



RaceVoice CS
Installation and User Manual
05/08/19



REVISIONS	4
LIMITED WARRANTY	5
Get To Know RaceVoice	8
Step 1 - Standard Installation	10
Mounting Location	10
Connecting and Routing Power+Data Cable	10
Voice Cable Routing	11
Step 2 - Dashboard Configuration	12
Typical AIM Dashboard Configuration	13
Typical MoTeC Dashboard Configuration	17
Check RaceVoice Operation	21
Step 3 - RaceVoice Studio Configuration	22
Install Software and Register	22
USB Driver Installation	25
Engine Values	26
Chassis and Vehicle Dynamics	30
Wheel Lockup Announcement	32
Lap MPH and Timing Announcements	33
Brake Threshold Tone	34
Track Selection and Performance Triggers	35
Segment Reporting	36
Setup Split Time Reporting	38
Download your Setup to RaceVoice	39
Track Map Personalization	42
Adjusting a segment	42
Add Segments and Splits	44
Deleting Segments/Splits	47
Track Management	48
Import a Track Map	48
Clone a Track	48
Delete a Track	48
Restore All Tracks	49
Restore Current Track	49
Preferences	50



Advanced Users	51
Using RaceVoice with IMSA or NASCAR Wired Radios	51
Using RaceVoice with STILO Helmets	53
Baud Rate and Multiple CANBus Devices	54
RaceVoice CANBus Template	55
Example Template with Front Brake PSI	58
Example Template with Brake and Wheel Speed	58
Checking Real Time Values	59
Configure Voice Output	60
Configurable GPS Settings	61
Configurable Message Triggers	62
Troubleshooting	64
Specifications and Pinouts	65
Dashboard Compatibility	65
PC Compatibility	65
Mechanical, Electrical, Environmental	65
Power+Data Cable Pinout	66



REVISIONS

3/5/19	Added revision table and page numbers
3/23/19	Updated for UI and Firmware feature release Q1-2019
4/25/19	Updated with track maps showing blue/gray distinctions. Cleanup a few screenshots.
05/08/19	Updated with Preferences and Track Menu descriptions



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One (1) year for Products purchased from the original date of purchase of the Product by a customer direct from RaceVoice LLC or a RaceVoice authorized dealer.

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If a manufacturing, material or workmanship defect arises regarding any Product, and a valid claim is received by RaceVoice no later than sixty (60) calendar days after the expiration of the applicable Warranty Period, RaceVoice will, in its discretion: (1) repair the Product using new or refurbished parts; (2) replace the Product with a new or refurbished Product. For purposes of this Limited Warranty, “refurbished” means a product or part that has been substantially returned to its original specifications; or (3) replace the Product with a Product that is the same or of a similar style to the Product customer returned to RaceVoice under this Limited Warranty or a substitute equivalent to customer’s original purchased Product that may not be of a like kind (depending on availability). RaceVoice will make every effort to replace or repair the unit but products or discontinued products cannot be guaranteed their availability for replacement. Any RaceVoice products or discontinued product still under its applicable warranty that cannot be replaced with an identical product will be replaced with the equivalent model based on availability. Replacement with the same color cannot be guaranteed. Replacement or repaired Products are warranted as above only for the remainder of the original applicable Warranty Period. In the event of a defect, these are customer’s sole and exclusive remedies. This Limited Warranty is extended only to the original end-use customer, and will not be extended to any other person or transferee.

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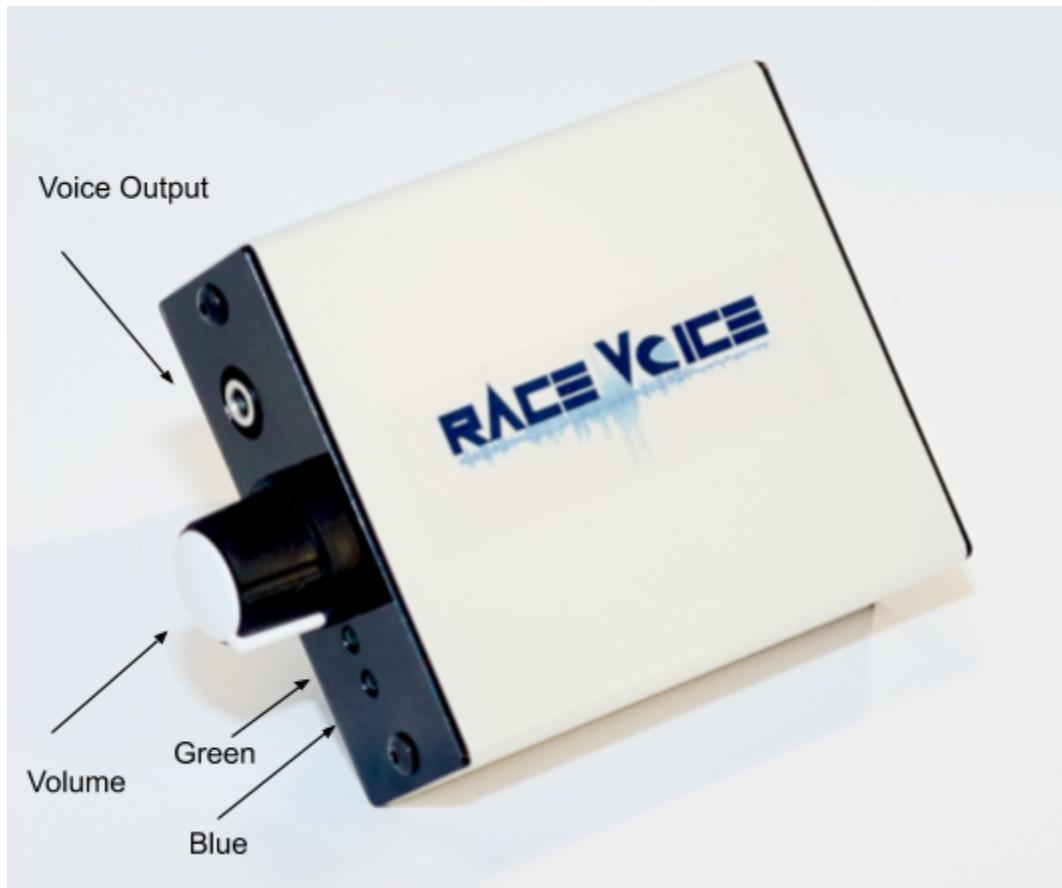
WARRANTY CLAIM PROCESS

To submit a warranty claim, visit www.RaceVoice.com or send an email to support@racevoice.com. Any warranty claims must be made by customer no later than one year from the purchase date. We may ask you to send us a photograph of your Product to validate the claim and, in some cases, we may ask that you return the product to RaceVoice for inspection. RaceVoice reserves the right to charge a shipping and handling fee in connection with the evaluation and fulfillment of any warranty claim.

This warranty statement was last updated November 9, 2018.



Get To Know RaceVoice



The front facing side of the RaceVoice unit provides two status LEDs, one volume control, and a 3.5mm stereo audio output.

The LEDs function as follows

Green Led: This should flash every few seconds with a short green pulse of light. This indicates that the RaceVoice unit is powered ON and is ready for dashboard communication.

Blue Led: This should flash a few times every second with a short pulse of blue light. This indicates that the RaceVoice is receiving valid CANBus data from the dashboard. *If this LED is not active, then RaceVoice will not function.*

The volume control can be adjusted by turning it counter-clockwise to reduce the volume level. Clockwise rotation will increase the volume level.

The 3.5mm audio output should be connected to earbuds or an IMSA style "Y" cable for use with in-vehicle radios.



The rear facing side of the RaceVoice unit provides a USB connection and a Power+Data port.

The USB connection is used along with RaceVoice Studio, running on a Windows PC, to configure the unit for various engine, chassis, performance, and race-track settings.

The Power+Data port provides +12VDC power, ground, and CANBus communication between the vehicle, dashboard, and the RaceVoice unit.

RaceVoice is a CANBus compatible device which means RaceVoice extends from other CANBus hosts (i.e Dashboard) which are installed in your vehicle.

For those unfamiliar with this terminology, CAN or Controller Area Network is a standard by which controllers (ECU, Dashboards, etc) and/or devices may communicate with each other.

These signals are transmitted through a pair of wires between a host and a device. RaceVoice uses a direct link CANBus approach where a purpose built cable receives data from channel definitions defined in the dashboard configuration.



Step 1 - Standard Installation

Mounting Location

The primary consideration for mounting is to install RaceVoice on a flat surface in the vehicle such that the driver can access the volume control while on track. This is important so that the driver can make adjustments, if needed, depending on track/wind noise. RaceVoice should also be mounted to ensure that the voice output wire can reach the driver's helmet.

The secondary consideration for mounting is to install RaceVoice such that access to the USB port is available. The USB port is required for configuration and track setup using RaceVoice Studio.

