Manual Transmission and Steering Wheel Support for GTA V

Version 5.6.0

Description

This project aims to expand the driving immersion and experience in Grand Theft Auto V, with a custom transmission, wheel support and much more.

Features

- Complete steering wheel support
  - DirectInput interfacing
  - Force feedback from scratch
  - Multiple devices supported
- Transmission replacement with custom modes and more
  - Manual sequential
  - Manual H-pattern
  - Custom Automatic
  - Working clutch
  - Engine braking/stalling/damage
- Tunable driving assists
  - Launch control
  - Traction control
  - Stability control
  - Custom anti-lock braking

- Synchronized steering wheel and animations
  - Match your actual wheel 1:1
  - First person hand-over-hand animations
- Seamless input switching between steering wheel, gamepad and keyboard
- Complete in-game configuration menu
- Vehicle-specific configurations
- Customizable steering assists
- Expose UDP telemetry (DiRT 4 format) for motion platforms, dashboard apps and more

Downloads

- GTA5-Mods.com
- GitHub release (older versions)
- Latest automated builds

Recommended mods

For gameplay and driving:

- A realistic handling mod
- Custom Gear Ratios: Essential if you have cars with more than 6 gears, and allows matching gear ratios with the real car counterparts.
- Turbo Fix: Fixes spool rates of the turbo upgrade.
- Dial Accuracy Fix: Remap dashboard dials to match your actual speed.
- ACSPatch: Keep wheels turned when exiting cars.
- Autosport Racing System by Eddlm: Complete custom racing system with advanced AI.

Any speedometer supporting RPM/Gear reading from memory:

- NFS Speedo
- LeFix Speedometer
- NFSU Speedometer
- Any ScriptHookVDotNet-based speedometer with gears and RPM

Mods that counter the power loss when sliding sideways (Also partially mitigated by LSD):

- InversePower
- Drift Assist
- True Realistic Driving V: Script-based physics
- Stop!Powercutting: InversePower alternative
- InverseTorque: InversePower alternative

Recommended handling mods

The default grip levels cause the wheel to bounce left and right because they're too grippy. These handlings have reduced grip to realistic levels, and are essential for playing with a wheel. Mix and match all you need, as these don't overlap much.

- Realistic Driving V by killatomate
- Aquaphobic's Realistic Handling Pack

- Lore Friendly Handling Pack by Eddlm
- Realish Handling Pack by Eddlm

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Requirements

- Grand Theft Auto V
- ScriptHookV

Optional: (Downloads)

- DashHook
- Handling Replacement

Installation

Put `Gears.asi` and the folder `ManualTransmission` in your GTA V folder (overwrite when asked).

Make sure the `ManualTransmission` folder is writeable! (not `Read Only`). If the folder is not writeable, it will automatically be copied to `%localappdata%\ikt\ManualTransmission`.

You may also directly place the `ManualTransmission` folder in `%localappdata%\ikt\ManualTransmission`.

Open the menu using the `mtmenu` cheat or the `\|` hotkey, and start customizing things.

The hotkey may be changed in `settings_menu.ini` -> `[MENU]` -> `MenuKey`. `Keyboard_Keys.txt` contains special keys you can use, on top of the default alphanumeric keys.

Wheel setup

1. Remove or disable any XInput or DirectInput input hook configurations for your wheel for GTA V (x360ce, for example).
2. Open the menu, navigate to `Controls` -> `Wheel & pedals`.
3. Set up your analog inputs in `Analog input setup` and set up your analog inputs (throttle, brakes, steering).

4. Go back to the `Wheel & pedals` menu and go through **all** options. **Read the description of each option.**
5. Read the force feedback section.

FiveM

FiveM is not supported. You can try to use it as user plugin, but don't expect any support.

1. Create a `plugins` folder in FiveM Application Data.
2. Put `Gears.asi` and the folder `ManualTransmission` in `plugins`.

You can also just copy-paste the `ManualTransmission` folder if you have configured the mod for singleplayer already.

If the `%localappdata%\ikt\ManualTransmission` folder exists, it will use that instead.

The script works in servers that allow user plugins (ScriptHookV scripts). Last checked to work with MT v5.5.0 and FiveM using the 2545 version of the game.

No plans exist to port this into FiveM or "convert" it to server-script, but if you have solid plans to do so, feel free to contact me if you have questions.

A FiveM resource research project seems to work well, so check that out instead.

LegacyFuel implements the code discussed above.

Updating

Replace `Gears.asi` and copy the `ManualTransmission` folder. You do **not** need to overwrite changes in the `ManualTransmission` folder, the script will write new settings in the file when saving.

Default controls

Refer to `settings_controls.ini` for the default controls.

Opening the menu:

- Press `[{` to access the menu or
- Enter the `mtmenu` cheat or
- Press `RB` + `B` on your controller.

