

RaceGrade

Document Number		RG_SPEC-0085	
Title		Steering Wheel	
Revision	Date	Prepared By	Change History
1.0	11/7/2017	HW	Initial Release
1.1	10/29/2018	HW	Update CAN info and specifications
1.2	9/19/2019	HW	Remove Button AV capabilities

Part # STEERING WHEEL RG.DV.PV0085-xxx

Description:

The Racegrade MSW-272 is a lightweight, composite steering wheel incorporating a MoTeC C125 display and logger for use in both slave and standalone applications. It contains momentary buttons, rotary knobs, paddle inputs and Opto isolated outputs.

The MoTeC C125 is a 5-inch (127 mm) TFT LCD anti-reflective colour display with an 800 x 400 resolution and anti-aliased graphics. In standard configuration up to 3 pages can be configured with selectable layouts and user defined Color schemes. Adding the optional C125 Display Creator feature allows even more layout versatility

The MSW-272 has 12 flush cap momentary buttons that are LED backlit. The LEDs have two brightness settings that can be configured through the MoTeC C125 software. Six rotary knobs are also available, each with 12 positions. These include 4 on the front face plate and 2 thumb wheels.

Paddle shift inputs are wired directly to the MoTeC C125. These are also wired through the steering column connector for direct connection to an Engine control module.

All Button and rotary positions are user configurable and can be transmitted via CAN for other ancillary devices. The MoTeC C125 has 10 customizable LEDs for shift lights, warnings etc. Each LED can be set to 8 different colors with 0-100 percent brightness settings using the standard Motec SLM control software found in the Dash Manager



Note: This steering wheel should not be used to push the car

Mechanical Specifications:

Base Material:	Composite Material Carbon fibre filled
Hand Grips:	Polyurethane mold
Weight:	2.80 lbs [1.81kg] (Including QR)
Operating Temp:	-20°C to 70° C
Size:	11.9" x 7.6 "x 4.1 " 303 mm x 192 mm x 96 mm
Quick Release:	Krontec QR 30-38-22P

Technical Specifications:

Supply Voltage:	6.0v – 32.0v
Current:	0.875A (excluding sensors) – tested at full SLM brightness, full Button brightness
Buttons:	12 Momentary (can be latching via C125 software) Reported states are: 0 = not pressed, 1 = pressed Button 1 is located top left, proceed counter clockwise sequentially to arrive at, button 12 top right Individual button LED brightness control Button state transmit rate onto CAN1 is 200 hz
Rotary Positions:	6 x 12 positions (4 front, 2 thumb wheels) Position (0-11) Voltage 0-5v, 2dps Transmit rate 10 Hz onto CAN1 *Note: Rotary knob color shades may vary from wheel to wheel*
Paddle inputs:	2 inputs (Left and right) 2 optional clutch input signals (see upgrades below) Raw input and output CAN receive 200 Hz
Opto Isolators:	For use with radio communications Normally open configuration 500 mA maximum
Communications:	Ethernet
CAN Comms:	C125 CAN Bus 1 – through QD C125 CAN Bus 2 – Internal use ONLY Design Standard: ISO 11898-2 CAN Termination Resistor: No

CAN2 Internal bus configurations details:Receive from button/knob array:

buttons and knobs labelled as shown in figure 1

CAN ID 0x110:

- Byte 0: button 1
- Byte 1: button 2
- Byte 2: button 3
- Byte 3: button 4
- Byte 4: button 5
- Byte 5: button 6
- Byte 6: button 7
- Byte 7: button 8

CAN ID 0x111:

- Byte 0: button 9
- Byte 1: button 10
- Byte 2: button 11
- Byte 3: button 12
- Byte 4: paddle right
- Byte 5: paddle left

CAN ID 0x112:

- Byte 0: rotary knob 1 position (0-11)
- Byte 1: rotary knob 2 position (0-11)
- Byte 2: rotary knob 3 position (0-11)
- Byte 3: rotary knob 4 position (0-11)
- Byte 4: rotary knob 5 position (0-11)
- Byte 5: rotary knob 6 position (0-11)

CAN ID 0x113:

