USER MANUAL

Wireless Racing Panel

Document version: 1.3
Published on: 31 July 2024

ECU**MASTER**

Contents

1. Device description

The Wireless Racing Panel offers a convenient and versatile control interface for your vehicle. Equipped with eight push buttons and four rotary switches, it integrates with the Wireless Receiver. Utilizing advanced wireless Radio Frequency (RF) technology, the panel transmits data over the CAN bus, enabling diverse applications within your car. Additionally, the panel supports connection to paddle shifters for expanded functionality.

1.1. Wireless Racing Panel description

Made from lightweight carbon fiber for durability and style, this Wireless Racing Panel offers a convenient and cable-free way to control your car's features. It easily mounts to racing steering wheels with 6x70 mm bolt pattern and connects wirelessly to the Wireless Receiver, eliminating the unnecessary wires. The panel features 8 customizable buttons and 4 rotary switches, allowing you to use them for your preferred functions. Included stickers help you mark each button for quick identification. For even more control, two dedicated connectors enable the addition of paddle shifters (not included).

The Wireless Racing Panel integrates with other CAN-bus devices. This ensures enhanced connectivity and coordination between different components of the vehicle's control system.

The CR2450 battery of the Wireless Racing Panel, tested for durability, demonstrates efficient power consumption by withstanding over 1.5 million button presses at room temperature. Battery level is transmitted over the CAN-bus, providing real-time information.

1.2. Wireless Receiver description

The Wireless Receiver unit processes the signal received from the Wireless Racing Panel and transmits it via the Controller Area Network (CAN) bus, the vehicle's primary communication system. Additionally, the Wireless Receiver incorporates three status indicator LEDs, providing visual feedback on critical system parameters.

Green LED: Glows indicating the Wireless Receiver is powered. If properly powered, the diode should glow constantly.

Red LED: Blinks indicating low Wireless Racing Panel battery (approximately 20%). Change the battery as soon as possible.

Blue LED: Blinks each time the Panel successfully transmits data to the Wireless Receiver. This signifies active communication.

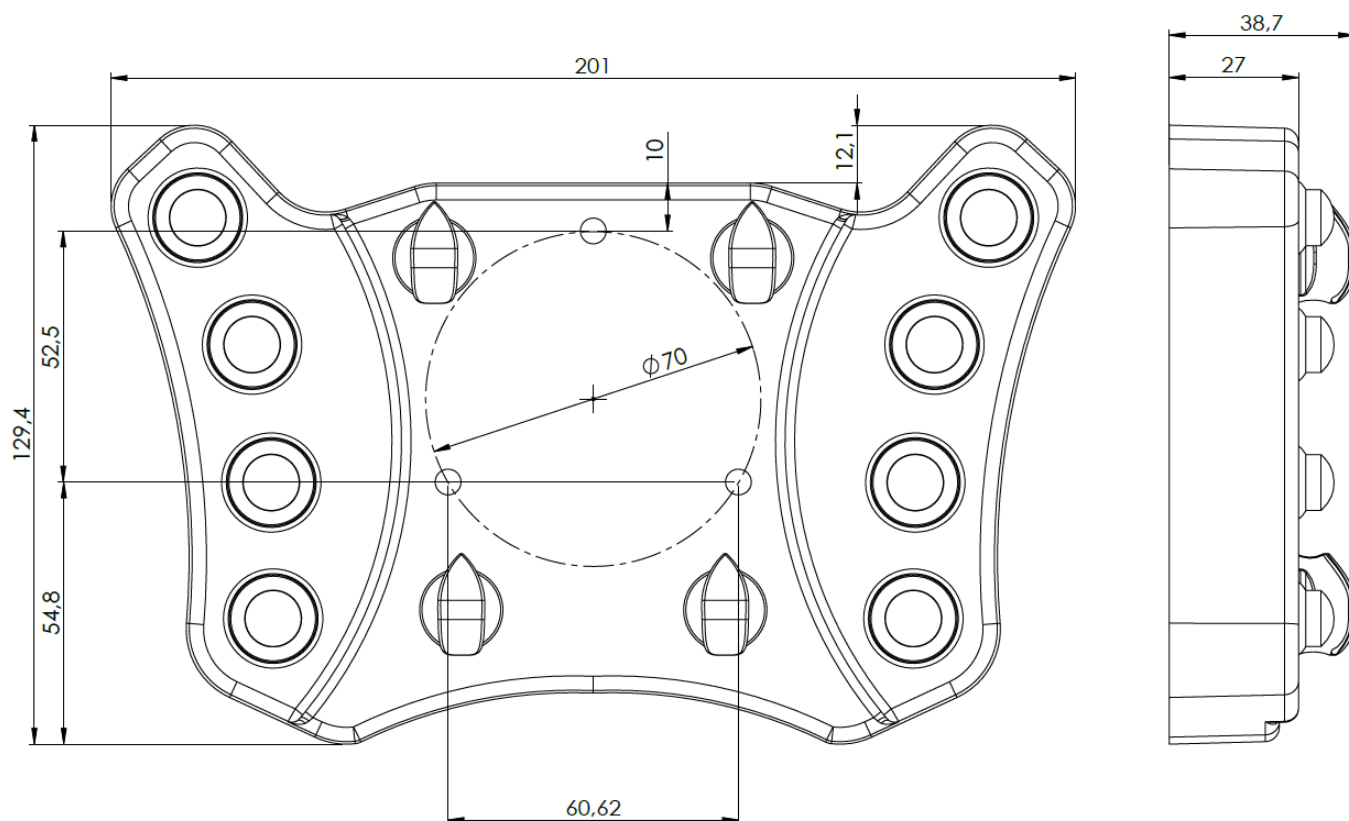# 2. Specification

2.1. Wireless Racing Panel specification

Specification	
Temperature range	AECQ GRADE3 (-40°C to +85°C)
Battery type	CR2450 (included)
Wireless communication	Radio Frequency
Frequency range	2360 MHz to 2500 MHz
Estimated battery life	5 years at rest at room temperature or 1,500,000 switches

| Weight	270 g
Dimensions	200 x 130 x 40 mm
Mounting mechanism	3 standard steering wheel bolts
Steering Wheel Bolt Pattern	6 x 70 mm
Material	Carbon, with plastic back plate
Latency	Below 20 ms
Buttons	8 with customizable functions
Rotary switches	4 with eight positions and customizable functions
Paddle shifters	2 connectors, paddle shifters not included
Range (line of sight)	100 m at highest power setting
Power levels	7
Power range	from -20 dBm to 4 dBm depending on power level selected

