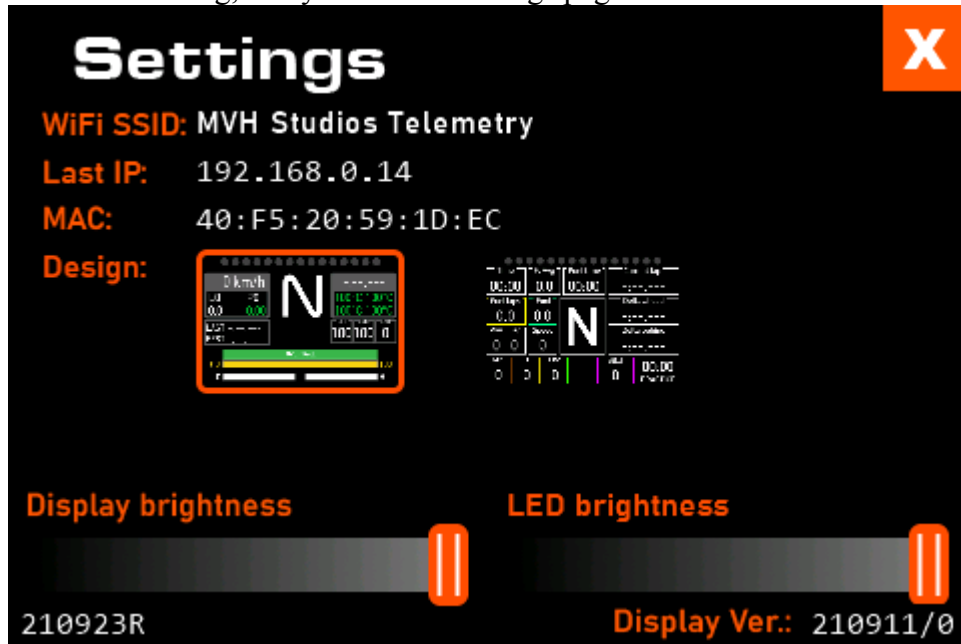Thank you for purchasing our Telemetry Display. In the following section, we will guide you through the usage.
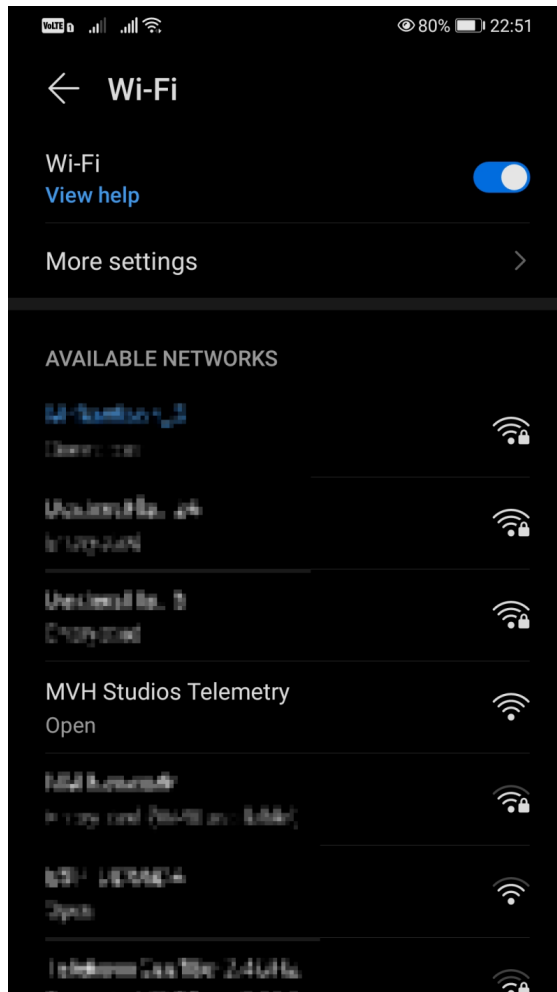
Quickstart guide

Connect the usb cable to the display, and then to a 5V power supply. It can be either a phone charger, PC or console.
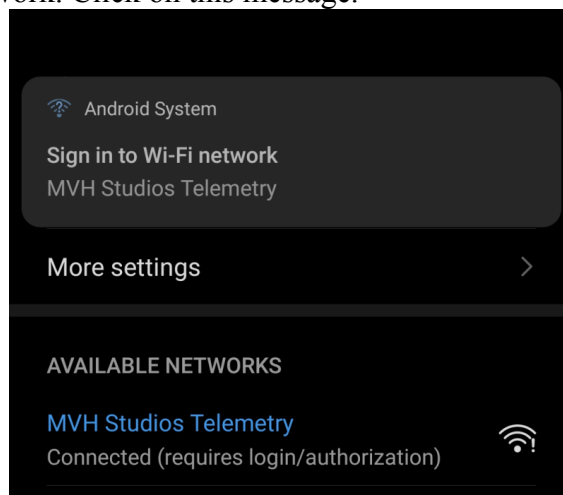
Wait until the leds start flashing, and you see the Settings page:

Take a smartphone, or any WiFi capable device, look for a network called **MVH Studios Telemetry**, then connect to it. No password required.

On some phone models a web page loads automatically. Other models show a popup message about needing to sign in to this network. Click on this message.

If nothing happens from the above is happening, open a web browser, and enter the following url: setup.com
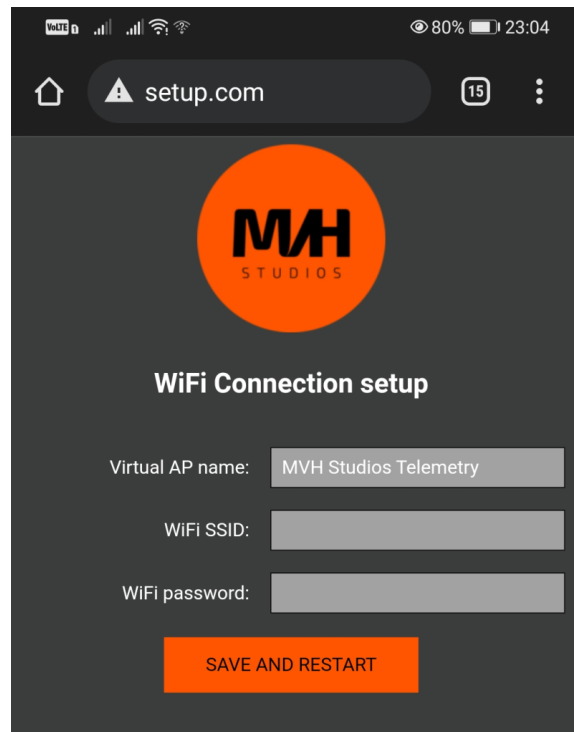
Fill in the two fields as follows:
- **WiFi SSID**: Name of your home network. This must be the same network as you use your gaming PC or Console on. (If the browser supports this feature, then you don't need to manually enter the name of the network, you can select it from a list. If the list does not show up, try a different browser.)
- **Wifi password**: The password of the network.

Click the **SAVE AND RESTART** button.
The display will restart, and try to connect to this network.

If the connection was successful, a Waiting for data… text will appear along with the display's IP address, and the WiFi signal meter starts to move in the top-left corner.