- Byte 0: rotary knob 1 voltage(0-5v) MSB
- Byte 1: rotary knob 1 voltage(0-5v) LSB
- Byte 2: rotary knob 2 voltage(0-5v) MSB
- Byte 3: rotary knob 2 voltage(0-5v) LSB
- Byte 4: rotary knob 3 voltage(0-5v) MSB
- Byte 5: rotary knob 3 voltage(0-5v) LSB
- Byte 6: rotary knob 4 voltage(0-5v) MSB
- Byte 6: rotary knob 4 voltage(0-5v) LSB

CAN ID 0x114:

- Byte 0: rotary knob 5 voltage(0-5v) MSB
- Byte 1: rotary knob 5 voltage(0-5v) LSB
- Byte 2: rotary knob 6 voltage(0-5v) MSB
- Byte 3: rotary knob 6 voltage(0-5v) LSB

Transmit to button knob/array:

CAN ID 0x100:

- Byte 0: LED 1 control (ON/OFF)
- Byte 1: LED 2 control (ON/OFF)
- Byte 2: LED 3 control (ON/OFF)
- Byte 3: LED 4 control (ON/OFF)
- Byte 4: LED 5 control (ON/OFF)
- Byte 5: LED 6 control (ON/OFF)
- Byte 6: LED 7 control (ON/OFF)
- Byte 7: LED 8 control (ON/OFF)

CAN ID 0x101:

- Byte 0: LED 9 control
- Byte 1: LED 10 control
- Byte 2: LED 11 control
- Byte 3: LED 12 control
- Byte 4: KNOB LED Brightness
- Byte 5: Brightness ON (0-255)
- Byte 6: Brightness OFF (0-255)

LED Brightness Off – LED brightness for the OFF position

LED Brightness On – LED brightness for ON position

****Note:** either or both can be set to a channel for variable brightness**

CAN ID 0x130:

- Byte 0: Opto 1 control (OFF =0, ON = 1)
- Byte 2: Opto 2 control (OFF =0, ON = 1)

