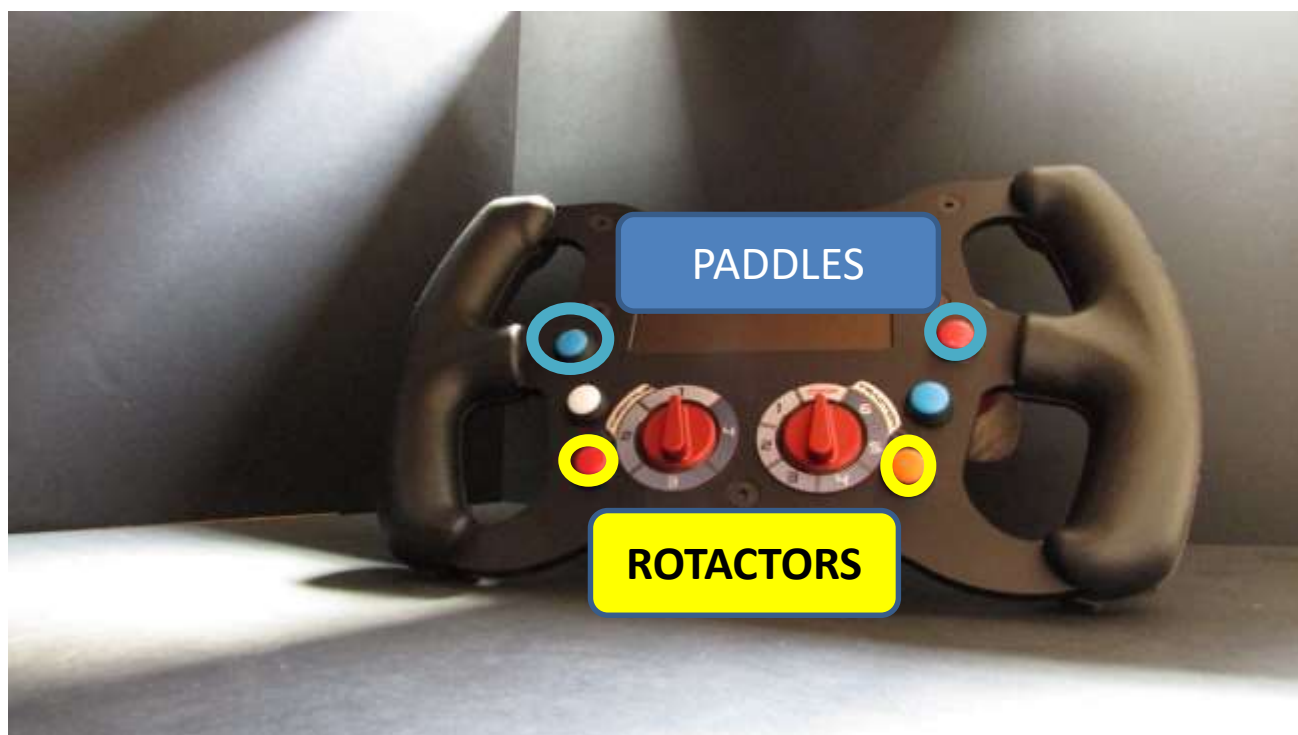
Bit	STW Name	External Name	Calibration	Notes
0	LED 0 RED Status	LED_0_R	Boolean	0 = OFF / 1 = ON
1	LED 0 GREEN Status	LED_0_G	Boolean	0 = OFF / 1 = ON
2	LED 0 BLUE Status	LED_0_B	Boolean	0 = OFF / 1 = ON
3	LED 1 RED Status	LED_1_R	Boolean	0 = OFF / 1 = ON
4	LED 1 GREEN Status	LED_1_G	Boolean	0 = OFF / 1 = ON
5	LED 1 BLUE Status	LED_1_B	Boolean	0 = OFF / 1 = ON
6	LED 2 RED Status	LED_2_R	Boolean	0 = OFF / 1 = ON
7	LED 2 GREEN Status	LED_2_G	Boolean	0 = OFF / 1 = ON
8	LED 2 BLUE Status	LED_2_B	Boolean	0 = OFF / 1 = ON
9	LED 3 RED Status	LED_3_R	Boolean	0 = OFF / 1 = ON
10	LED 3 GREEN Status	LED_3_G	Boolean	0 = OFF / 1 = ON
11	LED 3 BLUE Status	LED_3_B	Boolean	0 = OFF / 1 = ON
12	LED 4 RED Status	LED_4_R	Boolean	0 = OFF / 1 = ON
13	LED 4 GREEN Status	LED_4_G	Boolean	0 = OFF / 1 = ON
14	LED 4 BLUE Status	LED_4_B	Boolean	0 = OFF / 1 = ON
15	LED 5 RED Status	LED_5_R	Boolean	0 = OFF / 1 = ON
16	LED 5 GREEN Status	LED_5_G	Boolean	0 = OFF / 1 = ON
17	LED 5 BLUE Status	LED_5_B	Boolean	0 = OFF / 1 = ON
18	LED 6 RED Status	LED_6_R	Boolean	0 = OFF / 1 = ON
19	LED 6 GREEN Status	LED_6_G	Boolean	0 = OFF / 1 = ON
20	LED 6 BLUE Status	LED_6_B	Boolean	0 = OFF / 1 = ON
21	LED 7 RED Status	LED_7_R	Boolean	0 = OFF / 1 = ON
22	LED 7 GREEN Status	LED_7_G	Boolean	0 = OFF / 1 = ON
23	LED 7 BLUE Status	LED_7_B	Boolean	0 = OFF / 1 = ON
24	LED 8 RED Status	LED_8_R	Boolean	0 = OFF / 1 = ON
25	LED 8 GREEN Status	LED_8_G	Boolean	0 = OFF / 1 = ON
26	LED 8 BLUE Status	LED_8_B	Boolean	0 = OFF / 1 = ON
27	LED 9 RED Status	LED_9_R	Boolean	0 = OFF / 1 = ON
28	LED 9 GREEN Status	LED_9_G	Boolean	0 = OFF / 1 = ON
29	LED 9 BLUE Status	LED_9_B	Boolean	0 = OFF / 1 = ON
30	LED 10 RED Status	LED_10_R	Boolean	0 = OFF / 1 = ON
31	LED 10 GREEN Status	LED_10_G	Boolean	0 = OFF / 1 = ON
32	LED 10 BLUE Status	LED_10_B	Boolean	0 = OFF / 1 = ON