If the connection was not successful, the display will enter the Settings page again, and you can connect your phone to it.
- Check if the WiFi SSID name and password is correct.
- **Make sure the WiFi network is 2.4GHz. The display only supports this frequency.**

If the connection was successful, the display is ready to use. You only need to tell the game where it can find your display on the network, by entering your Telemetry Display IP address as shown on the Telemetry screen:
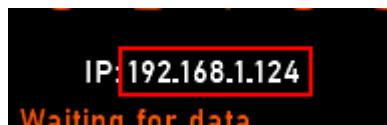
Game Setup

Codemasters F1
- Start the game
- Go to Game Options
- Settings
- Telemetry Settings
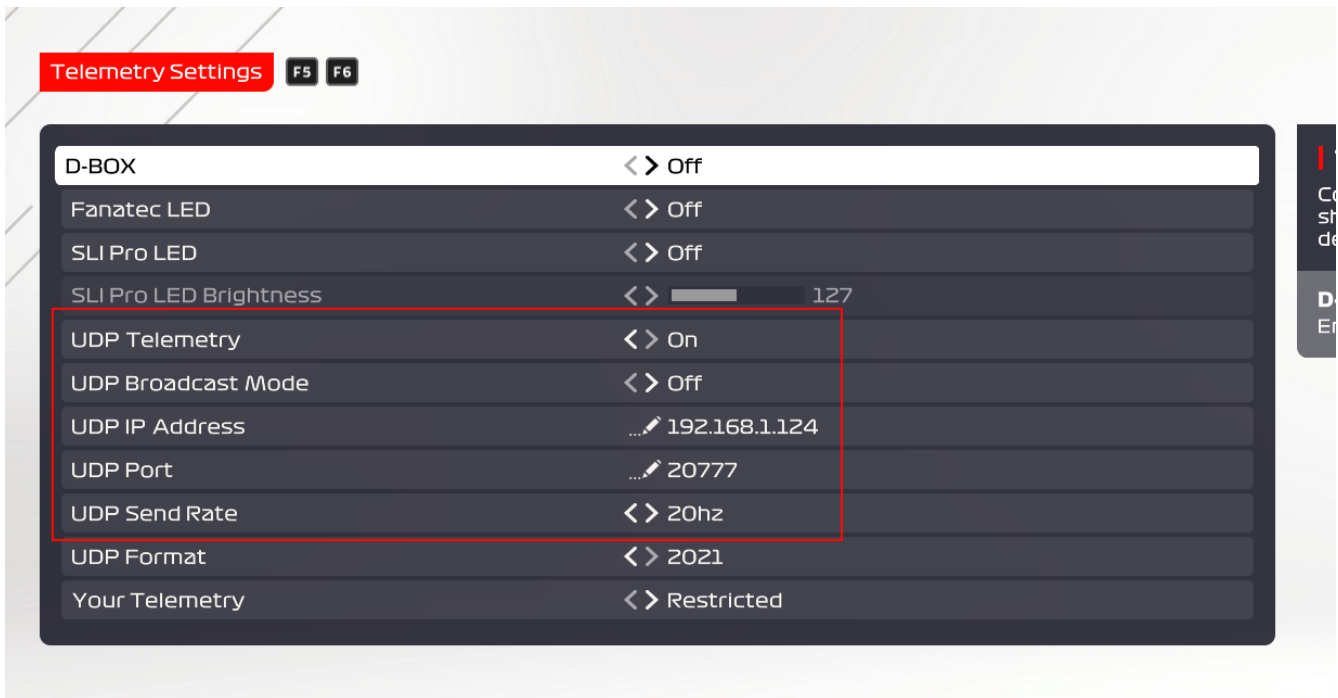
Set:
- UDP telemetry – On
- UDP Broadcast Mode – Off (If you turn it on, it causes delay in packages)
- UDP IP Address – Ip Address of your display, which you can find on the splash screen after the "IP:"
- UDP Port – 20777
- UDP Send Rate – 20hz (This results in a decent response time for the display. If you go higher, you could find the display to lag a bit. This is especially true when the WiFi signal strength is not good.)

You are ready to play with Codemasters F1 on Console or PC!

SimHub (PC only)
- Download latest MVH Studios Display plugin from MVH Studios website
- Copy the MVHSimHubDash.dll file into SimHub's installation directory (e.g.: C:\Program Files (x86)\SimHub\)
- Start SimHub
- A popup will show up telling it found a new plugin. Enable it, then click Ok.
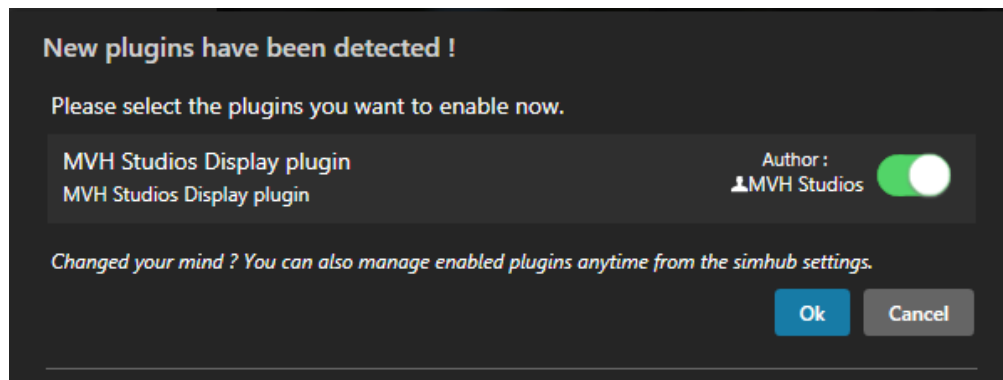
- When SimHub starts, click Additional plugins in the left menu
- Then MVH Studios Display plugin in the top menu:
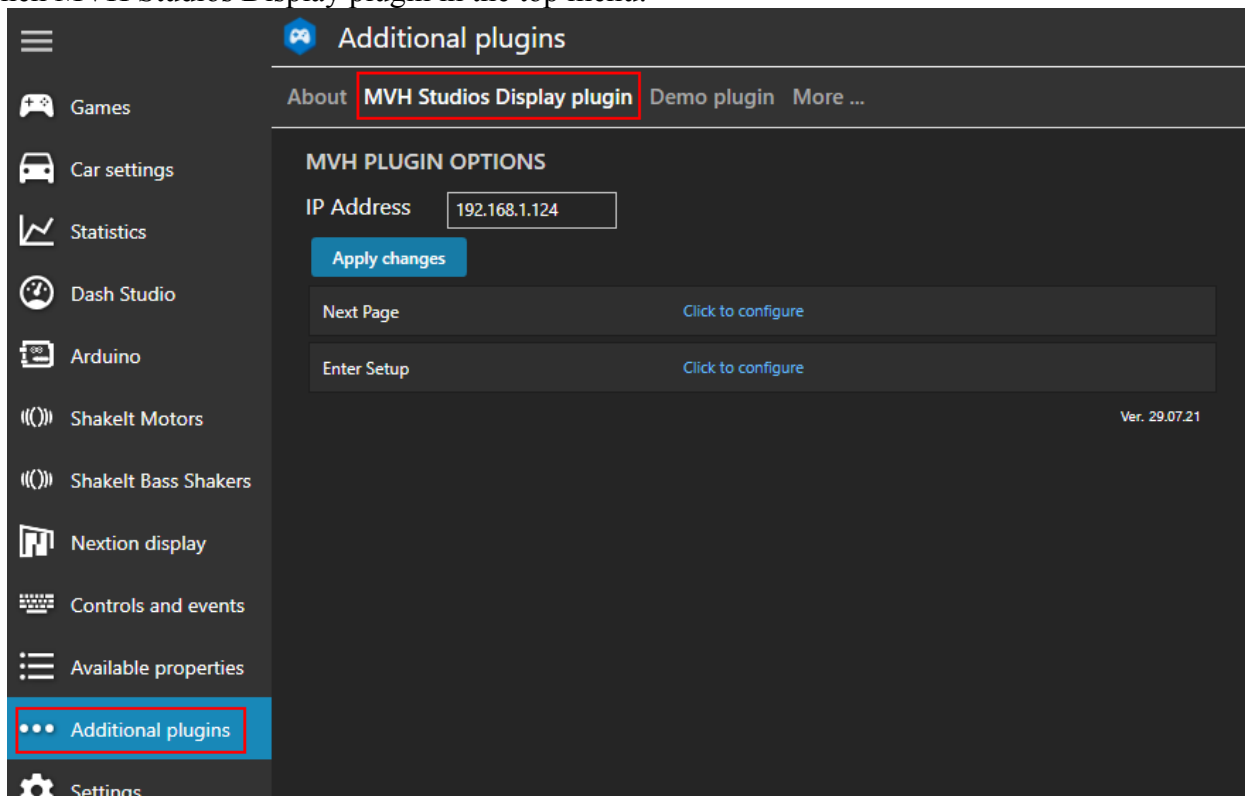
- Enter your Display's IP address in the field. You can find it on the splash screen after the "IP:"
- Press Apply changes button
- You can set custom input to step Next page on the Display
- And other input to enter into Display's Setup page while playing

You are ready to play with SimHub.