All dimensions in mm

2.2. Wireless Receiver specification

Specification	
Temperature Range	AECQ GRADE3 (-40°C to +85°C)
Operating Voltage	6-22 V, immunity to transients according to ISO 7637
CAN	CAN 2.0 A/B − 125, 250, 500, 1000 kbps
Dimensions	68 x 50 x 20 mm
Weight	50 g
Connector	Deutsch DTM04-4P (terminal included)
Cable length	20 cm
Mounting mechanism	2 x M3 bolts
Number of supported Wireless Racing Panels	Up to 8

All dimensions in mm
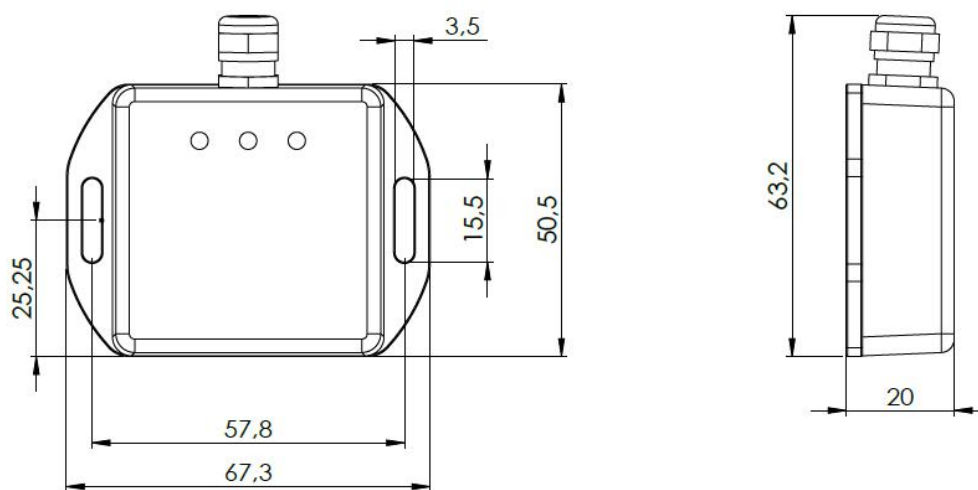
2.3. Wireless Receiver pinout

Pin	Description
1	Ground
2	CAN high
3	CAN low
4	+12V

2.4. Included in set

The set includes:

1. Wireless Racing Panel
2. Battery: CR2450
3. Paddle shift connector (ZHR-2) with terminals (SZH-002T-P0.5)
4. Stick-on labels
5. Mounting bolts with different lengths: 3x30, 3x55, 3x65mm
6. Mounting screws: 3xM3

If you purchased the "Wireless Racing Panel with Receiver" set, it additionally includes:

1. Wireless Receiver
2. Receiver connector (Deutsch DTM04-4P) with terminals

3. Installation

3.1. Wireless Receiver installation

Placement:

- **Surface:** Mount the Wireless Receiver on a **flat, level surface** to avoid stress on the back cover.
- **Temperature:** Ensure the installation area maintains a **stable temperature below 85°C (185°F)** and avoids sudden temperature fluctuations.
- **Vibration:** We highly recommend using **isolation/rubber dampers** to minimize vehicle vibrations transmitted to the Wireless Receiver.
- **Surroundings:** Avoid placing any metal (or conductive) objects between the Wireless Receiver and the Wireless Racing Panel's antenna. This can significantly weaken the signal strength and negatively impact communication range and performance.

> ⚠️ **Attention:**
>
> **We discourage placing the Wireless Receiver in the engine bay.** This area exposes it to extreme heat, moisture, and vibrations, all of which can shorten its lifespan and impact performance. Choose a cooler, protected location for optimal performance and longevity. Placing the Wireless Receiver in the engine bay can block the RF signal, further hindering its ability to communicate effectively.

Mounting:

- **Screw holes:** The device features **two M3 screw holes** for secure mounting.
- **Screw selection:** Choose M3 screws with an appropriate length based on your mounting surface and dampers (if used).

To power and communicate, connect the Wireless Receiver to:

- **Power:** A stable +12V source.
- **Ground:** A reliable vehicle ground.
- **Communication:** The vehicle's CAN bus (High and Low).

Default CAN bus speed: 500 kbps, adjustable through the Light Client application if needed.

# 3.2. Pairing Wireless Racing Panel with the Wireless Receiver

Pairing between the Wireless Racing Panel and Wireless Receiver is required before the first use and after every battery replacement. Please follow these steps for a smooth connection:

> ⚠️ **Warning:**
>
> Wireless Racing Panel is sensitive to ESD (Electrostatic Discharge). During the battery replacement process, caution must be exercised to avoid damaging the device. Please follow the recommendations to prevent device damage due to electrostatic discharge: Do not touch the device PCB or the battery if you are electrified or it is dry and warm. Touch something metal and grounded, such as a radiator, pipe, or car body, before and after changing the battery. Use a metal screwdriver, not a plastic or rubber one.