These shortcuts can be changed in `settings_menu.ini`.

Keyboard defaults (US-ANSI)

By default, `W` is throttle and `S` is brake.

- Press `\|` to disable or enable manual transmission
- Press `]}` to switch between sequential, H-pattern or automatic
- Press `Z` for Clutch
- Press `X` for Engine

Sequential and Automatic:

- Press `LSHIFT` to shift up
- Press `LCTRL` to shift down

Controller defaults

By default, `RightTrigger` is throttle and `LeftTrigger` is brake.

- Hold `B` to switch between sequential or automatic
- Press `A` to shift up
- Press `X` to shift down
- Use `LeftThumbUp` to control the clutch
- Press `DpadDown` for Engine

Wheel defaults

There are no defaults.

Use the menu to assign throttle/brake/clutch and other actions, such as shifting, changing gearbox mode and game controls.

Usage and setup

After installation use the menu key, button(s) or cheat to open the Manual Transmission menu. You will need this menu to change all the options of the script and set up things like steering wheels or custom controls.

Driving basics

Manual Transmission simulates a real car, so you might want to know how to drive a manual.

Using the clutch: Depending on your settings, you might need to operate the clutch to drive your car.

When the stalling option is enabled, remember to not let the RPM dip too low. It might stall otherwise. Stalling can be noticed by the RPM bar dropping below the stationary RPM.

When using a H-pattern shifter, remember to clutch in to shift. Not pressing the clutch might cause a misshift, which might damage the car, and the car will not go in gear. You'll hear a grinding sound when this happens.

When timed right, it's possible to shift into gear without clutching, when the speed of the car and the RPM match up.

Braking and reversing: While Manual Transmission is active, the brake input will only work as a brake. When stopped, the brake input will not reverse your car.

To reverse, shift into the reverse gear. Press the accelerator input to accelerate in reverse.

Wheel-specific: While Manual Transmission is active, the pedals behave like real pedals. When the manual transmission part of the mod is turned off, the throttle and brake pedals work like the left and right trigger on a controller.

Input switching

The mod picks up the last control and is only active for that set of controls. To switch between inputs (keyboard, controller or wheel), you only need to tap the throttle on that device. The mod switches between these inputs by itself, and the main menu shows what the current active input is.

Specifically for wheel users, you might need to fully depress the throttle pedal or clutch pedal (once) if the mod keeps swapping away from the keyboard or controller.

If for some reason you want to lock the controls, head over to `Debug` and check `Disable input detection`. This allows switching inputs manually in the main menu.

Vehicle Configurations

The script supports various vehicle-specific options, such as shifting behavior and driving assists. The submenu `Manual Transmission settings` -> `Vehicle configurations` shows the current known configurations. When you're in a vehicle that fits the model and/or plate, that configuration is loaded.

With the option `Create configuration...`, a new, clean configuration is generated and activated. Some submenu subtitles show `CFG: [<Configuration>]`, which means the options in that submenu are loaded from and saved to that configuration. Edits you make for these options don't get applied globally.

When hand-making a configuration yourself, options that are missing in the configuration file will use whatever the global settings are.

For instructions for this feature, check `ManualTransmission/Vehicles/Information.txt`.

Driving assists

Have trouble keeping the car on the road? The `Driving assists` feature might help!

The following assists are available:

- Anti-lock Braking System: Prevents the wheels from completely locking up under heavy braking, so steering input is still effective.
- Traction Control System: Prevents the wheels from spinning too much and losing control under hard acceleration.
- Electronic Stability Control: Detects understeer and oversteer and applies the brakes to counter these effects.
- Limited Slip Differential: Simulates a limited slip differential and sends more power to the slower wheel.
- Adaptive All-Wheel-Drive: Changes all-wheel drive distribution between front and rear in real-time, depending on wheel slip, oversteer or understeer. The Handling Replacement library is needed for this feature.
- Launch Control: Keeps the RPMs steady at a custom level, to prevent too much wheelspin on launch.

Animations

The script now overrides the animations and matches the steering wheel rotation. The system needs a bit of help to understand what to do, though.

Let me know if anything is missing, so I can update `animations.yml` to support as many vehicle types as possible out-of-the-box.

`animations.yml` is a text file containing the animation definitions: What animations to use for which vehicle layouts, and how many degrees of rotation chosen the animation supports. *Most* game vehicles are present already, but most add-ons need to be added.

If a vehicle doesn't have matching animations, do this:

1. Open the `vehicles.meta` containing your car.
2. Find the `<layout>` for your car entry.
3. Copy the contents of that (for example, `LAYOUT_STD_AE86`).
4. Paste it in `animations.yml` in a suitable animation.