Splash screen

When you startup the Display, it tries to connect to your WiFi network stored in the long term memory. If the connection is not successful (eg. the stored credentials are incorrect, or you try to use it on a different network), then the display automatically steps into the Settings page. When the connection is

successful, it stays on the splash screen and waits for data arriving from the game, or from SimHub on your PC.

If you play F1, and you pause the game, it stops sending data immediately, and the Display steps onto this splash screen. But if you use SimHub to transfer data to the telemetry screen, then if you pause the game, SimHub still sends data to the screen, and it takes considerable time to stop it. When you want to quickly enter into Setup mode, then you don't have to wait for this, you can setup a custom input that brings you into Settings mode instantly.

Page contents:

1 – WiFi signal strength indicator. Only works when the Display is connected to a WiFi network. Small values (less than 10%) can cause a bad gaming experience due to lag or dropped data packets. In this case try to relocate your WiFi router or access point closer to the display.

2 – Enter Settings.

3 – Additional status information. The bottom orange text can warn you about different events:

     - Waiting for data… - Everything is up to date, the Display is ready for playing.

     - Update is available! - A new software update has arrived to your device. Press the Update button to install it

     - Simhub plugin is outdated. Please use … - The display software knows what Simhub plugin version is required to use. If you play with an older version of SimHub plugin, the display warns you to update it as well.

4 – Placeholder for Update button. Only shows up when a newer software version is available to install.

Settings

When you enter Setup, the display pauses for 5 seconds, and collects the names of nearby WiFi networks. After that, it disconnects from your network, and starts an own network, which you can

connect to. While this page shows up, the leds start to flash with the colors that match the currently selected Design, with the currently selected intensity.

1 – Name of the WiFi network that the Display shows up when you want to connect to it with your phone for initial settup. It is useful when you change it to your own name, because you want to use more Displays at the same location.

2 – The last IP address that your display got when it connected to a network. It is called Last, because it is currently not connected to anything. It runs it's own WiFi access point instead.

3 – MAC address of the wireless adapter integrated into the display. It is a unique hardware identifier.

4 – Design selector. The display can have multiple User Interface designs. In this example, you can choose between a dedicated Codemasters F1 design, and a more general GT design. Changing design also changes the color scheme of LEDs.

5 – Display brightness slider. You can lower the display brightness if you want for night runs, to be less annoying. You cannot accidentally lower it to full black out.

6 – LED brightness. You can also lower the intensity of the LEDs for night runs.

7 – Firmware version. Only used for support purposes.

8 – User Interface version.

9 – Close button. Also saves the changes, then restarts the display
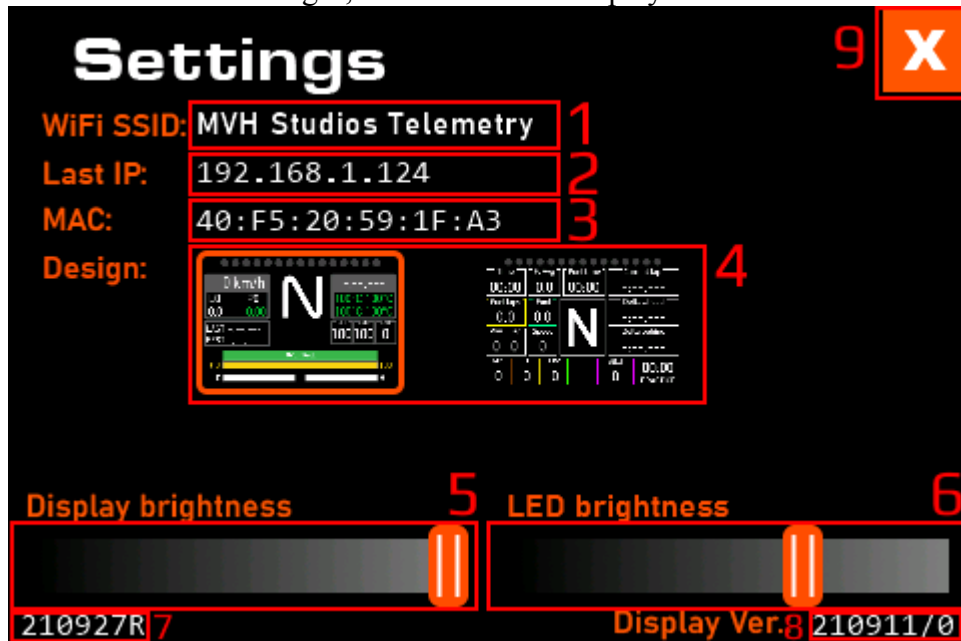
While the Settings page is active, it also means the Display started a WiFi Access Point, and it is waiting for users to connect to it with a Phone, Tablet, PC or Laptop. You will find the network name indicated at line 1. Follow the Quickstart guide on how to connect to it. When the connection was successful, you will get this additional setup website in your web browser.
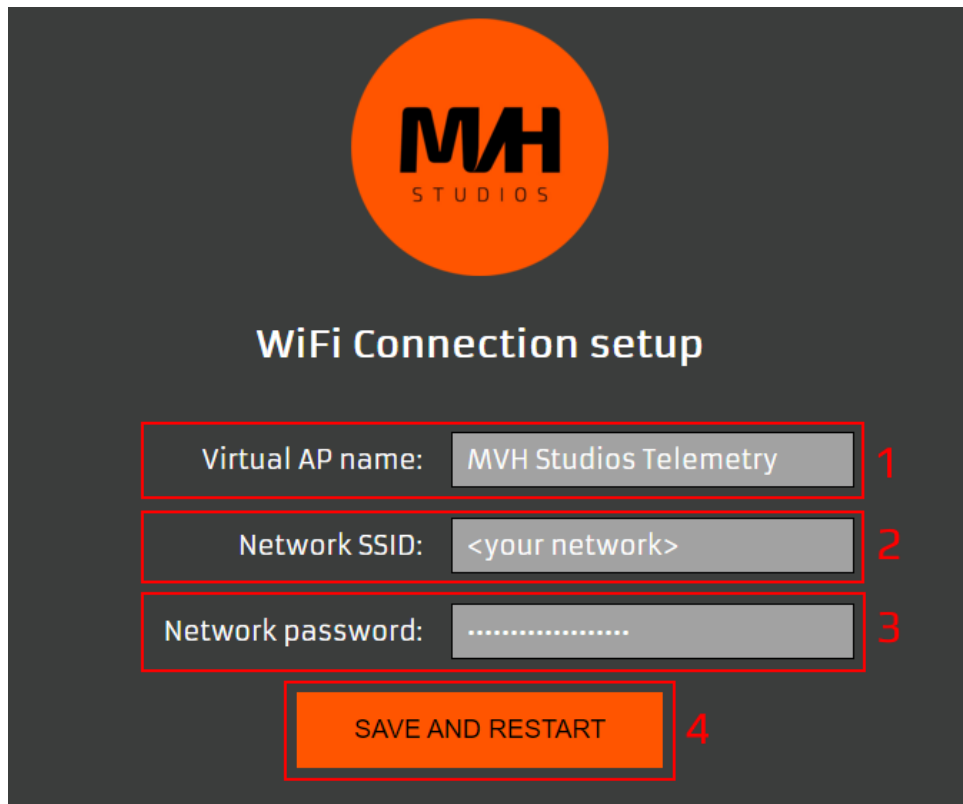
1 – The Access Point name your Display shows up when it is in Settings mode. You can customize it to any name you want. It can be useful, when the display is close to other displays, and multiple are set into settings mode. This way you can easily find yours.