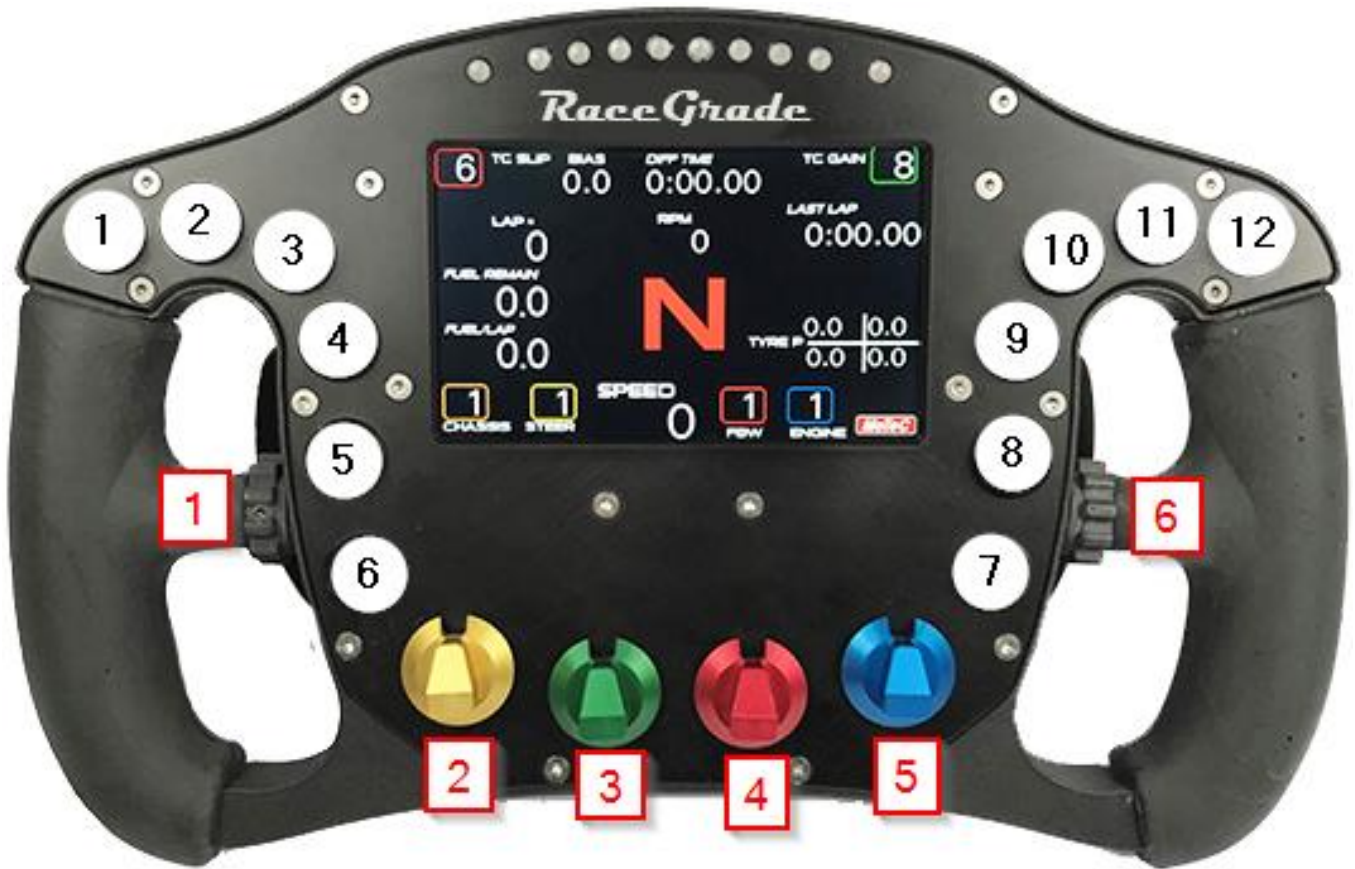


Figure 1: Numbering for buttons and knobs

Pin Out:

Center Column

Connector: Autosport AS012-35PN
 (* Souriau modification available)
 Mating Connector: AS612-35SN

Pin	Signal	Description	C125 Destination
1	12v	Power	
2	GND	Ground	
3	RC Signal	Right Clutch Signal	CAN input
4	C 0v	Clutch 0v	
5	LC Sig	Left Clutch Signal	CAN Input
6	PL Sig	Paddle Left Signal	DIG 1
7	PR Sig	Paddle Right Signal	DIG 2
8	Opto 1 in	Opto 1 In	AUX 1
9	Opto 1 Out	Opto 1 Out	
10	Rot 1	Rotary 1 signal	AV 3
11	Rot 0v	Rotary 0v	
12	Rot 2	Rotary 2 Signal	AT 2
13	Opto 2 in	Opto 2 In	AUX 2
14	Opto 2 Out	Opto 2 Out	
15	RS232 Rx-1	RS232 Rx (GPS, ECU)	
16	RS232 Tx-1	RS232 Tx (Telemetry)	
17	ETH RX+	Ethernet RX+ (Org/Wht)	
18	ETH TX+	Ethernet TX+ (GR/Wht)	
19	ETH RX-	Ethernet Rx- (Orange)	
20	CAN LO	CAN Low 1	
21	CAN HI	CAN High 1	
22	ETH TX-	Ethernet TX- (Green)	

Paddle Connection

Main Connector: ASU003-03PN
 Mating Connector: ASU603-03SN

Pin	Signal	Description
1	0v	Sensor 0v
2	PL Sig	Paddle Left Signal
3	5v	Sensor Power

Pin	Signal	Description
1	0v	Sensor 0v
2	PR Sig	Paddle Right Signal
3	5v	Sensor Power

C125 Specifications:**Display**

- Selectable fixed layouts with channel and label configurability (3 Pages)
- 48 user defined scrollable messages

Inputs/Outputs

- Compatible with CAN expanders – CAN bus 1 ONLY
 Note: CAN bus 2 is used for internal comms – is not available for outside use
- Opto isolators intended for use with Radio communications

Internal

- 3-axis G sensor, Dash Temp and Battery Voltage
- Sensor supply voltage

C125 Upgrades:

Display Creator – enables a full customisation of display graphics including imported images, logos, custom icons, and extra pages.

Logging Level 1 – 120 MB internal datalogging, up to 500 samples/ second

Pro Analysis – Provides access to advanced i2 Pro data analysis software with multiple graphs overlays, X-Y plots, Advanced math functions, synchronised video alignment, and flexible layouts.