The third consideration for mounting should be to keep RaceVoice away from direct water/rain. RaceVoice is water-resistant, *not waterproof*. As such, RaceVoice should be mounted to minimize contact with rain/water during operation. If RaceVoice becomes wet during use, compressed air may be used to remove water from the unit through an air compressor blow-nozzle attachment.

Once a suitable mounting location has been determined, RaceVoice may be secured to the vehicle using the included 3 inch x 3 inch velcro strip. Place the strips on the mounting surface and on the RaceVoice enclosure. Press the strips together to mount RaceVoice in the vehicle.

Connecting and Routing Power+Data Cable

The standard RaceVoice kit includes a 6-foot long Power+Data cable. This cable is NOT terminated and will require a connection to the dashboard in the vehicle.

There are four wires that require connection to the dashboard. These are the power (+12VDC), ground (chassis ground), CANBus-HIGH, and CANBus-LOW. RaceVoice requires a dedicated CANBus connection to the dashboard. This is typically available as a "CAN2" or "CAN3" option on many dashboards such as those manufactured by Aim and MoTeC. Consult the manual for your specific dashboard to determine the proper pins for CANBus-HIGH and CANBus-LOW.

Ensure that +12VDC power supplied to RaceVoice is from a switched power lead. Do not leave power continuously applied to RaceVoice as this will drain the vehicle battery.

RaceVoice also stocks a variety of Power+Data cables that can be used to directly connect the unit to the dashboard. These cables are available for purchase separately.



Voice Cable Routing

The audio output from RaceVoice is provided using a 3.5mm audio output connector. Included in the standard RaceVoice kit is a silicone “earbud” device. The cable should be routed away from seat belts, shift linkages, or any other pinch points within the vehicle. If the driver requires a longer cable, a standard 3.5mm STEREO extension cable can be used. Such cables are normally available at any electronics store for less than \$10.

Optionally, the user can purchase an IMSA style “Y” cable to allow RaceVoice to be used with an existing radio and helmet system already installed in the vehicle. Using the “Y” cable, the driver will be able to hear radio transmissions and voice announcements from the RaceVoice unit. For more information, review the uses of the IMSA “Y” cables in the Advanced Users section of this manual.

Note: If you are not using an IMSA style “Y” cable, RaceVoice recommends only a stereo “earbud” device. A stereo earbud device will have at least 3 copper bands on the connector and mono earbud has only 2 copper bands on the connector. A stereo earbud is recommended for optimum sound quality for applications not using the RaceVoice IMSA style “Y” cable.



Step 2 - Dashboard Configuration

After installing the RaceVoice unit into the vehicle and connecting it to the dashboard/data logging device, the dashboard must be configured to issue CANBus messages to RaceVoice.

This step is only required one time or when new features are added to RaceVoice that may require additional CANBus messages.

Prior to proceeding, turn power on to the vehicle/dashboard and ensure that RaceVoice is also powered on. The Green LED on RaceVoice should produce a quick flash every few seconds. The Blue LED will turn on briefly when power is applied to RaceVoice, however it will only pulse when CANBus messages are received. ***Assuming RaceVoice has never been installed in the vehicle, the Blue LED should not be pulsing at this point. If the Blue LED is pulsing, contact technical support at RaceVoice before continuing.***

After ensuring that RaceVoice is in the proper state (only Green LED is pulsing) and that the dashboard is powered on with a CANBus connection to RaceVoice, proceed to the typical setup guide for AIM / MoTeC dashboards. Your specific AIM/MoTeC may vary from the example(s) in this manual, but the general steps will be the same.

In order to perform these steps, the reader should be knowledgeable regarding the software for their dashboard, connecting to the dashboard, and manipulating configuration files for the dashboard.

Typical AIM Dashboard Configuration

Using the AIM Software, locate the Configuration button in the top left of the menu and click on this button to bring up AIM screen that shows all available configurations for your dashboard. The screen should look similar to the example below.



Locate the latest/current configuration for your dashboard. If you are not sure which one is your current configuration, then click the Receive button to download the current configuration from the dashboard.

After locating (or downloading) the current configuration, select it using the checkbox associated with the configuration and press the **Clone** button and create a new name for the cloned configuration. The **Clone** method is used to keep a copy of a known good dashboard configuration.

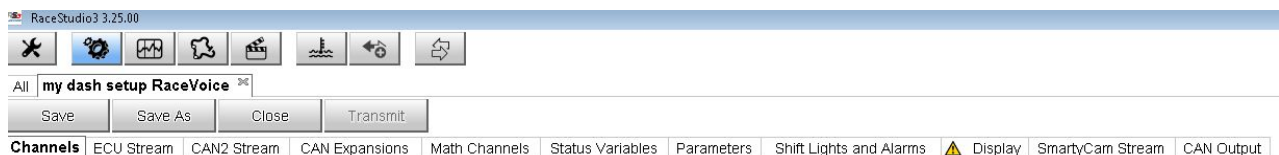




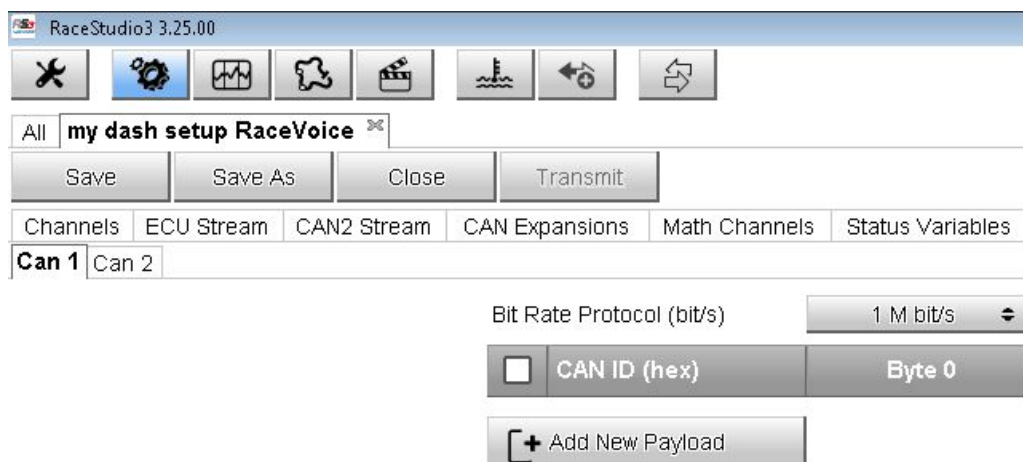
After completing the Clone operation, a new copy of the current dashboard configuration should be present as shown below.



Open the cloned configuration so that all available setup/operation tabs are visible.



Locate the tab “CAN Output” and select so that the Can1 and Can2 tabs are visible as shown below.



DO NOT MAKE ANY CHANGES ON THE “CAN 1” TAB

CANBus 1 is normally connected to the ECU of the vehicle, a note should also be shown in the AIM software that says you cannot use a canbus output on Can1.

During the installation of RaceVoice, the unit must be connected to a dedicated and unused CANBus, such as Can2 on the AIM MXL2. Refer to the installation section for more details.



Select the “Can 2” tab so that the control page for the second canbus output is visible.

Locate the IMPORT button on the “Can 2” tab and import your reference configuration file. Reference configuration files are available on the website www.RaceVoice.com. The reference files are specific to each vehicle, so ensure that the file are you using matches the ECU/vehicle that you are going to use RaceVoice with. If you use an incorrect configuration, values such as RPM and MPH or Oil and Water Temp may be out of place and this will result in improper function of the RaceVoice unit.

After importing the reference configuration, the Can2 page should appear similar to the example below.

This particular reference example is used with an SCCA SpecRacerFord Gen3. Locate the BitRate Protocol and ensure that it is set for 250Kb/s

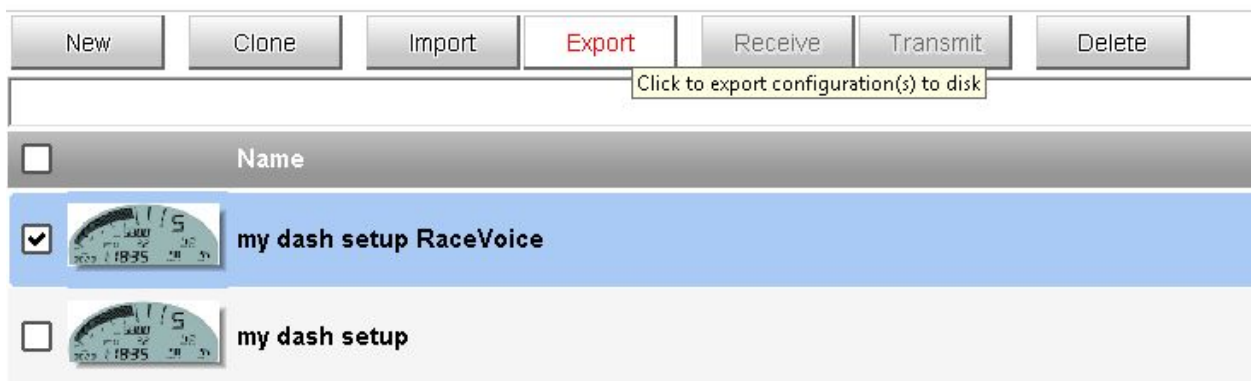
After importing the CANBus setup, save your AIM configuration and then upload the configuration to your dashboard. Once the configuration is uploaded, the AIM dashboard will begin sending messages to the RaceVoice unit and the Blue LED should begin pulsing, indicating that data is being received by the unit.