2 – Your local WiFi network name which you want your Display to connect to. It must be the same as your gaming device (Console or PC) is also connected to. If you click this textbox, a list should show up with the name of nearby networks. This list is collected when the Display is entered into Settings mode. If the list does not show up, try a different web browser as mentioned in the quickstart guide. You can enter a name manually for hidden SSID names.

3 – Wifi password for your local network.

4 – Save settings and restart the device. The Display reboots, and starts up into the splash screen, using the new settings

F1 design - page 1

Select this design on the Settings page by clicking on the leftmost image, then exit settings.

This gaming page shows up when the display starts to receive data from any supported game source. To step between pages, touch the gear text (middle of the screen) Or press L3 button on your controller in F1, or press your configured input in SimHub plugin.
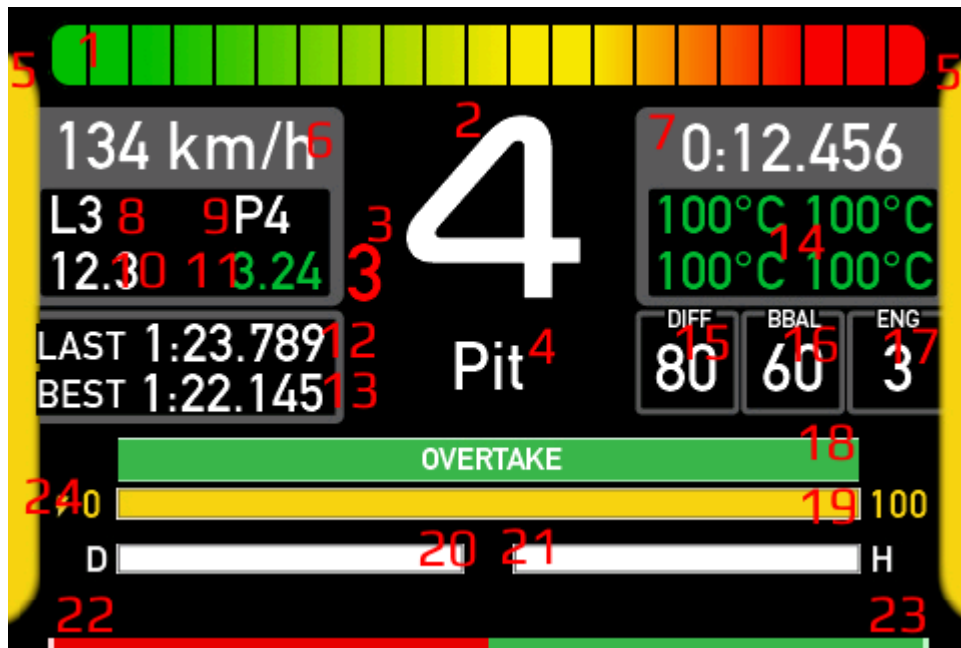
1. RPM bar. – Min value is 0, max value is received from the game.
2. Gear – Can be R for reverse, N for neutral, P in pits, 1-9 in gears
3. Suggested gear – Supported by F1 2020 and 2021, only shows up when it is enabled in game
4. Pit indicator – Shows "Pit" or empty
5. Flag indicator – Supported colors: yellow, blue, green, red, or none
6. Speed in km/h
7. Current Lap time
8. Lap number of the race
9. Position in race
10. Remaining fuel in terms of laps
11. Remaining fuel in liters
12. Last lap time
13. Best lap time (what game sends)
14. Tyre temperatures. Top left for Front left wheel, Top right for Front right, etc. In some game modes the game sends constant values. Text color also changes from cold to hot: blue – green – red. In the case of F1 the limits differ for every tyre compound. When playing through SimHub, the limits are fixed: 55 – 65: blue to green. 90 – 100 green to red.
15. Differential adjustment on throttle (percentage). Only supported by F1
16. Front brake bias (percentage) in F1, Break balance in SimHub
17. Fuel mixture for F1: 0 = lean, 1 = standard, 2 = rich, 3 = max. Engine mode for SimHub
18. ERS deployment mode. Green - Overtake, yellow – other - only supported by F1
19. ERS stored energy in (percentage)
20. ERS energy deployed in this lap (percentage) - only supported by F1
21. ERS energy harvested in this lap (percentage) - only supported by F1
22. Brake percentage
23. Throttle percentage
24. ERS deployment mode in number.

F1 design - page 2 (damage)
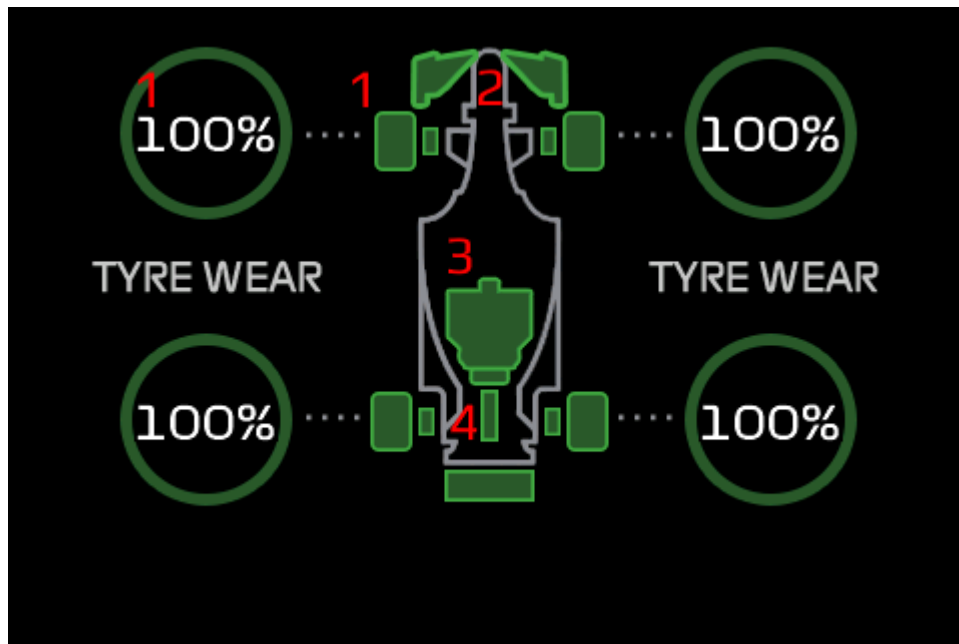
1. Tyre wear / damage in percentage, and also in color. 0-20: green, 20-60 yellow, 60-100 red
2. Wing damage Front left, Front right, Rear. Only supported in F1. In SimHub all changes at the same amount from "CarDamage1". 0-25: green, 25-70 yellow, 70-100 red
3. Engine damage - 0-30 green, 30-80 yellow, 80-100 red. In SimHub, data comes from "CarDamage2"
4. Gearbox damage - 0-30 green, 30-80 yellow, 80-100 red. In SimHub, data comes from "CarDamage3"