1. Power Up:

- Unscrew the 4 bolts holding the back plate - 2 mm Allen (hex).
- Remove the back plate.
- Insert CR2450 battery into the panel as per the provided picture.
- Reposition the back plate onto the panel.
- Securely tighten the 4 bolts you removed earlier.
- Make sure to power on the Wireless Receiver. For detailed information, see chapter "Wireless Receiver installation *(on page 7)*".
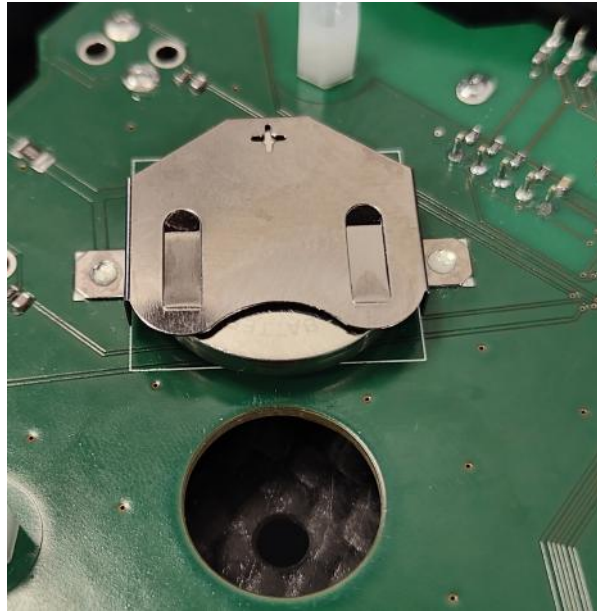
2. Open the Light Client application on the PC

While not required, you can verify proper panel operation by checking its status in the Light Client application. This offers an additional confirmation beyond the Wireless Receiver's LED indication. For detailed information, see chapter "Using Light Client *(on page 12)*".

3. Establish Proximity:

Position the Wireless Racing Panel within 10 centimeters (4 inches) of the Wireless Receiver.

> ✎ **Note:**
>
> Avoid covering the antenna situated at the top-left corner of the panel's rear during pairing, marked in purple on the picture below.

4. Initiate Pairing:

Simultaneously press and hold the two buttons (top and bottom) located on the panel's right side for at least 3 seconds, marked in orange on the picture above. Observe the Wireless Receiver's "status" LED:

- **Blinking:** Pairing is complete.
- **Data displayed in Light Client:** Pairing is complete.

Unpairing the Wireless Racing Panel

If you need to unpair the Wireless Racing Panel from its current Wireless Receiver to connect it to a different one, follow these steps:

1. Unscrew the 4 bolts holding the back plate - 2 mm Allen (hex).
2. Remove the back plate.
3. Remove the battery from the Wireless Racing Panel.
4. Wait for a few seconds.
5. Reinsert the battery into the Wireless Racing Panel.
6. Reposition the back plate onto the panel.
7. Securely tighten the 4 bolts you removed earlier.

3.3. Wireless Racing Panel installation

> 📝 **Note:**
>
> Before you mount your Wireless Racing Panel, pair it with the Wireless Receiver.

Before starting:

- **Safety first:** Always ensure your vehicle is parked safely and the ignition is off before beginning any modifications.
- **Compatibility check:** Verify your steering wheel hub utilizes the **6x70 mounting system**.

Steps:

1. **Identify top hub bolt:** Locate the top bolt securing your steering wheel to the hub. This will serve as your reference point. It has to be centered.
2. **Remove alternate bolts:** Starting from the top hub bolt, **unbolt every second bolt**, leaving three total removed.
3. **Install new bolts:** Replace the removed bolts with the **provided bolts of equal length**. Choose the appropriate length based on your steering wheel's geometry, opting for shorter bolts for flatter wheels.

4. **Mount panel:** Align the Wireless Racing Panel with the new bolts and carefully mount it onto the hub.

5. **Secure panel:** Using the provided **silver bolts**, gradually tighten them one at a time, starting from the top and working your way around in a circular pattern. This ensures even pressure and prevents warping the panel.
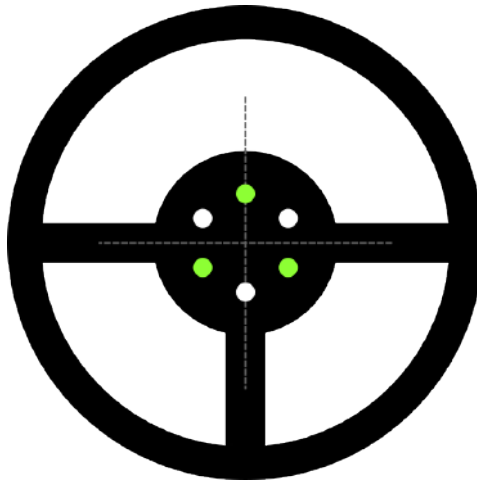
4. Wireless Receiver configuration and upgrade

For communication with the Wireless Receiver, a USB-to-CAN interface is required. Connect this interface to your PC and then to the Wireless Receiver via the CAN bus. Compatible Interfaces:

- Ecumaster USBtoCAN: http://www.ecumaster.com/products/usb-to-can/
- Peak Systems PCAN-USB and PCAN-LAN: http://www.peak-system.com
- Kvaser USBcan: http://www.kvaser.com

Use the Ecumaster Light Client to view real-time data from your Wireless Receiver, including the current Wireless Racing Panel state. You can also configure key settings like CAN send rate and CAN ID to fine-tune the Wireless Receiver's behavior to your setup. Additionally, Light Client is used to update the Wireless Receiver's firmware.

4.1. Using Light Client

Upon launching the Light Client application, you'll be prompted to choose the CAN bus bit rate. Your Wireless Receiver comes configured with a default CAN speed of 500 kbps.

Once you've successfully connected the Ecumaster Light Client application to your Wireless Receiver, you should see the following screen:

1. Devices

The Devices section within the Light Client application lists all compatible devices connected to your CAN bus. Upon connecting, Light Client will display a list of all compatible devices it detects on the CAN bus. Look for an entry named "rf-receiver" in this list. You will find the name, hardware revision, serial number, firmware version and additional information about used CAN IDs. To configure your Wireless Receiver, double-click its entry in the "Devices" section.

2. Properties

The following table provides descriptions for all adjustable parameters of your Wireless Receiver.

Parameter	Description
CAN out ID	The Base ID of the device. By default the Base ID is equal to 0x640.
CAN send rate	This parameter defines how often the device sends information to the CAN bus.
R#: offset	This parameter is added to the physical position of a rotary switch. When a value is transmitted via the CAN channel, it is the sum of the rotary switch's position and the offset.
Allow pairing	Indicates whether the Wireless Receiver allows pairing with a Wireless Racing Panel. Possible values: Yes or No.
Enable	Field enabling the activation of the diagnostic CAN frame (default: 0x6A5).
CAN diag out ID	Base ID of the diagnostic frame. This field allows for the modification of the diagnostic frame address.
Update Frequency	This parameter defines how often the device sends diagnostic frame to the CAN bus.

