

## QUICK MANUAL

### Thank you

I would like to take this opportunity to thank you for being who you are. You, and guys like you, are keeping car enthusiasm alive and well.

This new G-TECH/Pro Performance Meter is based on High-Speed GPS technology and it's better than ever. It's everything I always wanted it to be, so please enjoy it.

Jovo Majstorovic  
President & CEO, TESLA Electronics Inc.

### About your G-TECH

Your G-TECH is built for severe vibration environment, that's why all of the components are "floating" inside Santoprene rubber material. G-TECH has a built-in High-Frequency GPS antenna (square bulge in the back) which needs to be exposed to the sky. When the unit is turned on you will see the amount of satellites currently in the view (12 maximum) in the upper right corner of the display. The more satellites G-TECH "sees" the higher the accuracy will be. When you turn on the G-TECH it will take a few minutes to lock onto the satellites. When you turn on the G-TECH for the first time leave it running for 30 minutes, this will improve the overall GPS performance. Look for a small plus sign between the satellite icon and the number of satellites. This indicates that SBAS (Satellite Based Augmentation System) is locked in, this will improve accuracy. For best performance, keep the G-TECH right on top of the dash in the bottom of the windshield. Small icon on top of the screen indicates if the MicroSD card was inserted properly (RR model). Control module can be detached and mounted somewhere closer to you. You will find this very useful especially when strapped in a 5-point racing harness. It uses a regular Ethernet (network) cable which can be purchased in any electronics store.

There are two models SS (Super Sport) and RR (Road Racer). To upgrade from SS to RR is as simple as inserting a RR expansion board in the back of the unit. Available at gtechpro.com

SS is intended for all of the standard straight-line performance measurements including, Horsepower, Torque, 0-60mph, 60ft times, 1/8 mile, 1/4 mile, braking distance and more. It has the capability to replay runs and can be used in all vehicles including cars, motorcycles, boats, tanks etc.

RR model has all of the functions of the SS plus it has the ability to record lap times on the racetrack. RR is also capable of displaying lap-segment times as you are driving. This feature will help you improve as a driver and help shave-off seconds from your lap times.

### User Interface

Default screen is where current measurements are shown. There is a primary (bigger numbers) and secondary area (smaller numbers) of the display. You can choose between current SPEED, HORSEPOWER and G-FORCE to be displayed on either of the screen areas.

Main menu is where you can choose to view SAVED RUNS, SETUP and SWITCH MODE.

In SAVED RUNS you can choose to display SS runs or RR sessions (RR model). All the runs and sessions are organized in a familiar way, as folders and files. SS runs are arranged in the folders for each date. Each run is named with the time-stamp when it was recorded. When you select a particular run you will get the key result for that run displayed on the bottom of the screen. This way you can quickly locate the best run of the day. You can delete or rename a particular file by double-clicking it.

When you choose a particular SS run for replay you will get the screen with all the major results. **0-60**, **1/4**, **HPTQ**, **60-0** and **Gs**. When you select any of these results you can replay the graph and see additional info.

In **0-60** graph you can see acceleration time to any speed in 10mph increments indicated by + signs on the graph. You can even get passing times from 40-60 for example, by selecting one of those marks (small square will show up) and rolling over the other with the cursor.

In **1/4** mile graph you will get an actual real-time replay of the acceleration run with all the milestones like 60ft time, 1/8 mile time etc. If you want to skip the replay simply push the SELECT button. You can roll over any of the milestones with the cursor to see the times. You will notice that your speed is not starting from zero, that's because of the built-in 12" rollout.

In **HPTQ** graph you will see Horsepower and Torque vs RPM just like on a dyno. In case you were doing a regular acceleration run you will only see horsepower vs time on the graph.

In **60-0** graph you will see a plot of speed vs distance. You will see small + signs for every 10mph increment. This way you can easily select a given speed mark and see the braking distance from that speed to zero or any other speed you roll over with the cursor.

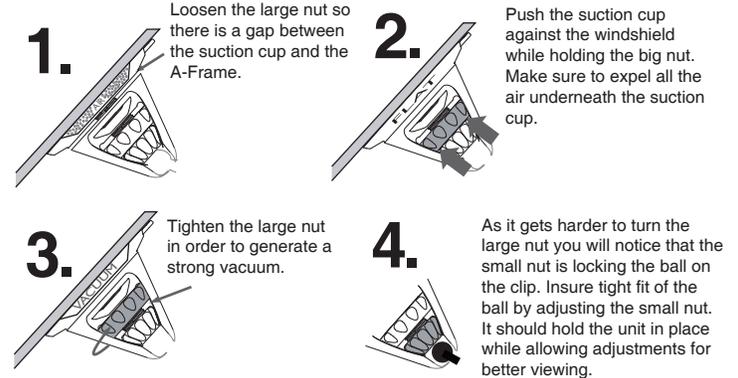
Finally there is a **Gs** graph that will show you forward acceleration vs time on the graph. Values below the horizontal zero line indicate deceleration or braking.