If you cannot locate a reference configuration, RaceVoice technical support can produce a reference configuration for you.

Email your dashboard configuration to support@racevoice.com and request a reference configuration. Include the year and type of vehicle, model of the AIM dashboard, and ECU manufacturer if known. Reference profiles for your application are usually produced within 24 hours.

If you are planning to email your dashboard configuration for support, the main page of the AIM software provides an “Export” button to allow a dashboard configuration to be saved as a file on your PC.

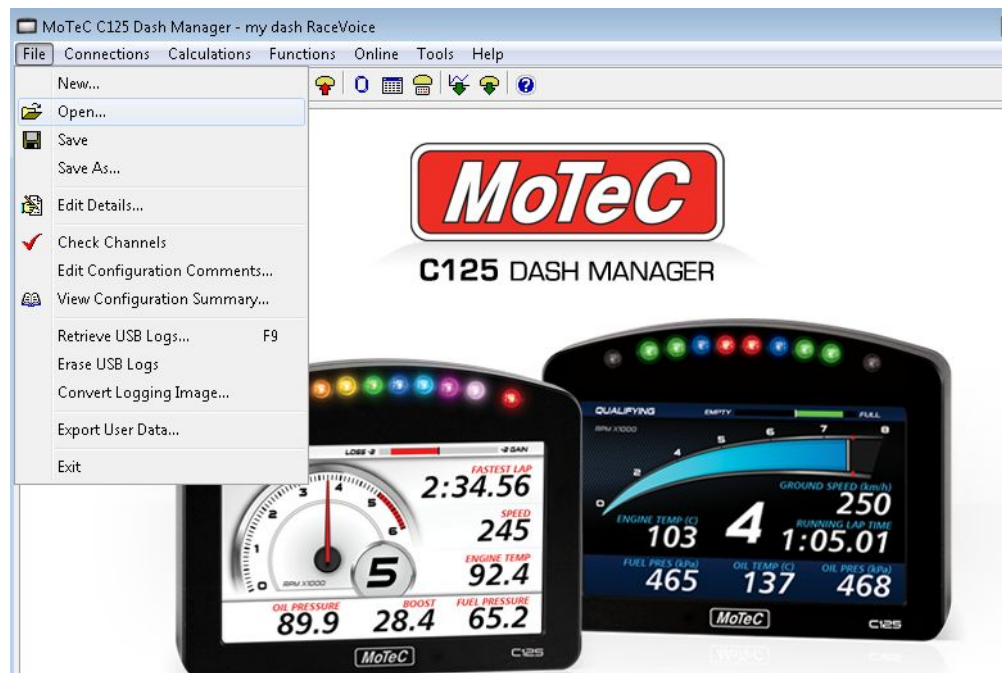


Use the export button to create a file of your dashboard configuration and then email this file as an attachment to support@racevoice.com

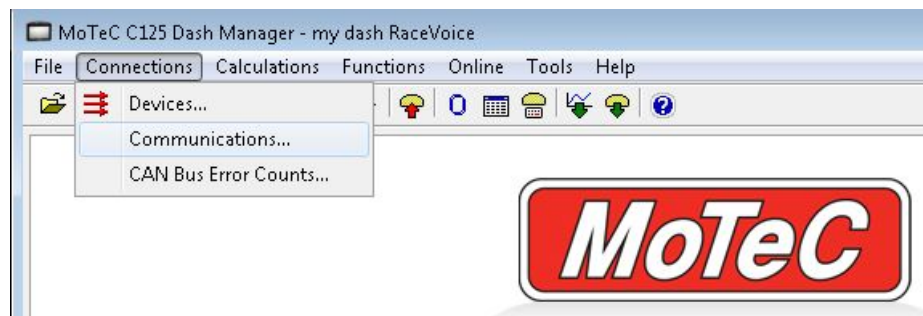
Advanced technical details on the CANBus configuration for RaceVoice can be found in the appendix of this document. These details can be used to create a CANBus configuration from scratch and are intended to be used by a technical professional who understands all aspects of dashboard configuration and detailed operation of the CANBus link layer and physical protocol.

Typical MoTeC Dashboard Configuration

Using the MoTeC Dash Manager software, open the current configuration for your specific dashboard. Note: If you are not sure on the current configuration, it is recommended to connect your dashboard and download the current configuration to make sure that you have the latest and most accurate setup for your dashboard.



After locating the proper configuration and opening that configuration, locate the “Connections” item on the main menu bar and select “Communications” from the menu list.





The communications setup page will include a variety of tabs for digital/expansion/communication ports available on your specific dashboard.

NOTE: DO NOT MAKE ANY CHANGES TO THE TAB RELATING TO THE ECU DATA CONNECTION. THIS IS TYPICALLY THE “CAN 1” TAB.

Select the “CAN 2” tab to assign the RaceVoice communication profile. Note that the example below relates to the configuration of RaceVoice on an SCCA SpecRacerFord Gen3. The process is the same for all other vehicle/ECU combinations

Communications Setup

CAN 1 | CAN 2 | RS232-1 | RS232-2 RX | Display | Video Capture

Options

Mode : CAN Rate : 1M

Sections :

Section	Name
1	PE3 Series ECU #1
2	PE3 Series ECU #2 Pres
3	PE3 Series ECU #3 AV1-4
4	PE3 Series ECU #4 AV5-8
5	PE3 Series ECU #5 Freq
6	PE3 Series ECU #6 Temps F
7	PE3 Series ECU #7
8	PE3 Series ECU #8
9	PE3 Series ECU #9
10	PE3 Series ECU #14
11	PE3 Series ECU #15
12	PE3 Series ECU #16

Received Channels :

- ☒ Engine RPM
- ☒ Throttle Pos
- ☒ Fuel Actual PW
- ☒ Ign Advance

Select... Import DBC... New... Edit... Remove Merge Remove All

Communications Setup

CAN 1 | CAN 2 | RS232-1 | RS232-2 RX | Display | Video Capture

Options

Mode : CAN Rate : 250K

Sections :

Section	Name
---------	------

Channels :

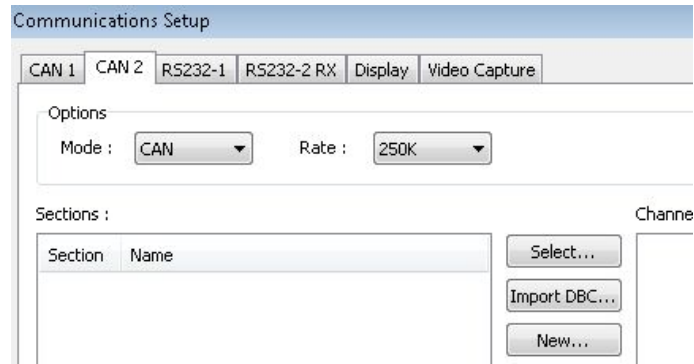
Select... Import DBC...

Note: Before continuing, ensure that NO other setups/devices/etc are installed on the “CAN 2” communication tab. Ensure that NO other devices are on the “CAN 2” pins/wires for the dashboard. RaceVoice requires a dedicated CANBus link to the dashboard.

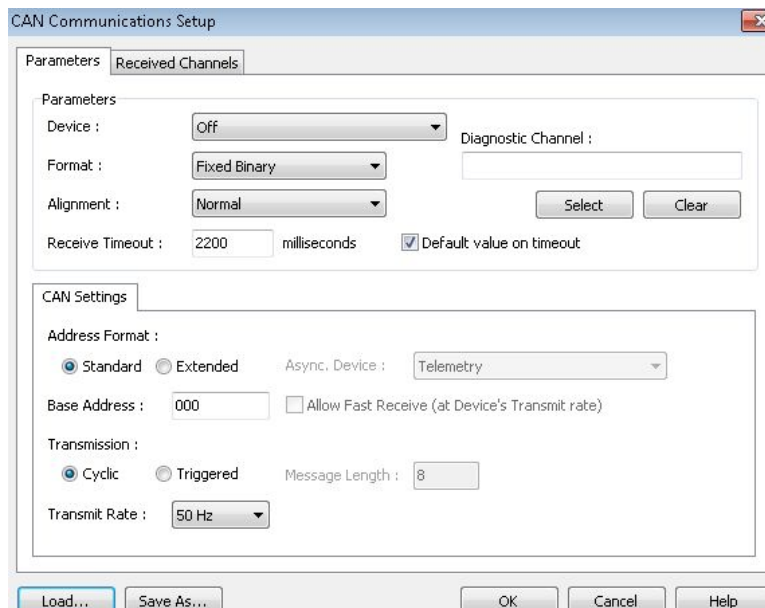
Note: Before continuing, obtain the baseline messages for RaceVoice from www.RaceVoice.com. The baseline messages will contain the data format/etc for communicating with RaceVoice. Several baseline message files are available for different vehicle/ECU applications.