3. Channels

This section provides valuable insights into various aspects of your Wireless Receiver and connected Wireless Racing Panel(s) Think of it as a central dashboard for monitoring key parameters.

| Parameter	Description
S1-S8	The status of Wireless Racing Panel switches: 0 - button not pressed, 1 - button pressed
P1-P2	The status of Wireless Racing Panel paddle shifts switches: 0 - paddle shift not engaged, 1 - paddle shift engaged
A1-A4	Calculated voltage value (in mV) based on the position of the rotary switches.
R1-R4	The position of rotary switches.

Parameter	Description
Battery level	Estimated battery level of the Wireless Racing Panel (0-100%).
Battery voltage	Measured voltage of the Wireless Racing Panel battery (in V). The value is 0 when the Wireless Racing Panel has not communicated with the Wireless Receiver yet. After pressing a button on the paired Wireless Racing Panel, the voltage value will be updated.
Rx signal lvl	Received radio signal strength from (in dBm) the Wireless Racing Panel measured by the Wireless Receiver.
Tx power lvl	Transmit power set in the Wireless Racing Panel. Lv 1: -20 dBm, indicates the lowest transmit power. Lv 7: 4 dBm indicates the highest transmit power (default setting). "Not available" means that the Wireless Racing Panel has not sent any data to the Wireless Receiver yet. After pressing a button on the paired Panel, the value will be updated.
A, B, C	Serial number of the Wireless Racing Panel divided into parts A, B, C. For example, the serial number 632-2350-00058 will be displayed as: A = 632, B = 2350, C = 58
Receiver state	Radio Wireless Receiver status: Active - the radio part of the Wireless Receiver is working correctly, Bootloader - the radio part of the Wireless Receiver is in bootloader mode, Error - no communication with the radio part of the Wireless Receiver.
Panel state	Wireless Racing Panel status: Idle - the Wireless Racing Panel is in a sleep state, Active - the Wireless Racing Panel is active, Bootloader - the Wireless Racing Panel is in bootloader mode.
Panel radio FW	Wireless Racing Panel firmware version. Value is 0.0 when the Wireless Racing Panel has not communicated with the Wireless Receiver yet. Symbol '?' indicates the diagnostic frame not being transmitted.
Receiver radio FW	Firmware version of the radio part of the Wireless Receiver. Symbol '?' indicates the diagnostic frame not being transmitted.

4. Upgrade button

The Light Client application allows you to upgrade the connected device's firmware to the latest version. To do this, press the *Upgrade button*. The upgrade process is described in chapter Wireless Receiver upgrade *(on page 15)*.

5. Tools button

This button is used to enter the bootloader mode, necessary for an update. The upgrade process is described in chapter Wireless Receiver upgrade *(on page 15)*.
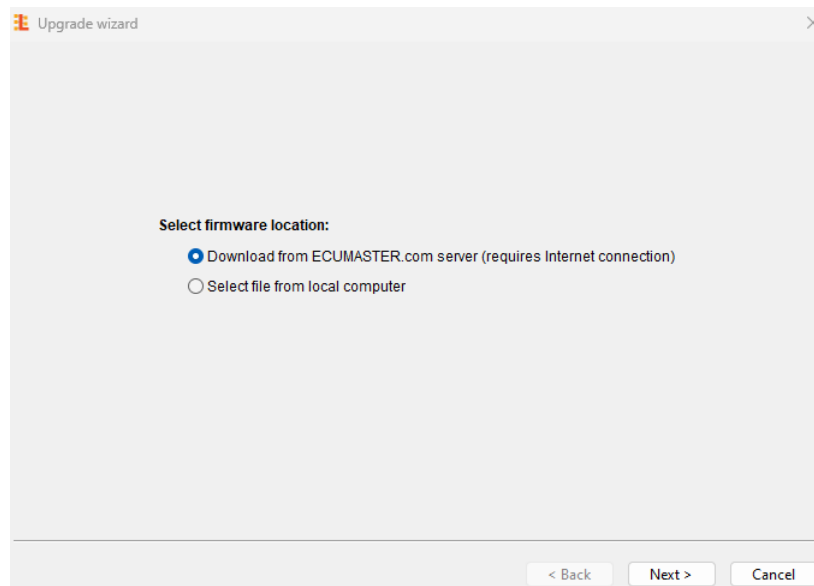
4.2. Wireless Receiver upgrade

Your Wireless Receiver consists of two separate modules: a CAN module and an RF module. Each part requires a separate firmware upgrade process. However, **it's crucial to maintain compatibility between the two modules' versions**. Inconsistency can lead to communication issues affecting your Wireless Receiver's performance.

Both the RF and CAN modules display their firmware versions in the format "X.Y," where X represents the major version and Y the minor version. **For optimal functionality, ensure both modules share the same major version (X).**
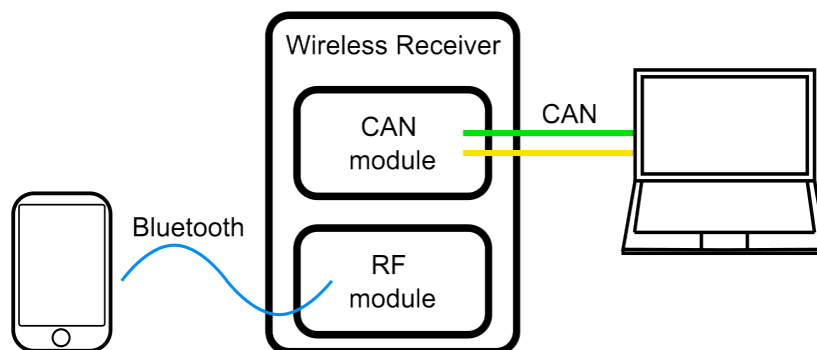
4.2.1. CAN module upgrade

To upgrade the CAN module, use the Light Client application. The detailed description of the application was supplied in the chapter Using Light Client *(on page 12)*. After a successful connection via the CAN bus, select the rf-receiver and press the ***Upgrade*** button.