In SETUP you can customize the way your G-TECH operates including what you want to be displayed in the major and minor area of the display, the color of the display, you can switch between metric and standard units (all recorded runs get converted), adjust date and time, control the sound, format the memory card and reset to defaults. Every time you use a new MicroSD card make sure you format it in the G-TECH, this will improve performance. In SETUP you can also enter data about your car, CAR WEIGHT and HORSEPOWER LOSSES for your car. More on this in the horsepower section.

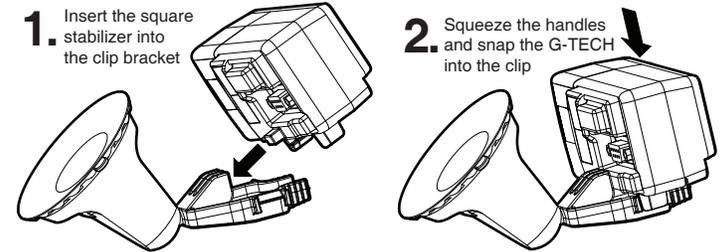
SWITCH MODE allows you to change the operation between SS and RR modes (RR model only). If you want to make straight-line measurements choose SS mode and if you want to do some circle track, road racing, carting, hill-climbing, moto-cross, off-road, solo or rallying you will want to be in the RR mode.

### Mounting System

G-TECH mounting system is capable of holding much longer than other windshield suction cups. However, in order to insure proper use make sure your windshield is clean and pull the vacuum by following these steps:



G-TECH can be taken in and out of the clip (cradle) by following these steps.



### About Car-Testing & Accuracy

There are few good practices to follow when making any type of car dynamics or performance measurements. This is what the pros do:

Average results from several measurements. This will help minimize the uncontrollable variables, such as the wind, surface slope, atmospheric conditions etc.

Do the measurements on level surface, find the appropriate area and try to do all your measurements there. Test in both directions, this also helps eliminate variables.

Avoid windy days, wind can significantly affect your cars ability to accelerate. Avoid rainy days, they will limit the satellites G-TECH can see.

Rolling resistance plays a major role in the overall horsepower losses. Always make sure your tire pressures are the same between measurements. Road surface also affects rolling resistance, so make sure all your comparable tests are done on the surface with similar roughness.

Absolute horsepower is a very elusive number. Any honest dyno operator will admit that there are a slew of "fudge" factors aka. corrections that are used to try to mimic the manufacturer published numbers which, more often than not, actually come from the marketing departments.

Keep in mind that the "devil is in the details", for example, you can make a couple of more tightening clicks with the tie-down straps on the chassis dyno and affect the rolling resistance of the tires to see a 5HP loss. This is just one example of many details that can affect accuracy regardless of the type of measuring equipment you use.

So remember, minimize the variables, average the results and have fun!

#### WARNING:

Be safe. Do not take your eyes off the road. This device will record all of the measurements for later viewing. Avoid using in adverse weather conditions. Driving vehicles at their performance limit is inherently dangerous, use caution at all times. Always obey all local and federal laws when using this device. This device is not intended for street or highway use. Use it only in designated areas, closed courses and racetracks.

TESLA Electronics, Inc. shall not be liable in any way for any incidental or consequential damages to the vehicle, driver, passengers and/or any other parties or property occurring during the use of this device. TESLA Electronic Inc. reserves the right to make changes to this manual and other product specifications at any time without any further notice. The content of this manual is for informational use only and is not intended as a commitment of any kind.

#### Limited Warranty

TESLA Electronic Inc. ("Tesla") warrants this product and its accessories against defects in material or workmanship for a period of one (1) year from the date of purchase. Tesla will repair or replace this product with new or refurbished product or parts, at Tesla's option, free of charge in the USA. This warranty extends only to the original purchaser. A purchase receipt or other proof of date of original purchase from an authorized dealer (including Tesla Electronics Inc.) is required in order to perform warranty service. Units bought from TESLA directly can be returned directly to TESLA. If purchased from any other authorized dealer it must be returned there in order for warranty service to be provided. Before sending the unit back to TESLA you must obtain an RMA (Return Merchandise Authorization) number. RMA number must be clearly placed on the outside of the package. Units received without the RMA number will not be accepted. This warranty covers failures due only to material or workmanship defects. This warranty does not cover cosmetic damage or damage due to accident, misuse, abuse, negligence, commercial use, acts of God, or modifications of, or to any part of the Product, including accessories. This warranty does not cover consumables such as fuses. This warranty is only valid for United States.