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33	LED 11 RED Status	LED_11_R	Boolean	0 = OFF / 1 = ON
34	LED 11 GREEN Status	LED_11_G	Boolean	0 = OFF / 1 = ON
35	LED 11 BLUE Status	LED_11_B	Boolean	0 = OFF / 1 = ON
36	LED 12 RED Status	LED_12_R	Boolean	0 = OFF / 1 = ON
37	LED 12 GREEN Status	LED_12_G	Boolean	0 = OFF / 1 = ON
38	LED 12 BLUE Status	LED_12_B	Boolean	0 = OFF / 1 = ON
39	LED 13 RED Status	LED_13_R	Boolean	0 = OFF / 1 = ON
40	LED 13 GREEN Status	LED_13_G	Boolean	0 = OFF / 1 = ON
41	LED 13 BLUE Status	LED_13_B	Boolean	0 = OFF / 1 = ON
42	LED 14 RED Status	LED_14_R	Boolean	0 = OFF / 1 = ON
43	LED 14 GREEN Status	LED_14_G	Boolean	0 = OFF / 1 = ON
44	LED 14 BLUE Status	LED_14_B	Boolean	0 = OFF / 1 = ON
45	LED 15 RED Status	LED_15_R	Boolean	0 = OFF / 1 = ON
46	LED 15 GREEN Status	LED_15_G	Boolean	0 = OFF / 1 = ON
47	LED 15 BLUE Status	LED_15_B	Boolean	0 = OFF / 1 = ON
48	LED PB 1 Status	LED_PB_1	Boolean	0 = OFF / 1 = ON
49	LED PB 2 Status	LED_PB_2	Boolean	0 = OFF / 1 = ON
50	LED PB 3 Status	LED_PB_3	Boolean	0 = OFF / 1 = ON
51	LED PB 4 Status	LED_PB_4	Boolean	0 = OFF / 1 = ON
52	LED PB 5 Status	LED_PB_5	Boolean	0 = OFF / 1 = ON
53	LED PB 6 Status	LED_PB_6	Boolean	0 = OFF / 1 = ON
54	LED PB 7 Status	LED_PB_7	Boolean	0 = OFF / 1 = ON
55	LED PB 8 Status	LED_PB_8	Boolean	0 = OFF / 1 = ON
56	LED PB 9 Status	LED_PB_9	Boolean	0 = OFF / 1 = ON
57	LED PB 10 Status	LED_PB_10	Boolean	0 = OFF / 1 = ON
58	NA	NA	NA	
59	NA	NA	NA	
60	NA	NA	NA	
61	NA	NA	NA	
62	NA	NA	NA	
63	NA	NA	NA	

5 LEARNING

!!!! Available until 5s after start !!!!



5.1 Rotary buttons learning operating mode

Press simultaneously buttons defined above, and follow instructions described in the screen, below.



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5.2Paddle learning operating mode

Press simultaneously buttons defined above, and follow instructions described in the screen, below.



6 COMPUTER PROGRAMMING

6.1 USB Connection

To send new configurations to the steering wheel you will need XAP recommended programming loom.



First, plug the power supply and wait until the steering wheel switches on. Then plug the USB connector on the computer. It is recommended to use USB hub to protect computer's USB ports from electric surge.

Be careful to switch on the steering wheel with unplugged USB, if not it will start in boot mode and will not be programmable.

When correctly plugged, usb connected message will appear on screen:



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You can now access to steering wheel folders or load/send your configuration.

6.2 Dash editor display configuration

Track map configuration can be easy-programmed using dash editor software. This XAP developed software is available on demand and on XAP website. It is used to define track map on dashboard of the steering wheel.

Please refers to embedded Dash Editor's user manual and contextual help for further information.