If you cannot locate your baseline configuration, contact support@racevoice.com. You can email your MoTeC dashboard setup file, ecu, and vehicle information and technical support will build a RaceVoice profile for your application. Profiles can be generated in as little as 24 hours. You can also refer to the advanced users section of this manual to see technical details on how to configure a CANBus profile by building the individual messages.

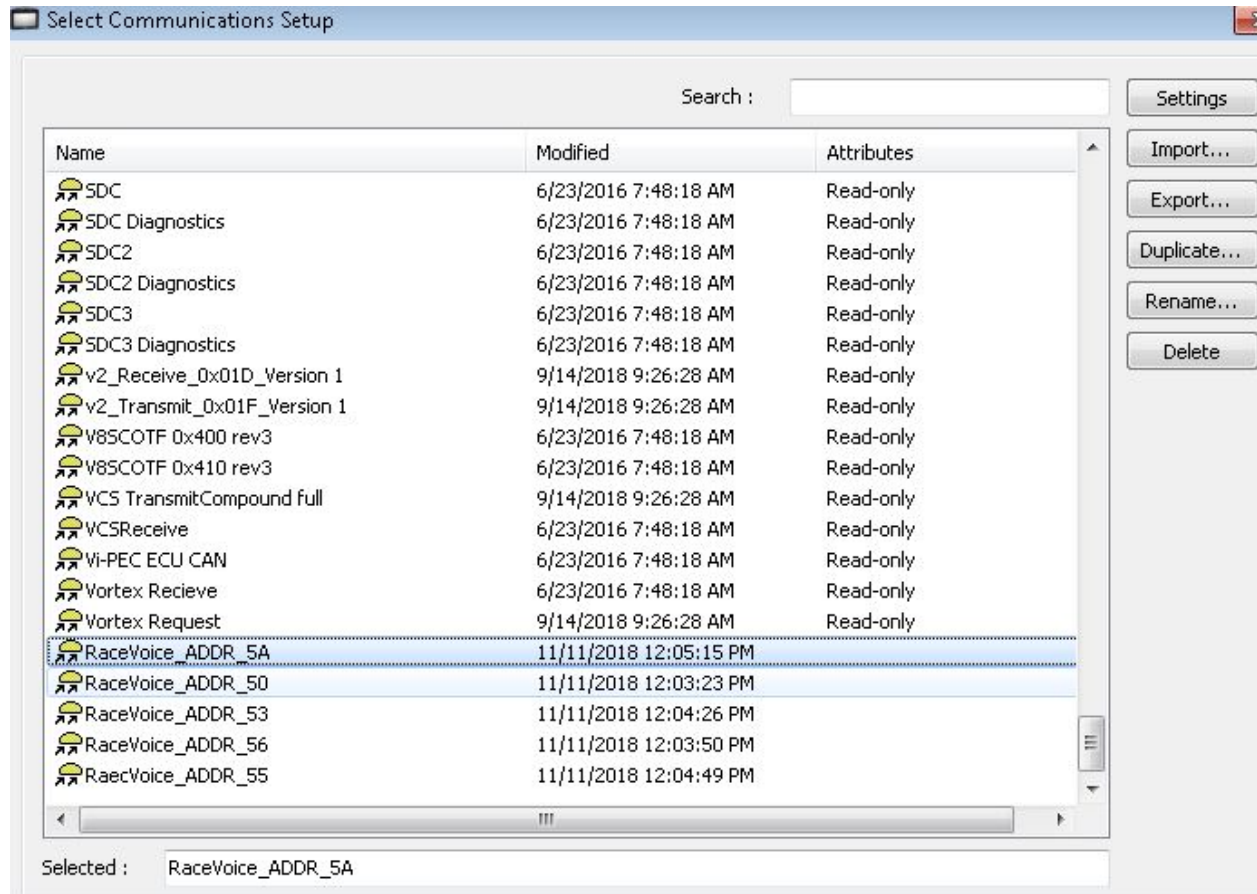
After obtaining the baseline message files from RaceVoice.com, click on the button labeled “New” to begin the setup of the RaceVoice CANBus configuration.



This will open the “CAN Communications Setup” dialog box. Locate the “Load” button at the bottom left and select it.



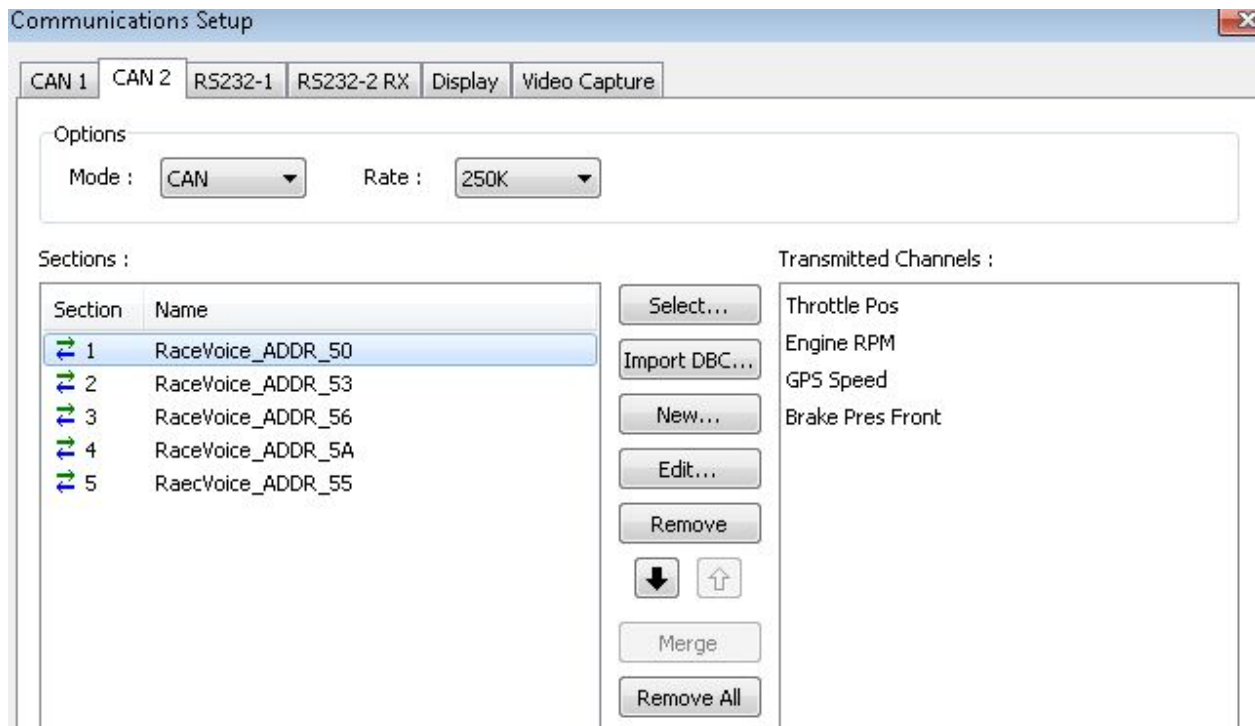
Use the “Import” button to load the RaceVoice baseline configuration files into the Communications Setup dialog. A series of “RaceVoice_ADDR_XXX” files should be present after the import.



Select each of the RaceVoice_ADDR_XX configuration files and load them into the “CAN 2” page. After loading each file, the “Can 2” page should look similar to the next example.



A properly setup “Can 2” page should consist of only RaceVoice messages and the data rate must be set at 250Kb/s.



Once all of the messages have been loaded properly, save the dashboard configuration and upload it to the MoTeC unit. This will then enable message transmission on the “Can 2” port for use with RaceVoice.

Check RaceVoice Operation

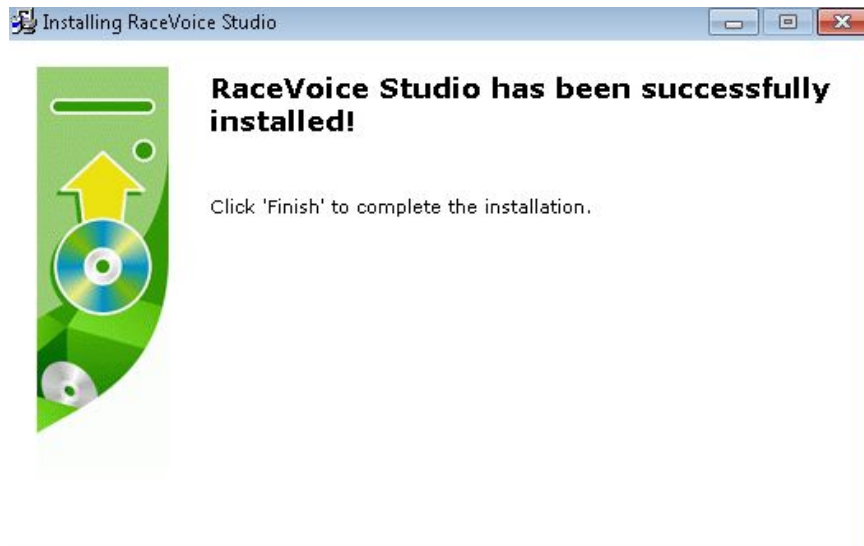
After loading the dashboard with the proper CANBus configuration, turn the ignition/master power off to power down both the dashboard and the RaceVoice unit. Then restore power to vehicle. Check that the dashboard display is running and displaying all expected values. Check the RaceVoice unit and the Blue LED should be pulsing indicating that RaceVoice is now receiving CANBus messages from the dashboard.