Select whether to upgrade from a file on your PC ("Select file from local computer") or download the latest version directly ("Download from internet").
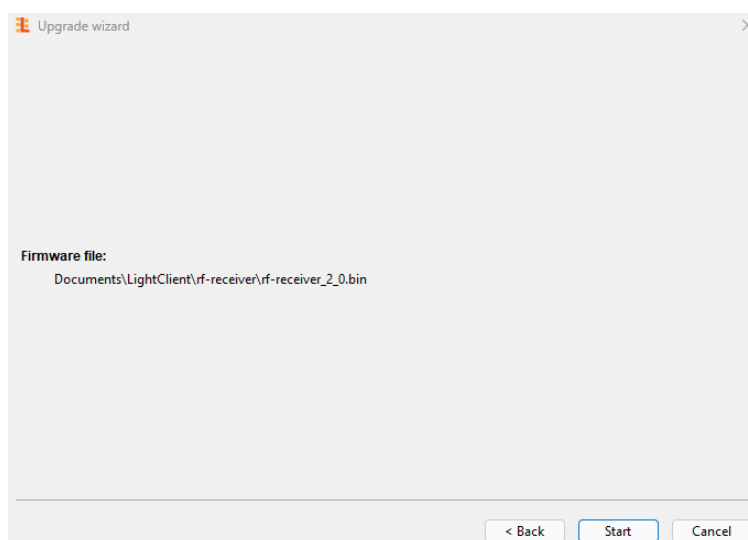
Next, press the "Start" button to upgrade the firmware. **Crucially, avoid turning off your PC or interrupting power to the device during the upgrade.**
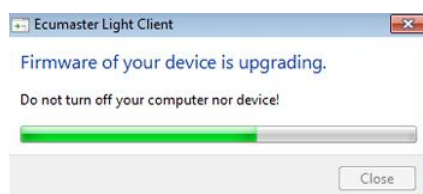
4.2.2. RF module upgrade

To upgrade the RF module of your Wireless Receiver, you'll need a smartphone with Bluetooth connectivity and the "nRF Device Firmware Update" application. Download it from the App Store (iOS) or Google Play (Android). The Light Client application on your PC is also necessary.

**1. Download the "nRF Device Firmware Update" application**

App Store: https://apps.apple.com/us/app/nrf-device-firmware-update/id1624454660

Google Play: https://play.google.com/store/apps/details?id=no.nordicsemi.android.dfu

2. Enable Bluetooth on your phone

3. Download the firmware

Open the website https://www.ecumaster.com/products/wireless-racing-panel/ on your mobile phone. Download the .zip file. It's location will be important in the next step.

4. Select the file

In the nRF Device Firmware Update application, select the appropriate .zip file:
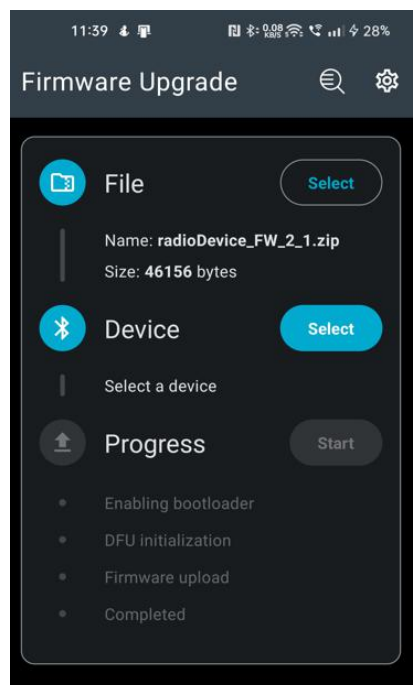
5. Enter bootloader mode

Before updating your Wireless Receiver firmware via smartphone, the device must enter bootloader mode. This process utilizes the Light Client PC application. Within the Light Client window, find the **"Tools..."** button and click it. From the presented options, select "**Go to receiver bootloader.**"
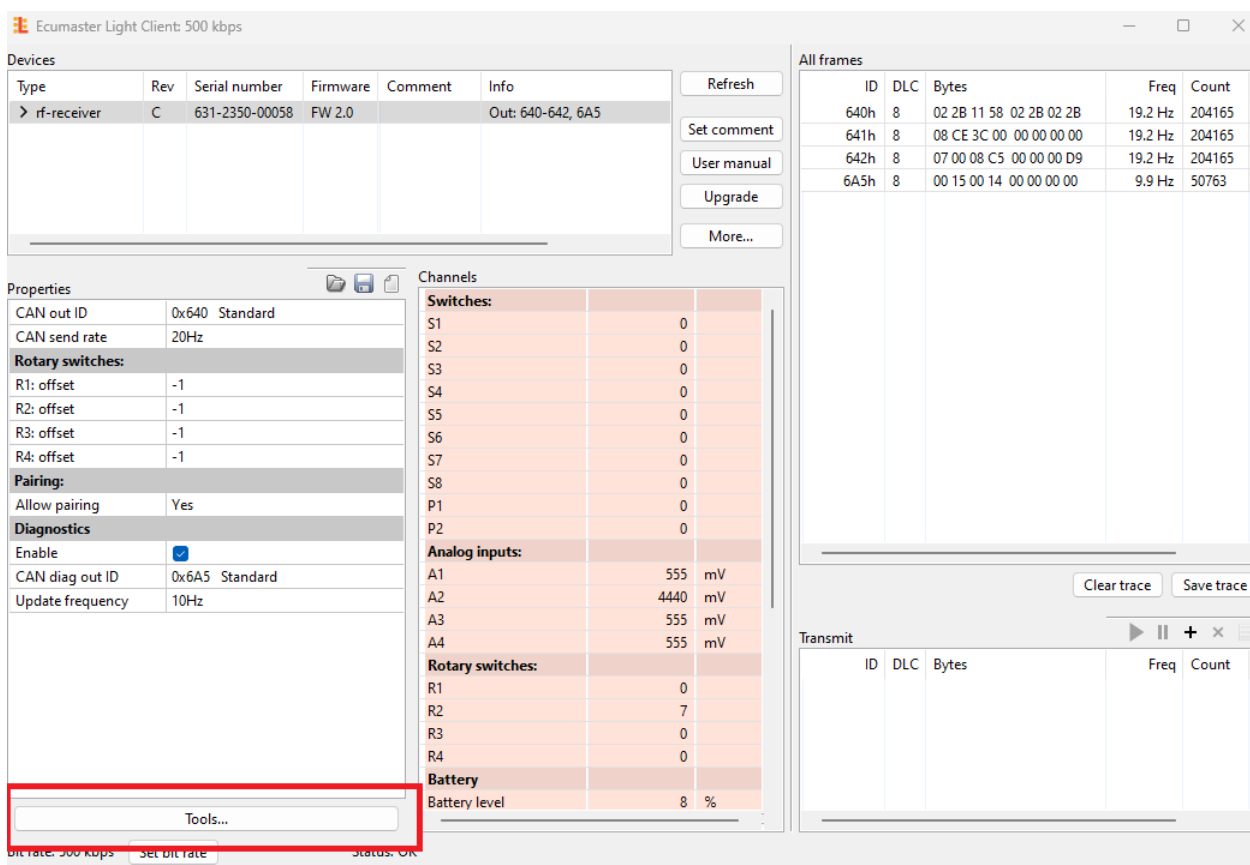
Once you select "Go to receiver bootloader" in the Light Client application, the Wireless Receiver enters bootloader mode. To **confirm successful entry**, check the **Receiver state** channel within the application.