F1 design - page 3 (temperature)
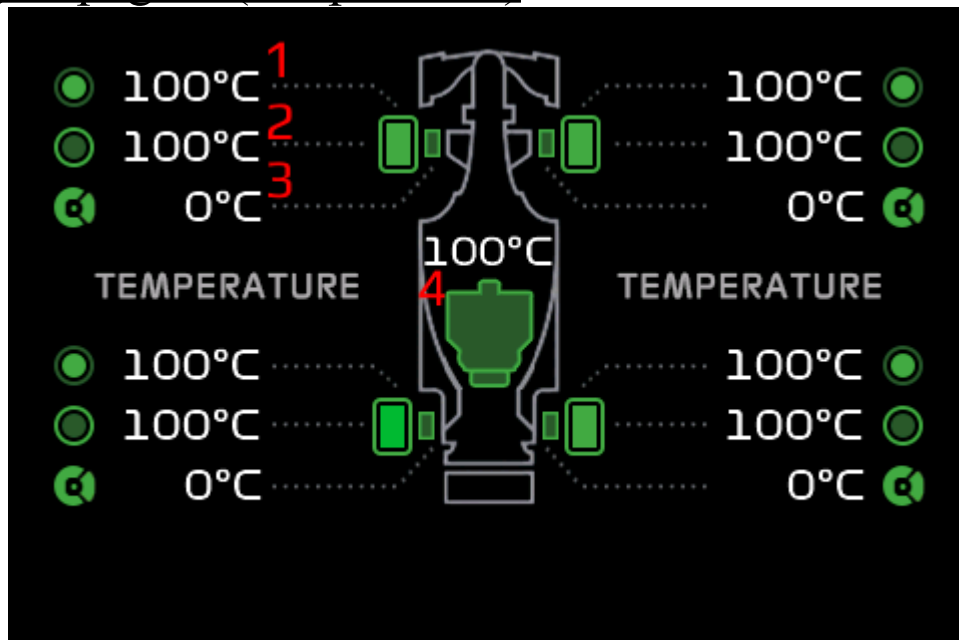
1. Tyre inner temperature – Color changes from cold to hot between green, yellow, and red. In F1 the limits are different for each tyre compound. In SimHub, the limits are: less than 105 - green, between 105 and 110 - yellow, greater than 110 – red. In SimHub data comes from "Tyre temperature".
2. Tyre surface temperature – Color changes from cold to hot between green, yellow, and red. In F1 the limits are different for each tyre compound. In SimHub, the limits are: less than 105 - green, between 105 and 110 - yellow, greater than 110 – red. In SimHub data comes from "Tyre temperature".
3. Brake temperature - Less than 800 - green, between 800 and 1000 - yellow, greater than 1000 – red
4. Engine temperature - Less than 130 - green, between 130 and 145 - yellow, greater than 145 – red. In SimHub, data comes from "Water temperature".
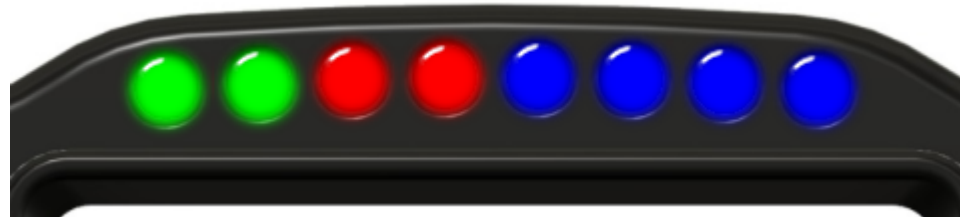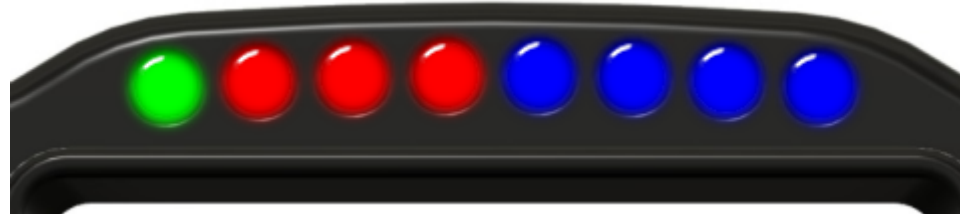
F1 design – Led signals
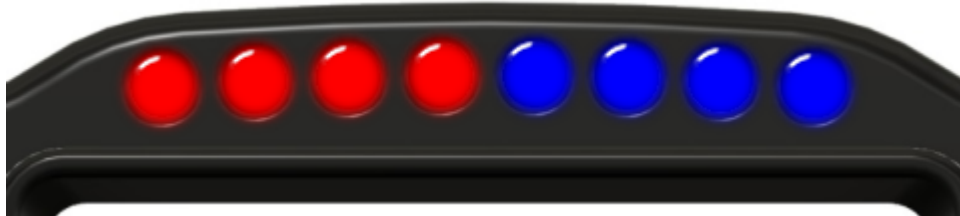
This design's shift light color scheme is four red and four blue leds. The leds start to show up when the game sends the revligh data: Rev lights percent for F1, and RPMShiftLight2 for SimHub. When all leds show up, then they start to flash.


When the car is in pits, every second led shows up in yellow, and starts flashing alternatingly.

The first two leds on the left are also indicating DRS: The first led turns into green when DRS is enabled, and the car reaches a DRS zone. The second led also turns into green when the DRS is activated.
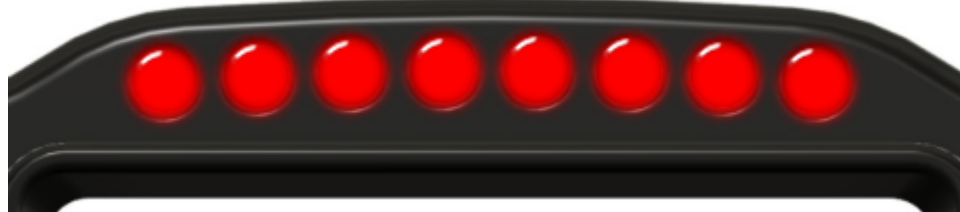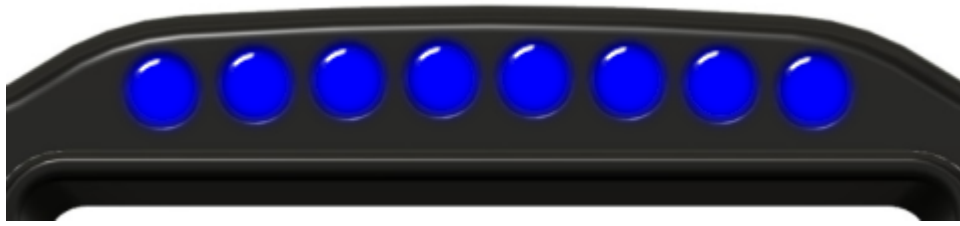
When a new flag event happens (blue, yellow, or red), all the leds start to flash rapidly in the color of the flag for two seconds. Then the middle six leds goes back to normal operation, but the two leds at the side keep the flag color, for the entire time the flag is active.
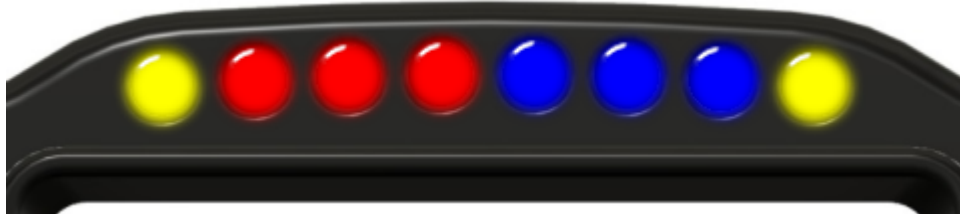
GT design - page 1 (laptimes)

Select this design on the setup page by clicking on the rightmost image:

The page shows up when the display starts to receive data from any supported game source. To step between pages, touch the gear text (middle of the screen) Or press L3 button on your controller in F1, or press your configured input in SimHub plugin.