When power is first applied to RaceVoice, the unit will announce a message similar to “RaceVoice Version XXXXXX” where XXXXX is the Month/Day/Year of the software loaded into the RaceVoice unit. Approximately 15 seconds after power is applied, the RaceVoice unit will report the current Temperature, Oil Pressure, and Voltage of the vehicle. These power-on messages can be used to verify that RaceVoice is operating and receiving data properly.

Step 3 - RaceVoice Studio Configuration

Install Software and Register

Download the latest RaceVoice Studio onto your Windows 7/8/10 PC. The latest RaceVoice Studio can be found at www.RaceVoice.Com/Download. After downloading to your PC and running the installer, RaceVoice should install successfully to the computer.



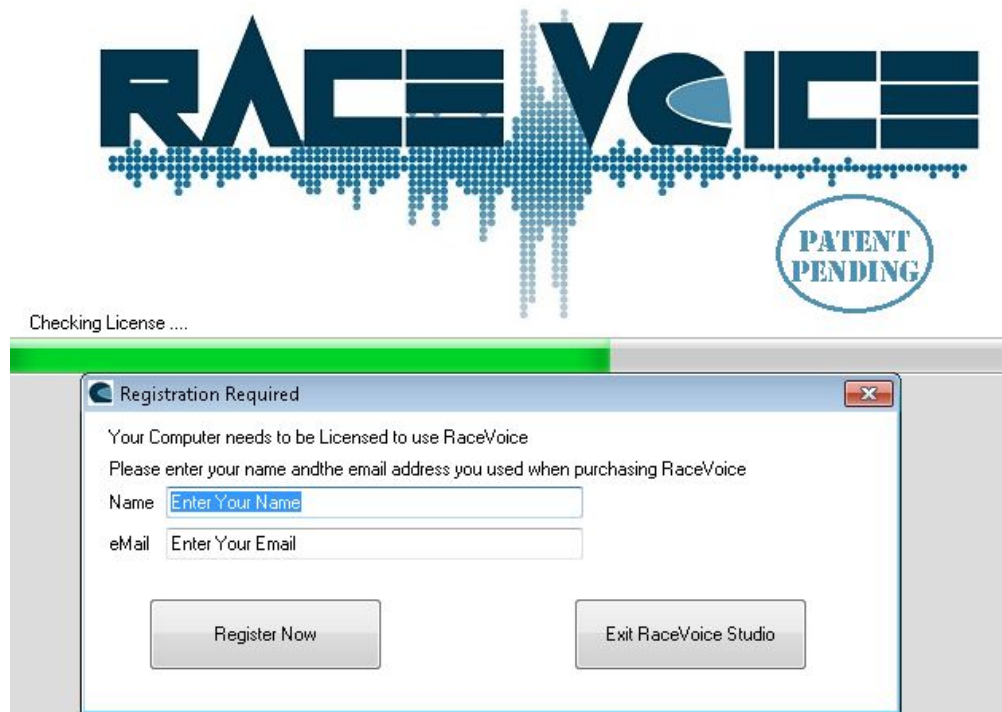
Once Installed, an Icon for RaceVoice Studio will be placed on the desktop. It will also be available from the Windows Start button under the folder RaceVoice Studio.



Ensure that your PC has an internet connection and then start RaceVoice Studio.



RaceVoice Studio will connect with the remote server and attempt to validate the software installation on the PC. If this is the first time using RaceVoice on this PC, a “Registration Required” message box will appear as shown below.

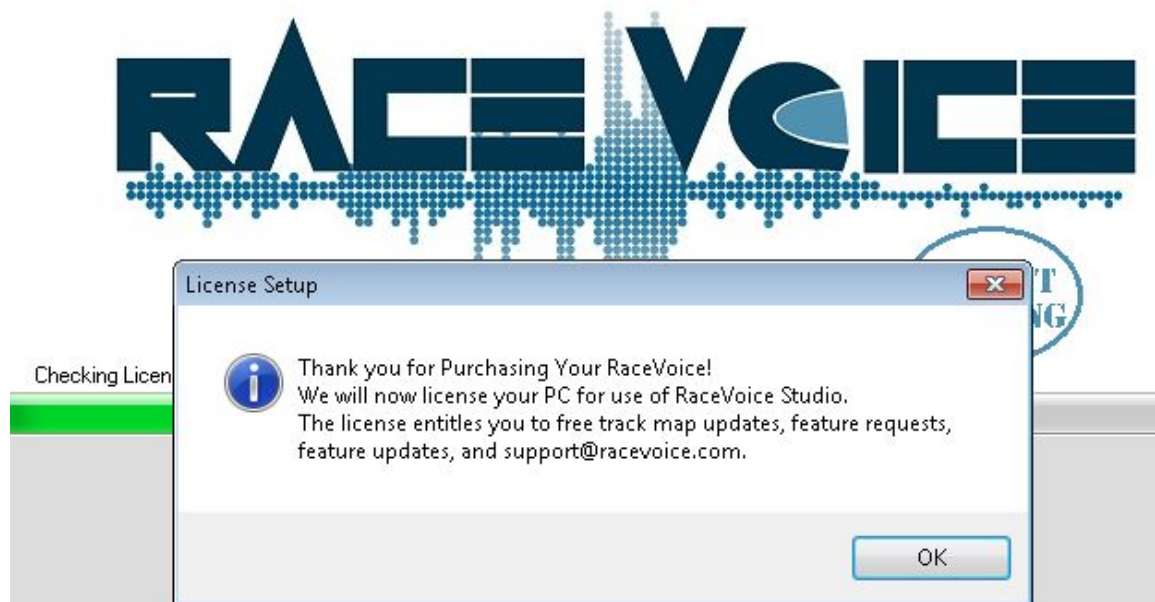


Enter your name and email address exactly the same as the name/email that was used when purchasing RaceVoice through RaceVoice’s website or your authorized dealer. Click the “Register Now” button to proceed.



RaceVoice Studio will contact the remote server to validate your user/email, once successful the software will be registered for use on the PC that it was installed to.

Note *RaceVoice Studio is node locked to a single PC. Once installed, it cannot be installed on any other computers. If you need to install RaceVoice Studio on a new PC, send an email to support@racevoice.com and request a license transfer.*



Once the username/email is validated, RaceVoice Studio will synchronize with the external server and download all of the latest pre-configured trackmaps. Click the "OK" button to proceed.

Every time RaceVoice Studio is launched, it will synchronize with the server and notify the user if any new tracks, features, or software updates are available. Once RaceVoice Studio is installed, it can be used without an internet connection (i.e. in the paddock of race track where there may not be internet). If an internet connection is not available, RaceVoice Studio will not check the remote server for new updates.



USB Driver Installation

After installing RaceVoice Studio, ensure that the RaceVoice unit has power and then connect the unit to the PC using the provided USB cable.

Windows 8/10 PC's should automatically recognize the RaceVoice unit and install the proper communication drivers without user intervention. A familiar "connection sound" should be heard on your Windows PC when the RaceVoice unit is connected.

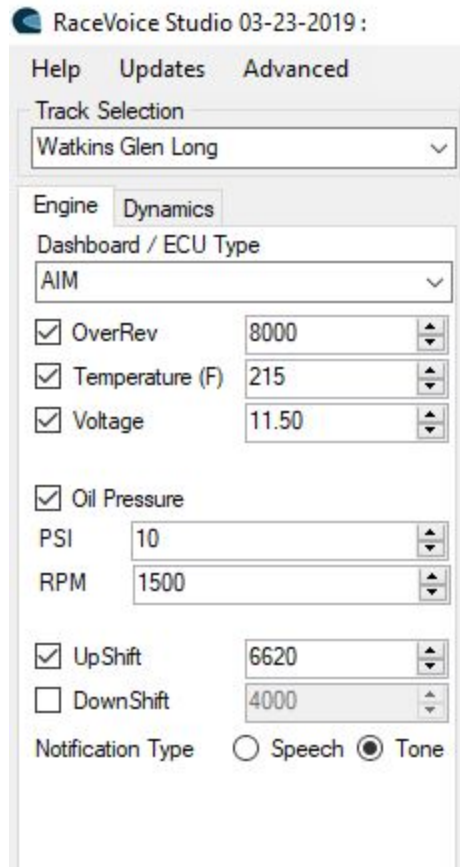
Windows 7 PC's may not automatically recognize the RaceVoice unit and it may then request that the user installs the driver package manually.