> **Note:**
>
> Bootloader mode on your Wireless Receiver is active for only 2 minutes. To ensure successful firmware update, initiate the process on your smartphone immediately after entering bootloader mode. Accidental entries pose no risk, as the mode automatically times out after 2 minutes. Please note that during bootloader mode, Wireless Racing Panel signal transmission to the CAN bus is suspended. This is normal behavior and will resume after the update or timeout. You can also exit bootloader mode by restarting the device.

6. Select the device

In the nRF Device Firmware Update application, select the appropriate device. The name of the Wireless Receiver is **"rf-receiver BT"**.

7. Start the upgrade

Within the nRF Device Firmware Update application, locate and press the "Start" button. This action initiates the transfer and installation of the new firmware onto your Wireless Receiver.

Confirmation of the successful upgrade procedure will be the information about the firmware version in the Channels window *Receiver radio FW* of the Light Client and the change of the **Receiver State** parameter from **Bootloader** to **Active**. The CAN diagnostic frame must be enabled to see the *Receiver radio FW* channel.

5. Wireless Racing Panel configuration and upgrade

5.1. Wireless Racing Panel upgrade

> ✏️ **Note:**
>
> This process is similar to the Wireless Receiver upgrade, detailed in chapter RF module upgrade *(on page 17)*. However, bootloader entry differs significantly here.

To upgrade the Wireless Racing Panel, you'll need a smartphone with Bluetooth connectivity and the "nRF Device Firmware Update" application. Download it from the App Store (iOS) or Google Play (Android). The Light Client application on your PC is recommended but not necessary.

1. Download the "nRF Device Firmware Update" application

App Store: https://apps.apple.com/us/app/nrf-device-firmware-update/id1624454660

Google Play: https://play.google.com/store/apps/details?id=no.nordicsemi.android.dfu

2. Enable Bluetooth on your phone

3. Download the firmware

Open the website https://www.ecumaster.com/products/wheel-panel/ on your mobile phone. Download the .zip file. It's location will be important in the next step.

4. Select the file

In the nRF Device Firmware Update application, select the appropriate .zip file:
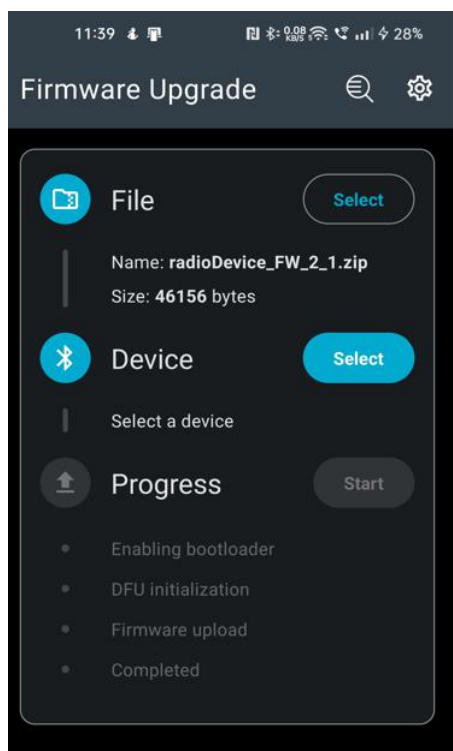
5. Enter bootloader mode

Before updating your Wireless Racing Panel firmware via smartphone, the device must enter bootloader mode. To enter it, hold the outer 4 buttons (marked on the picture below) for 5 seconds.

To **confirm successful entry**, check the **Panel state** channel within the Light Client application.

> ✎ **Note:**
>
> Bootloader mode on your Wireless Racing Panel is active for only 2 minutes. To ensure successful firmware update, initiate the process on your smartphone immediately after entering bootloader mode. Accidental entries pose no risk, as the mode automatically times out after 2 minutes. Please note that during bootloader mode, Wireless Racing Panel signal transmission to the CAN bus is suspended. This is normal behavior and will resume after the update or timeout.

6. Select the device

In the nRF Device Firmware Update application, select the appropriate device. The name of the Wireless Receiver is **"rf-swpanel BT"**.