## Making a Horsepower & Torque Pull

Horsepower pull should be performed completely differently than a straight acceleration run like a 0-60mph for example. So, no gear-slaming, this is all about smoothness. Proper Horsepower pull should be made following these steps:

1. While driving, choose the gear for your horsepower measurements. On a chassis dyno this is usually 4th gear because it has slightly less losses due to 1:1 gearing in most cars. However 4th gear is way too fast in most cars so with the G-TECH we usually recommend 2nd gear. Automatic transmissions should be kept in 2nd in order to avoid automatic upshifts.
2. Push **RECORD** button **TWO TIMES** (double-click) to initiate a horsepower pull.
3. Follow the screen prompts and drive steadily at 2000 rpm with the gear fully engaged (do not push the clutch pedal). Push **RECORD** button **ONCE** when you are exactly at 2000rpm.
4. Gradually apply **FULL-THROTTLE**. This should take a couple of seconds, avoid wheel-spin. Hold full throttle, watch the road, G-TECH will record the results for later replay.
5. Keep it at full-throttle all the way to redline, or rev-limiter. When you reach it you can ease off, but remember, don't shift yet, let the rpms drop and the measurement finish, then shift up.

**NOTE:** G-TECH calculates your RPM based on your speed. So if you were exact when pushing the button at 2000rpm your rpm graph will scale correctly (as long as you avoid wheel-spin). Keep in mind this is only for the rpm replay and it doesn't affect the peak Horsepower numbers which will be correct regardless if the rpms were not.

## Horsepower Losses and Car Weight

**NET** number indicates true "real-world" horsepower. This is the power that's left to accelerate your car after all the losses. While this number is lower than engine or even chassis dyno it is the most indicative of true capabilities of your car. **TOT** indicates corrected (total) horsepower that includes the corrections for all of the losses. First there are **Drivetrain Losses** which include transmission, differential and rolling resistance losses (tire carcass and thread deformation). This number can be represented as a percentage and is usually about **15-20%** for normal cars plus 5% for 4WD cars. Then there are **Aerodynamic Losses** which have two contributors, **Frontal Area** and **Coefficient of Drag**. You may find these numbers for your car on the Internet, but if you can't don't worry about it, use defaults and remember absolute horsepower is very elusive. What you want is the consistency so that you can track the gains before and after modifications.

For correct **Vehicle Weight** it's best to go to a local weigh station and measure the car with you in it. You can also approximate the weight by using your cars GVWR (gross vehicle weight rating) listed on the driver door/jamb and subtract 200Lb for each missing passenger. This works ok for passenger cars. For trucks you have to subtract the load capacity as well. Just remember, consistency is the key, so whatever weight you enter keep it that way.

## Road Racing (RR model only)

The whole idea behind G-TECH RR is to have a simple, easy-to-use, dedicated-hardware device that will quietly gather the most valuable data on the track. It was important to make it transparent to the driver, and that it would do everything automatically. Because, let's face it, the last thing you want to do is mess with electronics when you are on the track. In fact, we took this idea so far that you have to push just one button only once on the track to input Start/Finish line, G-TECH does the rest.

G-TECH RR will record the track map and its geographical position, you can get all your lap times and my personal favorite, in-car segment timing (predictive lap timing). It works like this. First you go out there and record the map by pushing the RECORD button once at the Start/Finish line during your first warm-up session. You can enter the segments at this time by pushing the RECORD button or later in the pits by editing them on the map. You can also rotate the map to the way you are used to seeing the track. Now when you go out for your second session you will get not only your lap times but also your segment times. This is particularly useful when you are trying to master a difficult corner or a technical section or perhaps find a best way to sacrifice a corner in order to get that early throttle before the straightaway. In your next sessions, every time you finish a segment, you will get "Thumbs Up" or "Thumbs Down" with the amount of time you gained or lost in that segment. If you made better time the entire screen will invert, so you can sense this with peripheral vision, without ever taking the eyes of the track. This is like having a race-driving instructor with you at all times. Best of all, there is no need for waiting to see the information, it's immediate, while it's still fresh in your mind and you know what you just did. It's the best way to implement incremental improvements in your driving and get faster by slowly building up speed and "picking-up" time on the track anywhere you can. This feature will definitely make anyone a better driver.