The USB drivers can be downloaded from www.RaceVoice.Com/Download

The USB drivers are provided in a zip file for both 32-bit and 64-bit Windows 7,8,10. Download the driver ZIP file to your PC and unzip the driver package. The Windows "driver not found" prompt can then be used to install the files from the driver package. Note that the Windows may prompt the user twice to install the drivers, this is expected behavior and the user should select the same driver files for both prompts.

Engine Values

The main page of the RaceVoice Studio software allows the user to select a track map from the database of tracks as well as define both operating and performance measurement announcements.



The Engine tab allows the user to enable/disable 6 triggers to monitor various engine conditions such as RPM (upshift, downshift, overrev), low oil-pressure, high-temperature, and low-voltage warnings.

Select the appropriate dashboard/ECU for your vehicle, based on an AIM or MoTeC dashboard. The main difference between these two settings relates to scaling/conversion of values received by RaceVoice. The AIM dashboards usually transmit in English Units (MPH, PSI, Fahrenheit) while MoTeC dashboards usually transmit in Metric Units (KPH, Kilopascals, and Celsius). The main item here is to select either AIM or MoTeC and ensure that you have the appropriate CANBus profile for RaceVoice loaded into the dashboard.

RaceVoice provides immediate on-track feedback for critical engine alerts such as:



OverRev, Oil, Temperature, Voltage Announcements

RPM OverRev: Announces the phrase "OVER REV" if the engine rpm is above the set point. This can be used to help prevent continuous abuse of engine/transmission such as downshifting too early and forcing the engine to spin beyond its normal range.

Oil Pressure: Announces an alert if the PSI of the engine oil pressure drops below the set point. An announcement will be issued every 1-2 seconds to immediately notify the driver during the duration of the low oil pressure event. The Oil Pressure alert is also paired with a dedicated RPM value for detection. RaceVoice will announce an alert if the oil pressure drops below the set PSI value and the RPM is above the set RPM value. Its recommended to set the RPM value at a few hundred RPM above the idle speed. By using the RPM setpoint for Oil Pressure, the driver can ensure that RaceVoice will not issue oil pressure alerts in pit-lane. Alternatively, the driver can set the RPM value to zero and that will enable oil pressure alerts across the entire RPM range of the engine.

A paddock at the racetrack will always have several stories of fellow competitor(s) who suffered a catastrophic engine failure due to an oil pressure drop; because they didn't see a small flashing LED on a dashboard. RaceVoice's Oil Pressure alert is an additional level of protection that can immediately alert the driver to a critical engine problem.

Temperature: Announces an alert if the temperature of the engine rises above the set point, in degrees Fahrenheit. An announcement will be issued every 1-2 seconds to immediately notify the driver of the high temperature condition.

Similar to the Oil Pressure alert, paddock stories can be heard about competitors who didn't realize their engine was overheating until the race car began releasing steam. Precision race car engines and their aluminum components can easily become damaged at such high temperatures, again with the potential to cost thousands of dollars in repairs and ruin a weekend.

RaceVoice's temperature alert is another level of protection to notify the driver that the engine is overheating.



Low Voltage: The battery voltage can also be monitored such that if the battery voltage drops below a set point, an alert will be issued to the driver. This alert will occur every 1-2 seconds during the low battery condition.

Many engine designs use a belt system that turns both the water pump and the alternator to charge the battery. If the belt fails on the engine, the alternator and the water pump will stop turning. Quickly after, the engine will begin to overheat because the water pump has also stopped.

By using the Battery Voltage alert, the driver can be notified of a loss of charge condition (i.e. alternator is not turning) which can also help to prevent engine damage.

Each of these notifications can be enabled/disabled by the driver, so a customized combination of alerts and setpoints can be made specific to the vehicle/engine combination.

UpShift, DownShift Announcements

Independent UpShift/Downshift notifications can also be enabled as follows.

UpShift: Announces the phrase “UpShift” if the engine rpm is above the set point. The UpShift notification can also be selected for either speech or tone. If speech is selected, the phrase “UpShift” will be announced. If “tone” is selected, a series of rapid “beep-beep” tones will be generated when the engine is at or above the set shift point RPM.

DownShift: Announces the phrase “DownShift” if the engine is below the set point

These values work together to help the driver keep the engine operating within its optimal power band. The UpShift announcement is similar to a “shift light”, however it does not require any break in concentration for the driver. Two examples of this are as follows

- 1) At the start of a race, conditions rapidly change from a nicely ordered group of cars into a swarm. RaceVoice allows the driver to maintain 100% of their vision focused on the cars they are trying to pass and checking their mirrors to stay ahead of the other cars. UpShift announcements are spoken to the driver so that full concentration can be kept on the race start. This helps to not only shift into higher gears faster than competitors but can also help reduce missed shift events.
- 2) When drafting behind a competitor, a driver needs to again maintain 100% of their vision on the attitude of the car ahead of them. RaceVoice shift alerts allow a driver to accomplish this because there is no need to divert any attention to a “shift light” array. The RaceVoice unit helps you shift at optimal points even during close racing conditions such as drafting.



The DownShift announcement can also be enabled to help provide feedback to the driver, allowing them to keep the engine on its power band. An example of this is testing gear choices in a corner during a practice session, with RaceVoice every lap can be used to determine if a corner should a 2nd gear or 3rd gear corner.

If the DownShift alert is announced, then the driver can know immediately that the selected gear could be too high for that particular corner. For the case of a corner that exits onto a long straight away, even a power band difference of 300-400 RPM could allow the driver to pass a competitor later down the straightaway.

RaceVoice provides lap by lap feedback to help the driver determine the best gears to be used for a corner.

In order to hear these notifications, the throttle position of the vehicle must also be above 90%. This allows the driver to have the ability to slightly lift off the throttle to maintain a draft or the driver can remain at full throttle and shift to a higher gear. This feature becomes even more powerful when combined with real-time mile per hour announcements, which are described in an upcoming section.



Chassis and Vehicle Dynamics

The dynamics tab allows selectable audio announcements related to g-force loading, lap timing, wheel lockup and threshold braking. ***NOTE: In order to use wheel lockup and/or threshold braking, the racecar must have wheel speed sensors on all four wheels and brake pressure sensors.***

RaceVoice Studio 03-23-2019

Help Updates Advanced

Track Selection
Watkins Glen Long

Engine Dynamics

G-Force Announce

☒ Lateral G-Force 1.0

☐ Linear G-Force 1.0

Wheel Lockup Announce

☐ Active Wheel Lock Detection

Brake Threshold PSI
100

Wheel Speed Percent Difference
1

Lap Announce

☒ Announce Speed 110

☒ Announce BEST Lap

☒ Announce +/-

Brake Threshold Tone

☐ Enabled

Min (PSI) 500 Max (PSI) 600



G-Force Announcements

The G-Force Announcement selections allow of both Lateral and Linear G-Force measurements. Independent thresholds are available so that the announcement will only occur once the measured value has exceeded the set point, configured by the user. If enabled, these announcements will occur anywhere on the track when the race car exceeds the selected thresholds.

For example, Lateral-G force can be announced when the vehicle is generating more than 1.0g of cornering force. This value will be spoken rapidly through a corner/etc when the vehicle is generating more than 1.0g (or a higher/lower value as configured). This immediate feedback can be used by a driver to help 'creep' up to the limit of the vehicle/track/tire combination, essentially a direct real-time audio announcement of the traction circle concept.

Assuming that the driver can maintain a reasonably consistent entry/apex/exit line, the Lateral-G force announcement can be used to determine if more speed can be achieved.

By example, suppose on Lap #5 at VIR's "Oak Tree" the driver hears an announcement of such as "1.2, 1.3 1.2". On Lap #6, the driver may choose to apply throttle sooner or use more overall throttle to raise the G-force announcements to "1.3, 1.4, 1.5". Perhaps the vehicle begins to slide at the 1.5g announcement, the driver will now have a target of 1.3 to 1.4g in this corner. Assuming the driver achieves a consistent line through the corner, developing ~1.4g will produce a faster time through the corner than developing ~1.3g. As always, be aware that every lap the track/tires/vehicle conditions can change, so the driver still must remain situationally aware at all times.

Linear-G force reporting works in a similar manner, to measure braking deceleration of the vehicle.

By example, suppose the driver wants to determine what the latest braking point could be into a corner. Enabling linear-g reporting at a low level such as 0.3g will allow this determination to be made. RaceVoice will constantly monitor the linear-g forces reported and once the linear-g exceeds the setpoint (0.3g in this example) then RaceVoice will search for the maximum linear-G value achieved during braking.

In this example, the vehicle deceleration rises from 0.3g through 0.7g while maintaining good balance and no tire lock-ups. When the driver returns to full throttle, an announcement "Max 0.7g" will be reported.