This page contains common data with additional laptime information. The same page has two display modes: Practice / Time trial:
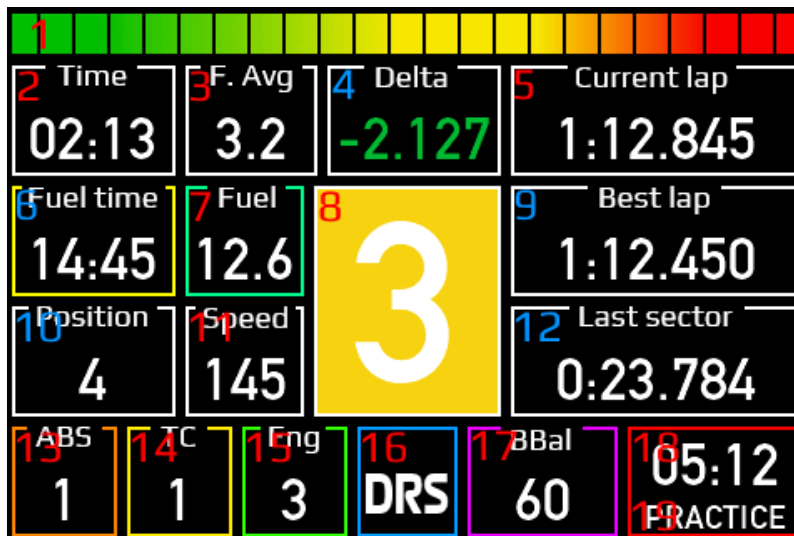
Or Race:

The page differences are marked with blue numbers.

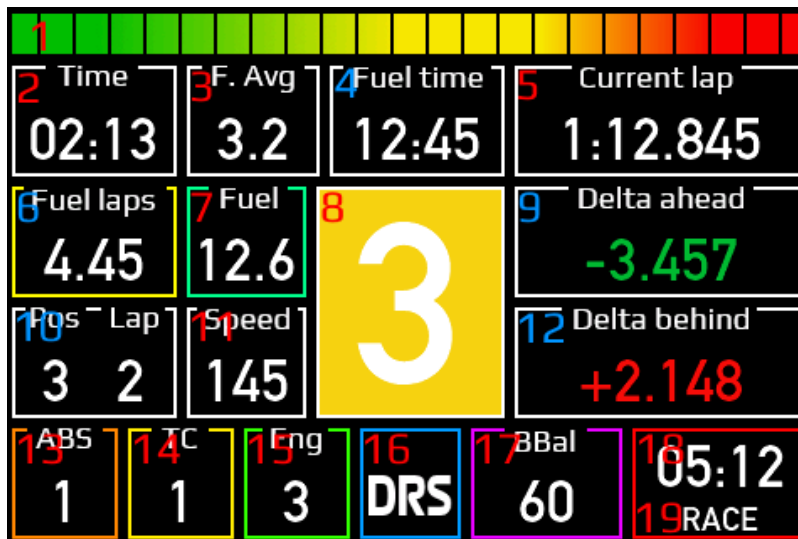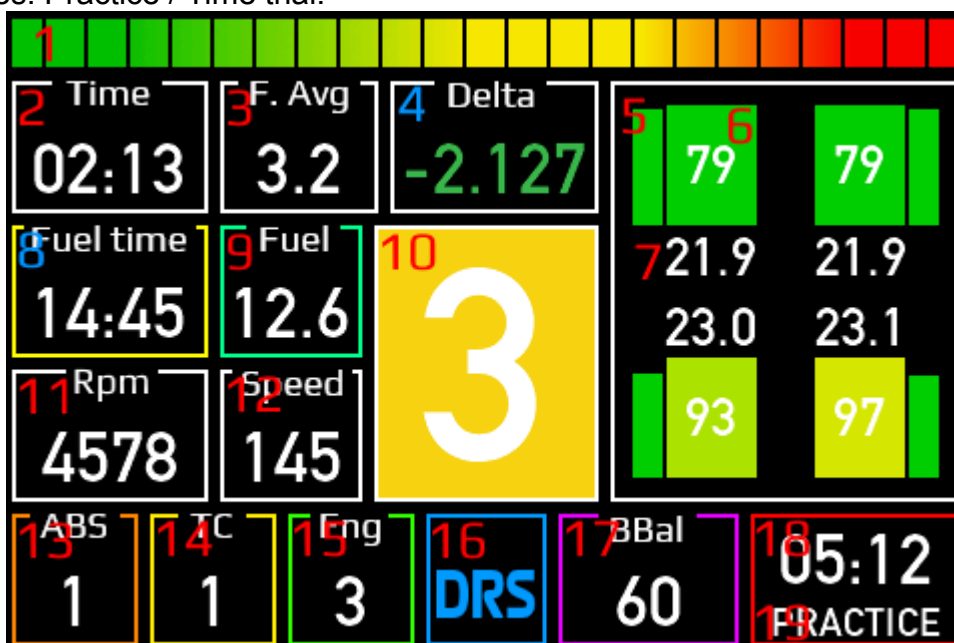1. RPM bar. – Min value is 0, max value is received from the game.

2. Session Time Left. If greater than 1 hour, then format is HH:MM. When time is less than 1 hour then format changes to MM:SS

3. Average fuel consumption. SimHub only

4.p. Delta time to session best. SimHub only

4.r. Remaining time for fuel. SimHub only. In HH:MM or MM:SS format.

5. Current Lap time

6.p. Remaining time for fuel. SimHub only. In HH:MM or MM:SS format.

6.r. Remaining fuel in laps

7. Remaining fuel in liters

8. Gear – Can be R for reverse, N for neutral, P in pits, 1-9 in gears. Background color is Flag indicator – Supported colors: yellow, blue, green, red, or none

9.p. Best lap time (what game sends)

9.r. Delta time to the car ahead. SimHub only

10.p. Position within practice

10.r. Position, and Lap number in the race

11. Speed in km/h

12.p. Sector 1 time in Sector 2. Sector 2 time in Sector 3. Last lap time in Sector 1.

12.r. Delta time to the car behind. SimHub only

13. ABS. 0 or 1 in F1. ABS level in SimHub

14. Traction Control level

15. Fuel mixture for F1: 0 = lean, 1 = standard, 2 = rich, 3 = max. Engine mode for SimHub

16. White "DRS" for DRS allowed, Blue for DRS enabled. Also low fuel warning in SimHub

17. Front brake bias (percentage) in F1, Break balance in SimHub

18. Real time. SimHub only

19. Session type. (Practice, Time trial, Qualify, Race, etc.)

GT design - page 2 (tyres)

This page contains common data with additional tyre information. The same page has two display modes: Practice / Time trial:
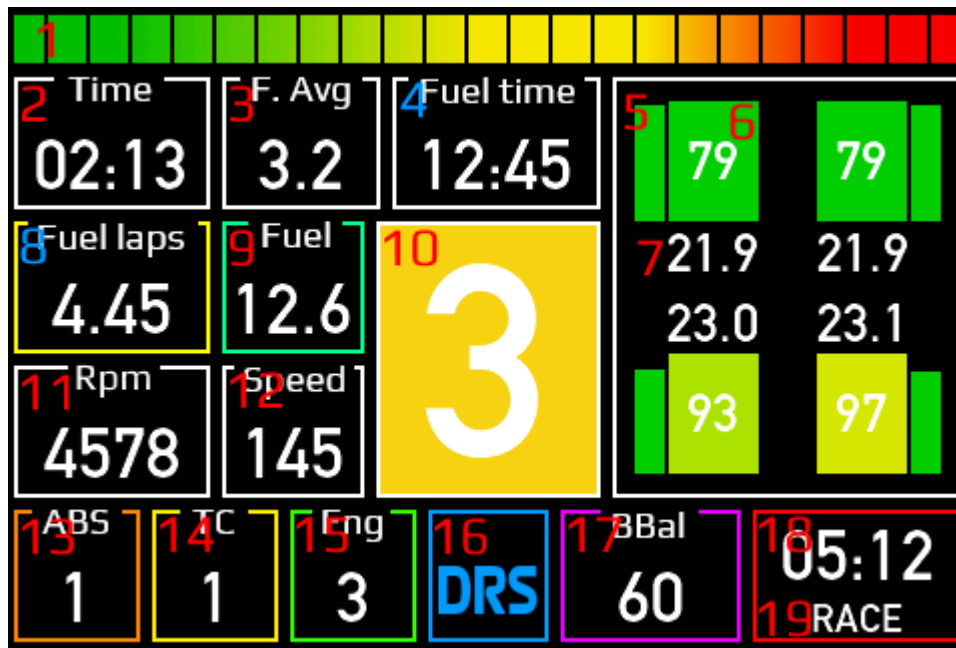
Or Race:

The page differences are marked with blue numbers.