You can usually guess what's suitable from the other entries already present. The debug menu has an animation section where you can force animations, you can also use that to find a suitable animation.

If a vehicle defines an animation clipset *not* in `animations.yml`, it can be added.

1. Check the layout name in `vehicles.meta`.
2. Check the corresponding clipset dictionaries in `vehiclelayouts.meta`
3. Check the corresponding clipset dictionaries in `clip_sets.xml`
4. Make an educated guess what the dictionary is for your vehicle
5. Check the dictionary in `clip_anim.rpf`
6. Open the `.ycd` in notepad and hope you find a `steer_no_lean` or `pov_steer`
7. Copy an `- Animation:` entry in `animations.yml` - **mind the indentation!**
8. Substitute the dictionary and animation name for your vehicle, replace layouts with your new layout and throw in an educated guess what the rotation degree is.

Useful resource: AlexGuirre's animation list.

If the current steering angle is more than what the animation supports, it will just stay at the maximum.

While synced animations are active the game limits the viewing angle to about 10 degrees left/right. Using an alternative camera mod is highly recommended.

Wheel FFB LUT

A lookup table (LUT) can be used in this script. A LUT can be used to customize wheel response, for example, to linearize the response from the motors.

The supported format is the same as Assetto Corsa. Use the following tools to generate a LUT for your wheel:

1. WheelCheck
2. LUT Generator for AC

The instructions are similar as the LUT generator page, but here they are specific to this script:

1. Run WheelCheck with your wheel plugged in.
2. Set `Max Count` to 100.
3. Select `Step Log 2 (linear force test)` and wait until the test stops. The test starts directly when the option is selected, and ends when the wheel stops moving. It might take a while to start if your wheel has a force feedback deadzone.
4. Run LUTGenerator.exe

5. Open the `.csv` generated by `WheelCheck`. It's in the `C:\Users\<user>\Documents` folder.
6. Save the generated LUT in `ManualTransmission` folder, eg `g27.lut`.
7. Open `settings_wheel.ini`, and under the `[FORCE_FEEDBACK]` section, add `LUTFile = g27.lut`.

Using a LUT file will disable the `AntiDeadForce`, as it already corrects for any dead spots.

If you're hand-rolling your own LUT or changing the forces, make sure the first entry is `0|0` and the last line is `1|1`. The `Gears.log` file will also output warnings or errors if something is wrong.

Force feedback

The force feedback in 5.5.0 takes its data from observed slip angles of the steered wheels, so it's important that the data fed to it is somewhat accurate.

Handling for force feedback

The force generated is proportional to the optimal wheel slip angle, as defined in by `fTractionCurveLateral` in a vehicles' `handling.meta` entry.

This value is in degrees. It dictates how quickly the car responds to steering inputs, and massively affects force feedback feel. Small values make it respond quite quickly, large values make the force feedback sluggish and vague.

- street tires: 9.3~8.5 degrees
- semi-slicks: 7.5 degrees
- slicks: 6.0 degrees

GTA V uses pretty high values by default, as do many vehicle authors, so most handlings feel sluggish and need adjustment to feel accurate.

I recommend using realistic values, and to not exceed 12.5 degrees. Otherwise it will feel sluggish and vague.

The `fTractionCurveMax`/`fTractionCurveMin` values dictate how much grip the tires have, roughly expressed in g-force for neutral load (no downforce).

Most handlings use a high value (sometimes paired with flags that increase gravity), but this makes the car feel too responsive. I recommend running `strHandlingFlags` with `20100`, which does not enable gravity-modifying flags, adds some tire squish (less harsh FFB on uneven terrain), and stops the car from slowing down very quickly off-throttle (unrelated to FFB, but still a must-have).

With realistic traction values, the force feedback behavior is much more natural.

Here are a few numbers from Assetto Corsa, where minor differences can make quite some difference.

- old street tires: 1.21 g's
- modern eco tires: 1.22 g's
- modern street tires: 1.25 g's
- semi-slicks: 1.32 g's
- slicks (hard): 1.54 g's
- slicks (medium): 1.56 g's
- slicks (soft): 1.58 g's

Force feedback settings and other notes

Firstly - take a look at the Wheel FFB LUT section! For non-direct drive wheels, it's a vast improvement in detail and lower-level force. Direct drive wheels won't need it.

Version 5.5.0 was developed with a Logitech G27, and later a Fanatec CSL DD. Both wheels differ vastly in feel, but similar (default) settings work fine.

For the settings: The descriptions ought to be descriptive enough. Following is just general advice, but for the best results just try stuff yourself.