On the next lap (or next corner) the driver can try a brake later/deeper into the corner in an attempt to raise the linear-g to 0.8g (or higher) of deceleration. Using this technique enabled on RaceVoice, the driver can work on faster speeds into the braking zone and using the a later braking point within the corner. ***As always, the track/tire/vehicle conditions are constantly changing therefore the driver must maintain situational awareness at all times.***



Wheel Lockup Announcement

A screenshot of a software window titled "Wheel Lockup Announce". It contains three settings: a checked checkbox for "Active Wheel Lock Detection", a "Brake Threshold PSI" spinner set to "100", and a "Wheel Speed Percent Difference" spinner set to "3".

Wheel Lockup Announce	
<input checked="" type="checkbox"/> Active Wheel Lock Detection	
Brake Threshold PSI	100
Wheel Speed Percent Difference	3

If the race car is setup with four wheel speed sensors and a brake pressure sensor, the driver can enable the active wheel lock detection feature. This feature allows the driver to select a minimum brake PSI and maximum allowed wheel speed difference in percentage. When the race car is under braking (i.e. brake pressure is above the selected threshold) then RaceVoice will monitor the value of all four wheel speed sensors. If the values of the sensors exceed the selected percentage-difference, RaceVoice will announce the following messages

Front Lockup : Indicates that one or both of the front tires have exceeded the selected %

Rear Lockup: Indicates that one or both of the rear tires have exceeded the selected %

These announcements can be used by the driver to help tune brake bias as well as practice heavy/threshold braking after high speed straightaway sections.

Note: If all tires are locked and not rotating, RaceVoice will not generate any announcements.



Lap MPH and Timing Announcements

The driver can select up to three lap timing announcements, including Speed, Best Lap, and +/- announcements.

A screenshot of a software window titled "Lap Announce". It contains three checked checkboxes: "Announce Speed", "Announce BEST Lap", and "Announce +/-". To the right of the "Announce Speed" checkbox is a numeric input field containing the value "110" and a small up/down arrow button.

The Announce Speed option allows the driver to enable rolling MPH speed announcements from RaceVoice. When this is enabled, RaceVoice will announce the MPH of the race car when it exceeds a selected MPH value (default: 110 mph). The speed will be announced when the MPH value changes, continuous announcements are paced approximately 2 seconds apart. This measurement can be used to help the driver locate braking/entry points and obtain better shift points when combined with the upshift indication. Refer back to the RPM settings of this document for a usage example on how to combine MPH and UpShift for a competitive advantage. Examples on how to use the MPH reporting are detailed below.

Example 1: Simply by turning on this reporting value, the driver can hear speeds around the track such as when entering a braking zone or the exit of corner.


Example 2: Depending on wind conditions, a driver may be facing a headwind down a long straight, such as the back straight at Watkins Glen. Even though the engine may be very near the upshift RPM threshold, a headwind may hinder progressive mph increments where increases in rpm and mph become stalled. This can be heard as an oscillating MPH announcement such as "116, 117, 116, 117, before hearing the progression expected of 116, 117, 118. In these conditions, shifting to a higher gear too early results in a continued drop in MPH due to the torque reduction in a higher gear. Hearing how wind is affecting your speed is an important feedback measure for maximizing lap times.

RaceVoice is also constantly monitoring the lap-time values for each track lap.

At the start/finish line of every lap, RaceVoice can announce the phrase "BEST" if the recently completed lap is now the fastest/best lap of the session. RaceVoice can also announce the +/- lap time for the recently completed lap at each start/finish crossing.

Brake Threshold Tone

RaceVoice can help the driver practice and become more consistent with initial brake application. If the race car provides a brake pressure sensor, the Brake Threshold Tone feature can be enabled in RaceVoice. When this feature is enabled, the driver can configure a minimum and maximum brake pressure PSI target.

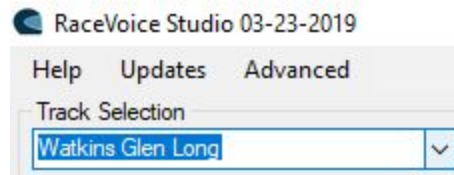
A screenshot of the "Brake Threshold Tone" configuration window. It features a title bar with the text "Brake Threshold Tone". Below the title bar is a checkbox labeled "Enabled" which is checked. Underneath the checkbox are two input fields. The first field is labeled "Min (PSI)" and contains the value "700". The second field is labeled "Max (PSI)" and contains the value "800". Both fields have small up and down arrow buttons to the right of the input area.

While on-track, the driver can then practice applying the target brake pressure immediately at initial brake application. When the applied brake pressure is within the target PSI range, RaceVoice will produce an audible tone as feedback for the driver. The driver's goal should then be to immediately hear the tone upon brake application and then smoothly release the brake to restore balance to the race car prior to corner entry.

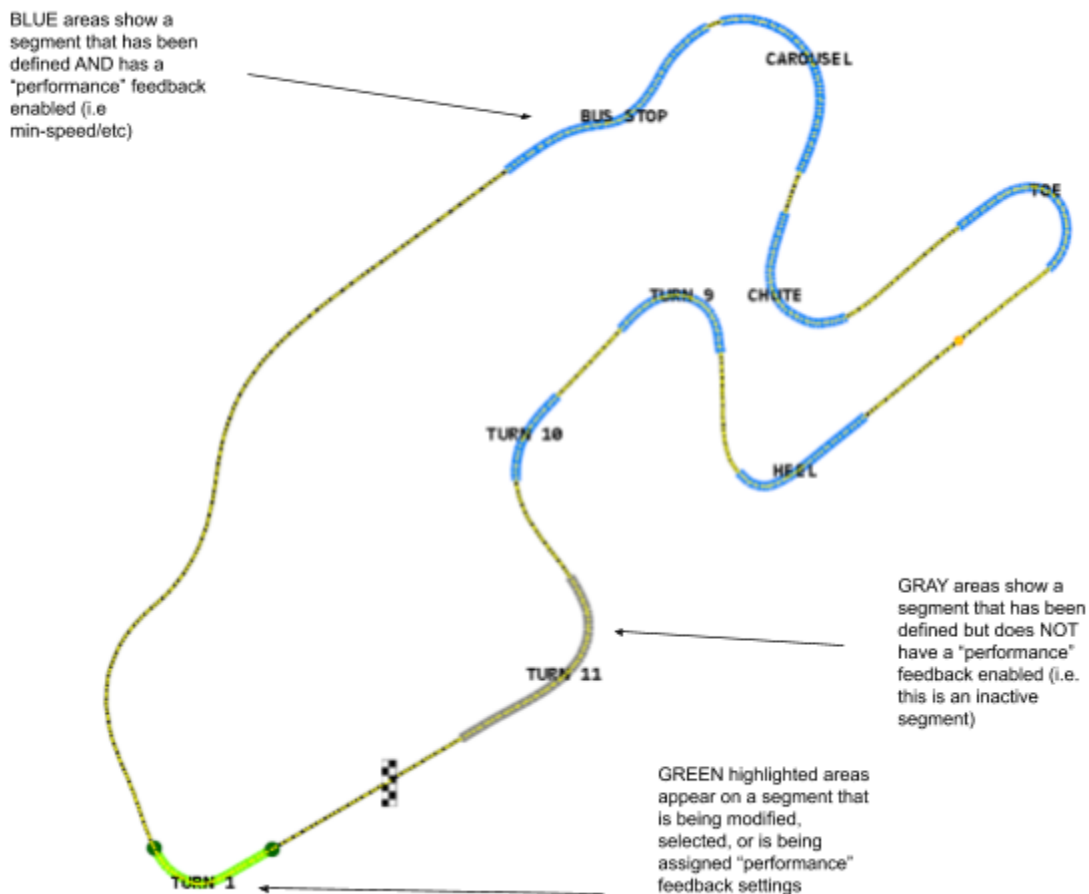
The Brake Threshold Tone feature can assist the driver with becoming more consistent with the process of braking and release of the brake pedal. An experienced driver can also use the tone feature to provide feedback for maximum braking effort that could be applied at the transition of a high speed straightaway that leads into a low-speed/hairpin corner.

Track Selection and Performance Triggers

A drop-down box for Track Selection is available at the top-left of RaceVoice Studio. This allows the user to select any of the available tracks provided with RaceVoice Studio.