1. RPM bar. – Min value is 0, max value is received from game.
2. Session Time Left. If greater than 1 hour, then format is HH:MM. When time is less than 1 hour then format changes to MM:SS
3. Average fuel consumption. SimHub only
4.p. Delta time to session best. SimHub only
4.r. Remaining time for fuel. SimHub only. In HH:MM or MM:SS format.
5. Tyre wear / damage in percentage, and also in color. 0-20: green, 20-60 yellow, 60-100 red
6. Tyre temperatures in Celsius degrees. In some game modes the game sends constant values. Background color also changes from cold to hot: blue – green – red. In the case of F1 the limits differ for every tyre compound. When playing through SimHub, the limits are fixed: 55 – 65: blue to green. 90 – 100 green to red.
7. Tyre pressure. The measure unit is defined by the game.
8.p. Remaining time for fuel. SimHub only. In HH:MM or MM:SS format.
8.r. Remaining fuel in laps
9. Remaining fuel in liters
10. Gear – Can be R for reverse, N for neutral, P in pits, 1-9 in gears. Background color is Flag indicator – Supported colors: yellow, blue, green, red, or none
11. RPM.
12. Speed in km/h
13. ABS. 0 or 1 in F1. ABS level in SimHub
14. Traction Control level
15. Fuel mixture for F1: 0 = lean, 1 = standard, 2 = rich, 3 = max. Engine mode for SimHub
16. White "DRS" for DRS allowed, Blue for DRS enabled. Also low fuel warning in SimHub
17. Front brake bias (percentage) in F1, Break balance in SimHub
18. Real time. SimHub only
19. Session type. (Practice, Time trial, Qualify, Race, etc.)

GT design – Led signals

This design's shift light color scheme is a transient from green to red. The leds starts to show up when the game sends the revlight data: Rev lights percent for F1, and RPMShiftLight2 for SimHub. When all leds show up, then they start to flash.

When the car is in pits, every second led shows up in yellow, and starts flashing alternatingly.
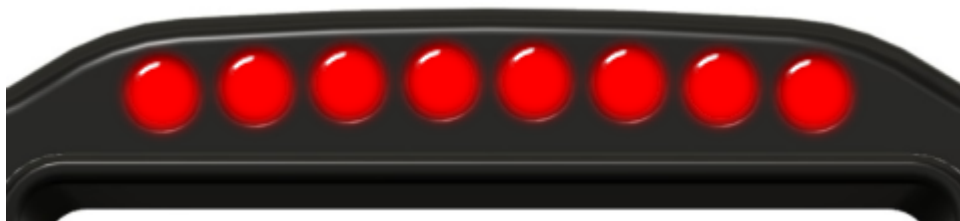
When a new flag event happens (blue, yellow, or red), all the leds start to flash rapidly in the color of the flag for two seconds. Then the middle six leds goes back to normal operation, but the two leds at the side keeps the flag color, for the entire time the flag is active.

SimHub plugin

SimHub is a modular multi sim dashboard and tactile feedback software that runs on PC, and it helps to unify telemetry data received from different games. We have developed a plugin for SimHub that collects the necessary telemetry data from SimHub, and sends this data over the local network to the Telemetry Display. You can download the latest MVH Studios Display plugin from MVH Studios website
(Plugin installation is covered in quickstart guide)
To open plugin settings, start SimHub, select Additional plugins from the left menu, then choose MVH Studios Display plugin from the top menu.
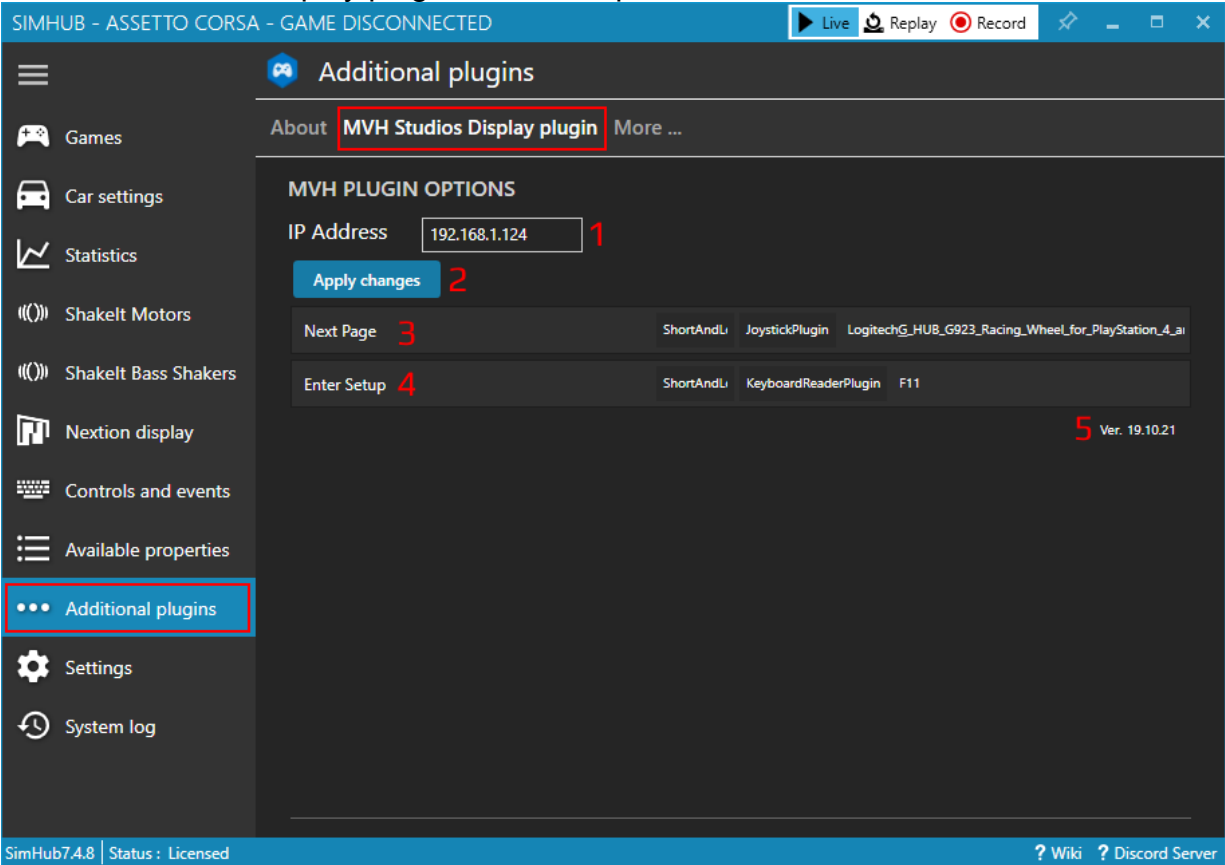
1. IP Address field is where you enter your telemetry display IP address which you can find on the Splash screen of the display. It is needed for the plugin to know where to send the data on your network.
2. If you change the IP Address, then press the Apply button to save the modifications.
3. Action: Next Page. You can change the active page on the Display by tapping it, or by choosing an action in SimHub. If you hover the mouse above this line, a menu will pop up where you can Add a new action, or edit the current, or clear it
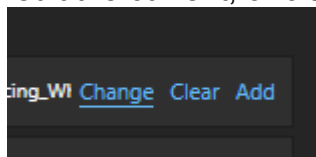
Choose add or change, and a new window will pop up.
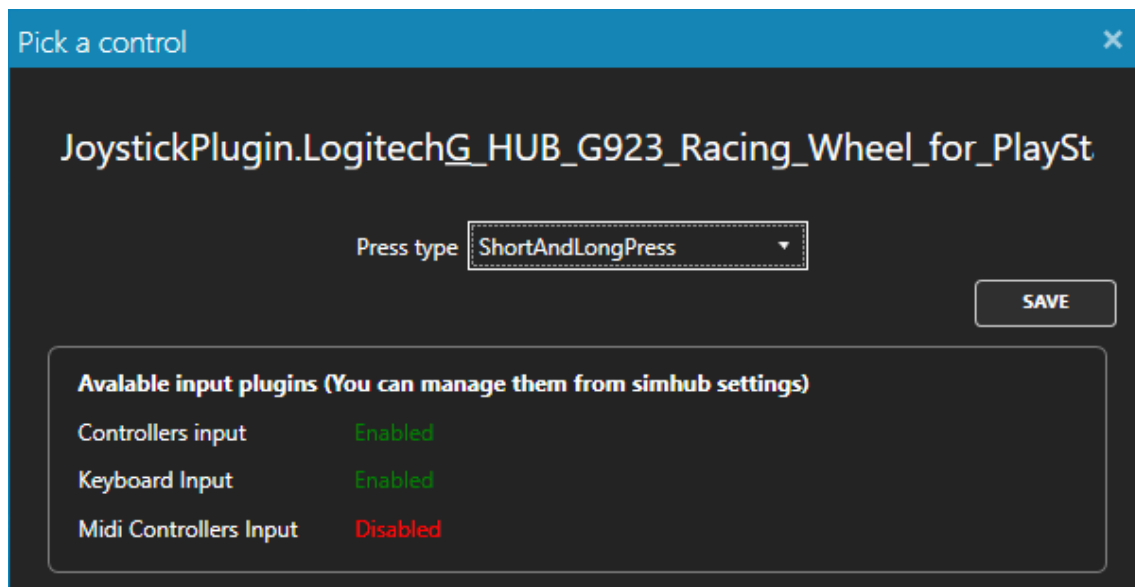
First select the input receive type from the drop down list (short press, long press, both, etc.), then press the desired input on your game controller, or keyboard. Click the SAVE button if you finished setting it, and the windows will disappear.