7. Start the upgrade

Within the nRF Device Firmware Update application, locate and press the "Start" button. This action initiates the transfer and installation of the new firmware onto your Wireless Racing Panel Panel.
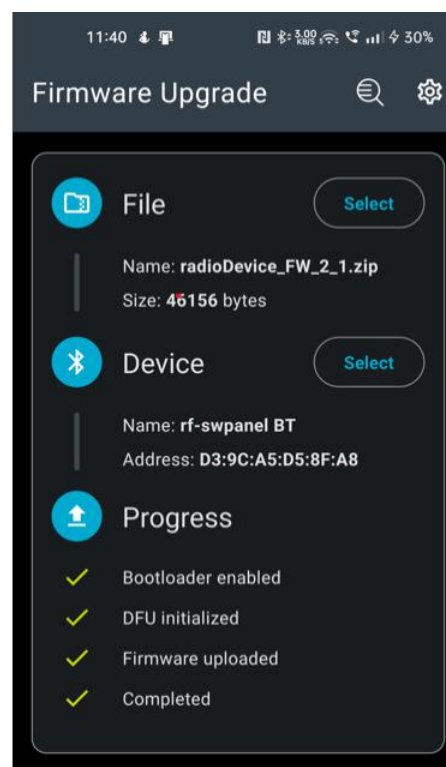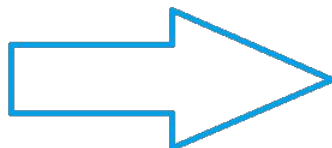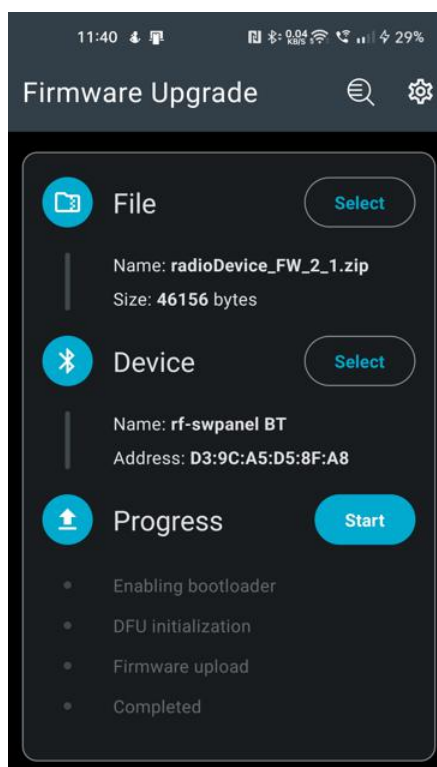
Confirmation of the successful upgrade procedure will be the information about the firmware version in the Channels window *Receiver radio FW* of the Light Client and the change of the **Receiver State** parameter from **Bootloader** to **Active**. The CAN diagnostic frame must be enabled to see the *Panel radio FW* channel.

Others		
Receiver state	Active	
Panel state	Idle	
Diagnostics		
Panel radio FW	2.1	
Receiver radio FW	2.0	

5.2. Power level

Initially, the Wireless Racing Panel transmits at its highest power level (Lvl 7, 4 dBm). At this power level, the range in line of sight can be up to 100 meters. However, you can adjust this power level to optimize between battery life and effective radio range.

Lowering the power **increases battery life but reduces range** (down to approximately 1 meter, placement dependent).

To change the transmit power of the Wireless Racing Panel:
Set the desired power level using the rotary switch highlighted in **yellow**, where 1 is the lowest transmit power, 7 is the highest power. Position 8 is also treated as the highest power.

When the rotary switch indicates the desired power level, confirm the change by pressing the 4 buttons highlighted in **blue** for a **minimum of 3 seconds**. Confirmation of the power change will be reflected in the **Tx power lvl** channel in the channels window of the Light Client. An example of changing the power from the highest to the lowest is shown in the image below:

Radio signal				Radio signal		
Rx signal lvl	-40	dBm		Rx signal lvl	-59	dBm
Tx power lvl	Lvl 7: 4	dBm		Tx power lvl	Lvl 1: -20	dBm

> ⚠️ **Warning:**
>
> If the set transmit power is too low, data from the Wireless Racing Panel may not be transmitted to the Wireless Receiver, the power level in the Light Client will not be updated.

6. Communication details

The Wireless Racing Panel prioritizes battery life by transmitting signals to the Wireless Receiver **only when its state changes** (e.g., turning a rotary switch or pressing a button). This **eliminates redundant updates** and preserves battery power. However, it's essential to remember that if the Wireless Receiver misses a signal due to weak reception or insufficient power, the **panel's state won't be automatically refreshed on the CAN bus**. Therefore, **selecting the appropriate signal power level** based on the intended distance and placement of the Wireless Receiver is crucial for ensuring reliable communication and control.

With multiple Wireless Racing Panels connected to a single Wireless Receiver, a key aspect to understand is **transmission priority**. When a state change occurs on any panel, **only the state of the most recently changed panel is transmitted on the CAN bus**.

Example:

Imagine a two-driver endurance race, each with their own Wireless Racing Panel.

Driver 1 makes adjustments to their panel, and the updated state gets transmitted to the Wireless Receiver and subsequently the CAN bus.

Now, Driver 2 enters the car with their panel. **Crucially, until Driver 2 takes any action (even a simple button press), the CAN bus will continue transmitting the previous driver's settings,** potentially causing unexpected behavior if not aware of this prioritization system.

7. Troubleshooting

Wireless Receiver not visible in Light Client application

- Check if the Wireless Receiver has green LED continuously glowing, indicating it's receiving power
- Double-check that the wiring is connected correctly:
    - **Pin 2:** CAN High
    - **Pin 3:** CAN Low
- Ensure secure and firm connections with no loose wires or damage

- Verify that the Wireless Receiver's Base ID (0x640) is not already used by another device on the CAN bus. Conflicting IDs can impede communication.
- Ensure you have downloaded and installed the latest version of the Light Client application

Pairing unsuccessful

- Check if the Wireless Receiver has green LED continuously glowing, indicating it's receiving power.
- Confirm that Wireless Racing Panel is powered. Please note it comes without the battery. For details, see Pairing Wireless Racing Panel with the Wireless Receiver *(on page 8)*.
- Bring the Panel and Wireless Receiver **within 10 cm (4 in)** of each other, ensuring a **clear line of sight** with no objects obstructing the antenna.
- In Light Client application, check if the ***Allow pairing*** option is set to *"Yes"*
- Locate the **two buttons on the Panel's right side - top and bottom**. **Hold both buttons simultaneously for at least 3 seconds** until you see a blinking *"Status"* light on the Wireless Receiver

Wireless Racing Panel upgrade unsuccessful

1. Device not found in **nRF Device Firmware Update** application
   - Confirm that Wireless Racing Panel is powered. For details, see Pairing Wireless Racing Panel with the Wireless Receiver *(on page 8)*.
   - Enter the bootloader by holding the outer 4 buttons for 5 seconds. Check if the Wireless Racing Panel entered the bootloader in the Light Client application.
   - The bootloader is only active for two minutes, after that time the device will not be visible via the Bluetooth communication.
2. Failed firmware upload
   - The bootloader is only active for two minutes, the *"Start"* button has to be pressed within that time.
   - Check if the proper firmware file was selected. **Wireless Racing Panel and Wireless Receiver have different firmware files.**
   - If firmware upgrade stops, it's likely due to power loss or Bluetooth signal. Restart your device, ensure stable power/connection, and retry the upgrade.