T2 Telemetry – Allows use of MoTeC Telemetry software.

Clutch inputs – Possibility to add clutch paddles to the bottom of the wheel. This requires a software update and internal harness change.

Dimensional Drawings:

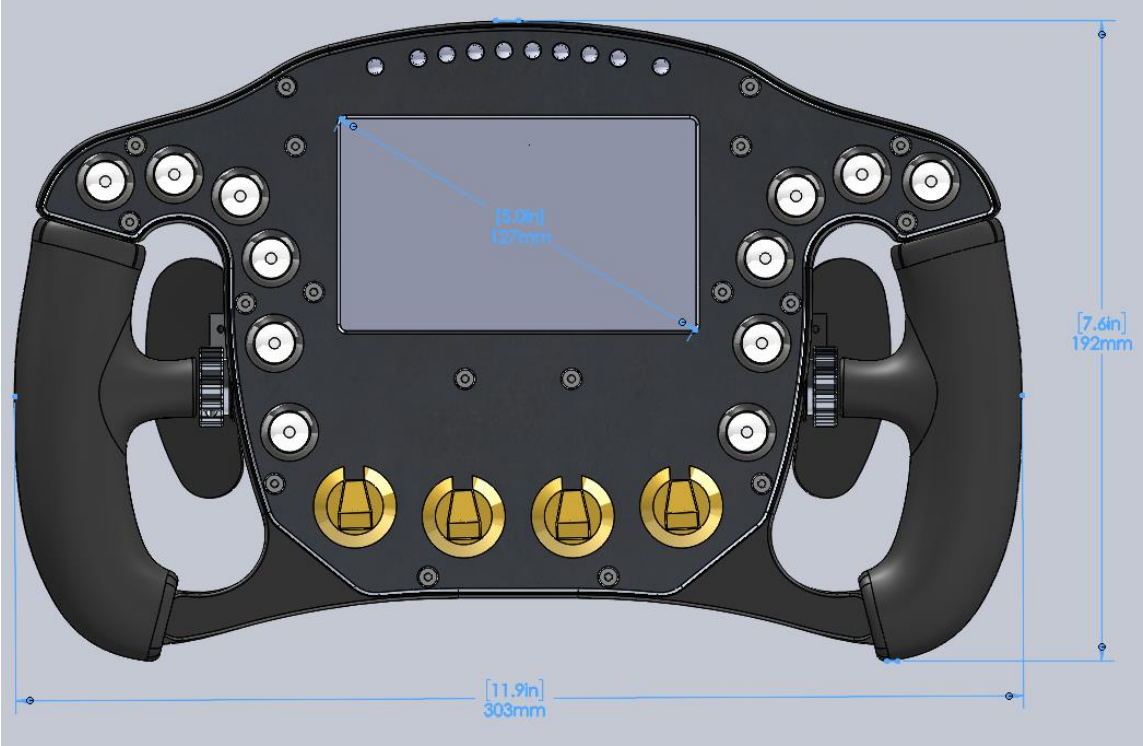


Figure 2: Front face of MSW-277

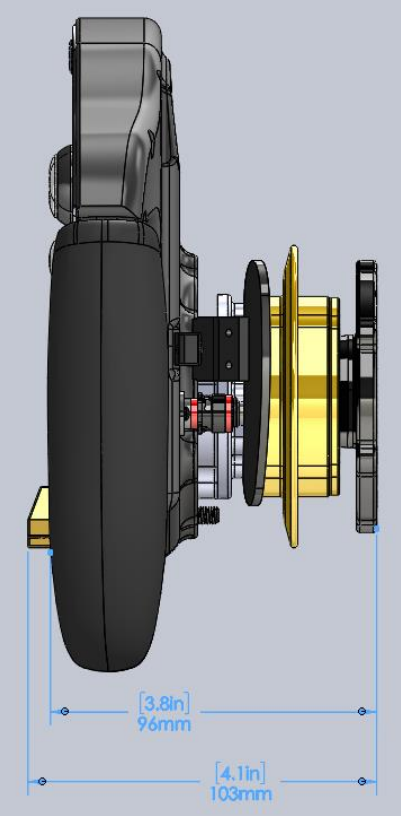


Figure 3: Side View of MSW-277