4. Action: Enter Setup. While you are playing with a game, and you want to enter into the Displays Settings menu, (to change the design, or brightness) then here you can set up a custom action for it.

5. Plugin version.

Update Display firmware

When you connect your Display to a WiFi network that has internet access, then it checks for updates at every startup. When the display finds a new update, then an "Install update" button will appear in the top right corner next to the Settings icon, and also a text will appear that warns you about it. The update process can take several minutes to complete, so you can ignore it, and install anytime when you have time for it. **Please ensure the display does not get unplugged during the update process.**

The Display software consists of two parts: A firmware part and a user interface part. The updating usually happens in sequence after each other, but for minor bug fixes it is possible to get an update only for one of these. When the UI updates, the screen changes to updating mode, where you can see the updating progress. It can take up to 10 minutes to finish, please be patient, and **don't power off the display during the update.**
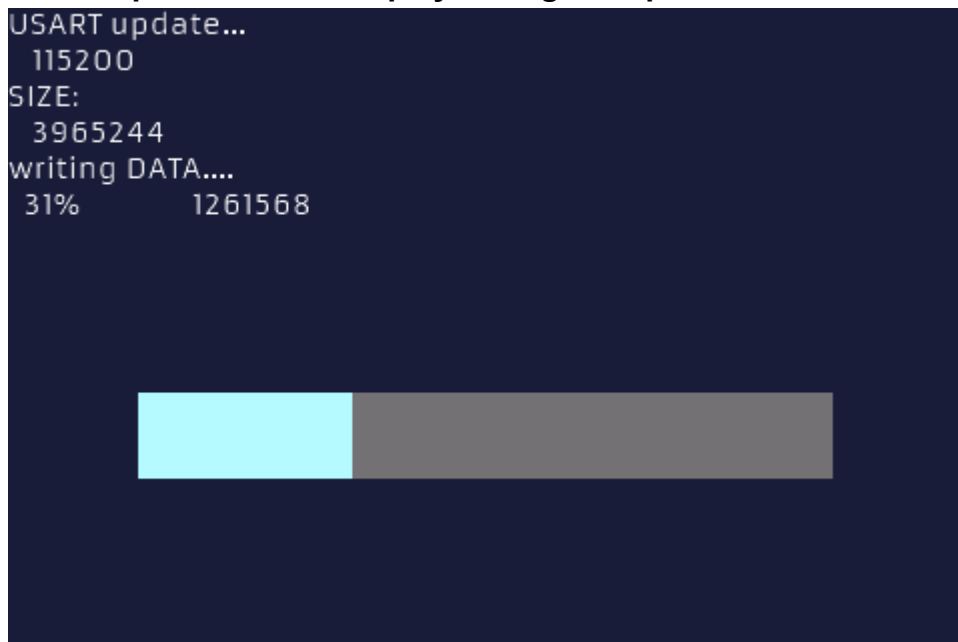
Some rare cases the update can fail. (e.g. internet issue or server overload). If the process stops at a point, and the percentage does not increase for more than 10 minutes, then you can try to restart the display by disconnecting and reconnecting the USB cable. Please note that if the UI update fails, then you will not see the usual MVH screens, but an error screen. The Display is prepared for this scenario. If it still has internet access, then the display will start the update automatically again after a few minutes. If you don't see the update start, then it is possible you have a temporary internet issue, and currently the Display can't reach the internet. In this case the Display steps into Settings mode, and starts it's own WiFi

network. You can check it with a phone or laptop as it explained in the Settings section. In this case, please ensure that the credentials are correct, and try starting the display when it has Internet access again. After a successful UI update the screen restarts, and you will see the splash screen again.

Updating the firmware (after the UI update) runs much quicker. An "Updating Firmware, do not power off!" appears for a few second, then the process starts.

You can see the percentage on the bottom of the screen. When it reaches 100%, the display restarts again, and you are done! You are ready to play again.

Update SimHub plugin

When new features come out for the Display, it is possible that the SimHub plugin also needs to be updated to a newer version. In this case then the display will warn you about it later. While you are on the Splash screen waiting for data, the screen does not know if you will ever play on PC, and if you do play, it does not know if you already updated the plugin or not. Start to play with any supported game on PC. It will work, except for the new features. While data arriving from the plugin, the display checks the version of the data that comes from the plugin, and stores a warning within it's memory if the plugin is outdated. If a warning is stored, anytime you are on the splash screen there will be a warning message at the bottom.

IP: 192.168.1.124

Simhub plugin is outdated. Please use 19.10.21!

When you see this message, please go to MVH Studios website, and download the latest plugin! Close SimHub, make sure it is also closed on the tray bar, then copy the MVHSimHubDash.dll file into SimHub's installation directory (e.g.: C:\Program Files (x86)\SimHub\) overwriting the old one. (Your settings will remain) If you open up SimHub, you should see this version at the plugin properties.

After updating, the display will still show this warning message on the splash screen, until you start to play on PC again, with the new plugin. When the display finds out it now gets up-to-date data messages, then it resets the warning in it's memory. From now the splash screen resets back to normal operating mode, and the bottom message will be the usual "Waiting for data..."

Happy gaming!