Wireless Receiver RF module upgrade unsuccessful

1. Device not found in **nRF Device Firmware Update** application
   - Check if the Wireless Receiver has green LED continuously glowing, indicating it's receiving power.

◦ Enter the bootloader through the Light Client application. See or details.

◦ The bootloader is only active for two minutes, after that time the device will not be visible via the Bluetooth communication.

2. Failed firmware upload

◦ The bootloader is only active for two minutes, the *"Start"* button has to be pressed within that time.

◦ Check if the proper firmware file was selected. **Wireless Racing Panel and Wireless Receiver have different firmware files.**

◦ If firmware upgrade stops, it's likely due to power loss or Bluetooth signal. Restart your device, ensure stable power/connection, and retry the upgrade.

Wireless Receiver malfunctioning after upgrade

• Your Wireless Receiver consists of two separate modules: a CAN module and an RF module. Each part requires a separate firmware upgrade process. However, **it's crucial to maintain compatibility between the two modules' versions**. Inconsistency can lead to communication issues affecting your Wireless Receiver's performance.

Wireless Racing Panel power level not changing in Light Client application

• If the set transmit power is too low for given distance and Wireless Receiver placement, data from the Wireless Racing Panel may not be transmitted to the Wireless Receiver and the power level in the Light Client will not be updated.

Wireless Racing Panel rotary switches and button states not displaying correct values in the Light Client application

• Check if the Wireless Racing Panel is paired with the Wireless Receiver. For details, see .

• Confirm that Wireless Racing Panel is powered. For details, see .

• If the set transmit power is too low for given distance and Wireless Receiver placement, data from the Wireless Racing Panel may not be transmitted to the Wireless Receiver. Try bringing the Wireless Receiver closer to the Wireless Racing Panel or increasing the signal power. For details, see .

8. CAN Stream

The CAN stream is compatible with the stream of CAN Switch board V3.

Byte	Bit	Channel	Data Type	Range	Multiplier/ Divider	Factor	Offset	Unit
CAN out ID+0 (default: 0x640)								
0..1		Analog 1	16-bit U	0 – 65535	1/1	1	0	mV
2..3		Analog 2	16-bit U	0 – 65535	1/1	1	0	mV
4..5		Analog 3	16-bit U	0 – 65535	1/1	1	0	mV
6..7		Analog 4	16-bit U	0 – 65535	1/1	1	0	mV
CAN out ID+1 (default: 0x641)								
0..1		Battery voltage	16-bit U	0.000 – 65.535	1/1000	0.001	0	V
2	5 (0xE0)	Receiver state[2]	3-bit U	enumeration	1/1	1	0	
	2 (0x1C)	Tx power lvl[1]	3-bit U	enumeration	1/1	1	0	dBm
2..3	0 (0x03FF)	A	10-bit U	0 – 1023	1/1	1	0	
4	6 (0xC0)	Panel state[3]	2-bit U	enumeration	1/1	1	0	
4..5	0 (0x3FFF)	B	14-bit U	0 – 16383	1/1	1	0	
6..7		C	16-bit U	0 – 65535	1/1	1	0	

Byte	Bit	Channel	Data Type	Range	Multiplier/ Divider	Factor	Offset	Unit
CAN out ID+2 (default: 0x642)								
0	4 (0xF0)	Rotary 1	4-bit U	0 – 15	1/1	1	0	
	0 (0x0F)	Rotary 2	4-bit U	0 – 15	1/1	1	0	
1	4 (0xF0)	Rotary 3	4-bit U	0 – 15	1/1	1	0	
	0 (0x0F)	Rotary 4	4-bit U	0 – 15	1/1	1	0	
2		Battery level	8-bit U	0 – 255	1/1	1	0	%
3		Rx signal lvl	8-bit S	-128 – 127	1/1	1	0	dBm
4	7 (0x80)	Switch 8	1-bit	0 – 1	1/1	1	0	
	6 (0x40)	Switch 7	1-bit	0 – 1	1/1	1	0	
	5 (0x20)	Switch 6	1-bit	0 – 1	1/1	1	0	
	4 (0x10)	Switch 5	1-bit	0 – 1	1/1	1	0	
	3 (0x08)	Switch 4	1-bit	0 – 1	1/1	1	0	
	2 (0x04)	Switch 3	1-bit	0 – 1	1/1	1	0	
	1 (0x02)	Switch 2	1-bit	0 – 1	1/1	1	0	
	0 (0x01)	Switch 1	1-bit	0 – 1	1/1	1	0	
5	5 (0x20)	Paddle shift 2 (Left)	1-bit	0 – 1	1/1	1	0	
	4 (0x10)	Paddle shift 1 (Right)	1-bit	0 – 1	1/1	1	0	
CAN diag out ID+0 (default: 0x6A5)								
0..1		Panel radio FW	16-bit U	0.0 – 6553.5	1/10	0.1	0	
2..3		Receiver radio FW	16-bit U	0.0 – 6553.5	1/10	0.1	0	

[1] Values for channel: **Tx power lvl**

Value	Description
0	Not available
1	Lvl 1: -20
2	Lvl 2: -16
3	Lvl 3: -12

Value	Description
4	Lvl 4: -8
5	Lvl 5: -4
6	Lvl 6: 0
7	Lvl 7: 4

[2] Values for channel: **Receiver state**

Value	Description
0	Active
1	Bootloader
2	Error

[3] Values for channel: **Panel state**

Value	Description
0	Idle
1	Active
2	Bootloader

9. Document history

Version	Date	Changes
1.0	2024.03.27	Initial release
1.1	2024.05.08	Name changed to Wireless Racing Panel and Wireless Receiver
1.2	2024.06.12	Improved *R#: offset* parameter description
1.3	2024.07.31	Added information about compatibility with CAN switch board V3