- FFB SAT scale: Increase or decrease if the force feels overwhelmingly off. For wheels like the G27/29/923, it may be increased at the cost of clipping. For direct drive wheels, it may be decreased.
- FFB Linearity type: How the slip angle is mapped to the force. The option displays a graph of the force mapping. Using "Boosted" is recommended on all wheels.
    - "Gamma": Adjust between:
        - Less than 1.0: Initially less force, full force at end.
        - 1.0: Linear force.
        - More than 1.0: Initially more force, tapers off at the end.
        - If chosen, should be less than 1.0.
    - "Boosted": Has a steep rise by default and tapers off at the end.
        - The ramp-up can be decreased or increased.
        - If chosen, can usually be left at 1.0.
- Effect multipliers: Set to whatever you're comfortable with.
- Detail averaging: Use ~3 samples to prevent excessive jerks, but keep detail.
- Damper: Wheel friction.
    - "Damper max" can be set to preference. (Low for strong power steering)
    - "Damper min" should be set lower than "Damper max", but as high as possible without feeling friction. It should feel like the natural friction of the steering linkage, as this is the constant friction when driving at speed when disregarding the "centering forces".

The "FFB normalization options" are to make high `fTractionCurveLateral` cars feel somewhat responsive. If you're going for realistic, very low `fTractionCurveLateral` handlings, it might be useful to use the "No normalization" values, otherwise the difference in feeling between minute handling changes is diminished.

Finally: GTA V's physics and scripting engine is coupled to the frame rate. Playing the game at a higher framerate results in more accurate force feedback.

This has one trade-off: Some tracks have small gaps in their collision surface, so with high frame rates, these can be felt. There is no way to filter these out, so consider appealing the track author to fix their collisions.

Troubleshooting

Something don't work? Read this first.

Game compatibility

The current version of the mod has been tested with the latest GTA V version during development, which is v1.0.2545.0. Limited support runs back to v1.0.1604.0, but new features might be unstable.

Compatibility options

Check the `Developer options` -> `Compatibility settings`.

- For wheels recognized as gamepad, check `Disable input detection` and choose wheel input in main menu.

Known issues

- Conflicting inputs:
  - **x360ce** will conflict with input detection if throttle, brake, clutch or steering axes are mapped in x360ce. Assigning inputs without overlap is no problem.
- Conflicting mods:
  - **Strapped** will conflict with inputs.
  - **CustomSteering** will conflict with steering patching.
  - **Smooth Driving V** will conflict with inputs and gearbox.
- Gears.asi doesn't load (in asiloader.log, or indicated otherwise):
  - Make sure you're using the latest Microsoft Visual C++ Redistributable.

Steering wheel issues

- Wheel not detected:
  - Ensure you've (tried to) set up the wheel by assigning the axes and buttons.
  - When using Steam:
    - Fix: Uncheck `Generic Gamepad Configuration Support` in Steam Big Picture settings, Controller settings. (Found by Kaerali)
    - Fix: Check your wheel drivers and software (Logitech)
  - Try toggling the mod (`|\` key or toggle Enable Manual Transmission)
  - Ensure you have removed xinput dlls from the GTA V directory
  - Check if your drivers are up to date and the wheel works for other games
  - Check if some other program isn't using your wheel (x360ce, etc)
  - Check if the wheel is detected in Gears.log (in the ManualTransmission folder)
  - Try another USB port!
- Wheel throttle causing aiming or shooting, or switches away from wheel to controller: Your wheel pretends to be a controller.
  - Check if you can make it not do that.
  - In `Developer options` -> `Compatibility settings`, check `Disable input detection` to disable constant input switching.
  - Plug in another XInput controller before plugging in your wheel. Sadly, no way for the mod to block GTA from detecting it as controller.
- Logitech G920 (NOT G29) crashing game while using ScriptHookVDotNet:
  - Caused by XInput somehow. Unknown if there is a solution.
  - Remove ScriptHookVDotNet, or
  - Use RagePluginHook to launch, or
  - Remove/Downgrade/Upgrade G-Hub, or
  - Buy another wheel that doesn't do XInput voodoo □
- Wheel oscillates a lot:
  - Use 5.5.0 or newer.

    - Increase damper force.
    - Get a faster wheel.

Credits

A massive *Thank You* to everyone who contributed!

- Rockstar Games
- Alexander Blade
- Crosire
- LeFix
- XMOD
- InfamousSabre
- leftas
- kagikn
- zorg93
- alloc8or
- any333
- Nyconing
- CamxxCore
- guilhermelimak
- Rbn3D
- LeeC2202
- Dot.
- Zolika1351
- fingaweg
- All others who helped 😃

Source code

You can check the source code at https://github.com/E66666666/GTAVManualTransmission.

Feel free to make issues, PRs and other contributions 😃

Contact

If you have any issues or questions, you can find me (ikt) on the following channels:

- My Discord server
- GTA5-Mods.com Discord server
- GTA5-Mods.com Manual Transmission page

Please *directly* ask your question, and remember to provide the log files 😃