There are two types of tracks, the difference is whether or not the Start/Stop line is the same. For example, circle track, road racers and carting guys will have to push the RECORD button only once for the Start/Finish line. G-TECH will automatically recognise when it crosses it again and it will complete the lap. Solo, Rally and Hill-Climb guys will have to push the RECORD button **ONCE** at the Start line and **TWO TIMES** (double-click) at the Finish line. Everything else is the same.

Each geographical location can have one or more racetrack maps. Once G-TECH senses that you are driving near a previously recorded track it will automatically start using its map. If there are two or more track configurations recorded G-TECH will ask you to choose the one you want to use at that time.

Each track folder has two additional files besides all the sessions. One of these files is called MAP and it's used to rotate the map by using the UP and DOWN ROLLER button. The other file, called GATES, is used to input/edit track segments. Use the ROLLER button to move the cursor down the track. When you want to input a segment "gate" push the SELECT button. If you want to erase the "gate" simply roll over it in the backwards direction.

## Making An Acceleration Run

You no longer have to perform all your measurements from a stand-still thanks to High-Frequency GPS technology. This makes this G-TECH more user-friendly than before.

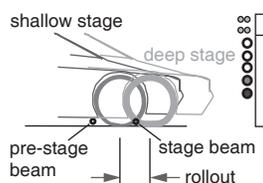
You could be driving along and decide that you want to know what is your 30mph - 50mph time. Simply push the **RECORD** button and start accelerating. G-TECH will do the rest, it will record the measurement and stop it when you slow down. You will get your 30-50mph measurement and any other that you did, for example 40-60mph or even 60-0mph if you were braking to a complete stop.

However, for a standard 0-60mph, 60ft time, 1/8 mile or 1/4 mile you will need to start from a stand-still. While stopped push the **RECORD** button **ONCE** indicating that you are ready to perform a run. Then just let it rip. When you ease off or slow down or come to a complete stop G-TECH will give you all the measurements that you gathered in that run. For a 1/4 mile Trap Speed G-TECH will average the last 60 feet just like at the track.

Feel free to use any driving style that suits you and gives you best results. The true value of the G-TECH is in the ability to give you immediate numbers, while the run is still fresh in your mind. So pay attention to what you are doing, that way you can learn from it and modify your technique in order to get consistently good times.

**NOTE:** Tires work best at about 10 degrees of slip angle. This is the case for lateral as well as longitudinal (forward) acceleration. During a slow start your slip angle is close to 0 degrees and during a burnout it's close to 90 degrees, this gives you some idea of how much slip you are looking for. We all know, this is easier said than done, but when you do hit that sweet-spot the launch just "feels" right and the 60ft times prove it.

## G-TECH vs 1/4mile Track



Rollout is the distance you can travel while still blocking the stage (timing) beam with your front tire. Depending on the size of your wheel this is usually about 12". At the track, timing starts when you unblock the staging beam. G-TECH, on the other hand, starts the measurement when you start moving, so there is an inherent 12" difference. When you compare that to 1320 feet (1/4 mile) it doesn't sound like much, however it actually is, that's because any car is moving so slowly at the start that it takes a long time to travel those 12" (up to .5 sec.). This is

why rollout is so important. G-TECH has a default 12" rollout, so if you want to compare "apples-for-apples" on the track make sure you shallow stage. That is, stop as soon as the second set of lights comes on and you are fully staged. By the way, shallow stage will give you the best results since you get somewhat of a running-start and it's perfectly legal.

## Road Racing Replay (RR model only)

RR runs are organized first by the location (track name) and then by the dates. The names of the files (sessions) are the times you went out on the track. This way it's easy to locate that morning session when the track was cooler, for example.

To replay a session, select it from the Folder/File menu by clicking SELECT (roller button). To rename it or erase it click the button twice (double-click).

Once you have chosen a session, the map will be shown on the screen. First you will see a window with the info for that session containing track name, date, session name (time), best lap# and best lap time. This way you can easily find the session you are looking for, for example, the session with the best lap time.

Start the replay by pushing the REPLAY button. You will see the cursor (your car) moving on the map in real time. You can speed it up or slow it down with the ROLLER button. In the upper portion of the screen you will see lateral and longitudinal G's, current speed and current lap.

As the cursor finishes a current section it will display a small window with the time for that section. When it crosses the Start/Finish line it will show the lap time and the last section time of that lap.

You can also jump laps from any point on the track. This is very useful when comparing different laps. To get into the LAP JUMP mode simply push the SELECT button once. The replay will stop and you will see a small LAP JUMP icon where the Play Indicator normally is. Now you can jump into another lap at that same track position by using the ROLLER button. This way you can quickly compare segments from different laps or see how many G's you pulled at a particular corner in different laps. To get out of the LAP JUMP mode simply push the SELECT button again. This way you don't have to replay all the laps to find the one you are looking for.