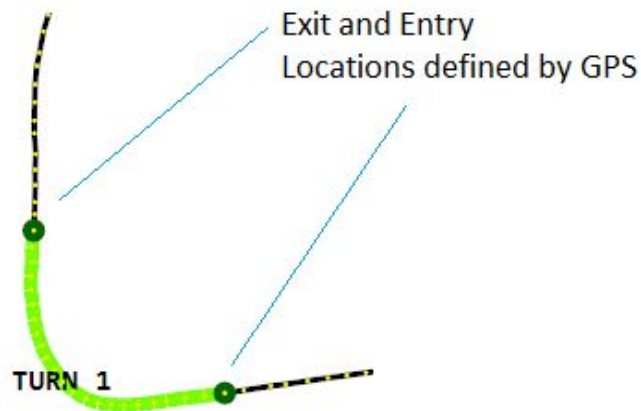
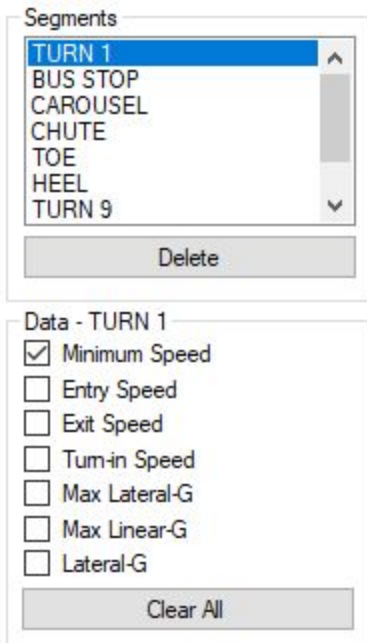


After selecting the track, the map will be displayed in the Track window of RaceVoice Studio. A variety of data points and split-time points can be enabled/disabled at predefined segments for the track map.



Segment Reporting

RaceVoice provides a series of powerful segment analytics that can be enabled/disabled for each corner on the track map.



For each selected segment on the track, RaceVoice can calculate and provide speech announcements of critical values to the driver such as

Minimum Speed: RaceVoice will monitor the MPH of the between the entry and exit locations defined on the track map. Once the car crosses the exit location, RaceVoice will announce the minimum speed of the car through that segment using an announcement such as “Minimum 65” indicating that the minimum speed through the corner was 65 mph. On the next lap, the driver now has a target to meet or exceed by adjusting their racing line/entry/throttle/braking/etc.

Entry Speed: RaceVoice constantly monitors the throttle position and MPH of the race car after the car has crossed the entry GPS location defined on the track map. When the throttle transitions from full throttle (above 90%) to off throttle (less than 90%), RaceVoice will announce the immediate MPH value with an announcement such as “Entry 127” indicating that the race car achieved 127 mph at the instant the driver transitioned from full throttle.

Exit Speed: RaceVoice monitors the throttle position and MPH of the race car during the entire range of the segment. Once the driver transitions to full throttle (above 90%) and remains at full throttle for 2 seconds, RaceVoice will announce a message similar to “Exit 95” indicating that the exit speed of the car has achieved 95 mph.



Turn-In Speed: RaceVoice monitors the MPH and lateral g-force of the race car after the car has crossed the gps entry location defined on the track map. When the lateral g-force climbs above 0.7g, RaceVoice will announce the instantaneous MPH with a message similar to "Entry 75". This message indicates that the turn-in speed of the race car was 75 MPH. Latching MPH against a fixed lateral-g trigger allows a repeatable measure of turn-in speed to be provided to the driver. This measurement can assist the driver as they slowly practice increasing throttle levels after braking and towards the corner apex.

Max Lateral-G: RaceVoice monitors the lateral-g loading of the car throughout the entire segment defined on the track map. At the GPS defined exit location, RaceVoice will announce a message similar to "Max 1.7" indicating that the maximum lateral g-force was 1.7g during the corner.

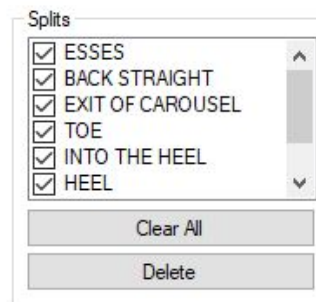
Max Linear-G: RaceVoice monitors the linear-g loading of the car during the entry section of the segment. Prior to corner turn-in (i.e. 0.7g lateral loading) RaceVoice will announce a message indicating the maximum linear-g (i.e. braking force) achieved during entry with a message similar to "Max 1.1" indicating that the maximum linear g-force was 1.1g during braking.

Lateral-G: RaceVoice will rapidly announce the lateral-g loading of the car through the entire segment defined on the track map. This operates similar to the Lateral-G option on the dynamics tab in RaceVoice Studio. However, enabling Lateral-G in a segment can be used for g-force announcements based a specific segment only.

Setup Split Time Reporting

The right side of RaceVoice Studio provides a menu with selectable Split timing markers. Each marker can be enabled/disabled independently. When the race car crosses the point on the track for each enabled marker, RaceVoice will announce the current +/- lap time as speed announcement such as “PLUS 0.3” or “NEGATIVE 0.7”. This announcement is the same value as the +/- lap time value reported by the dashboard.

Enable/Disable
Split Markers



Splits	
<input checked="" type="checkbox"/>	ESSES
<input checked="" type="checkbox"/>	BACK STRAIGHT
<input checked="" type="checkbox"/>	EXIT OF CAROUSEL
<input checked="" type="checkbox"/>	TOE
<input checked="" type="checkbox"/>	INTO THE HEEL
<input checked="" type="checkbox"/>	HEEL
Clear All	
Delete	

Each marker represents distinct locations on the race track map, such as the Exit of the Carousel at Watkins Glen (see example below)

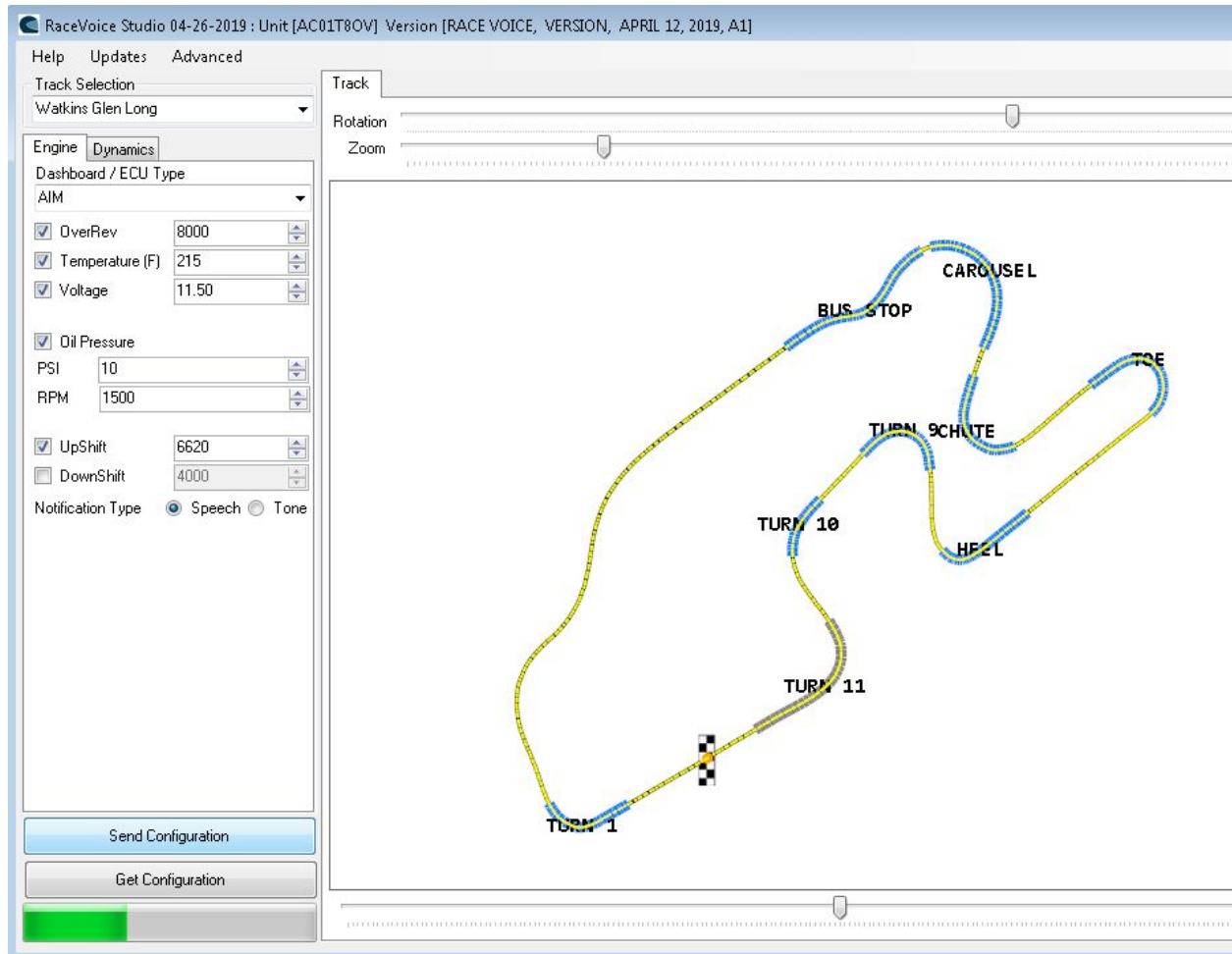


The +/- lap reporting feature of RaceVoice helps to keep the driver “eyes-up” so they can focus on positioning the race car and passing a competing vehicle.

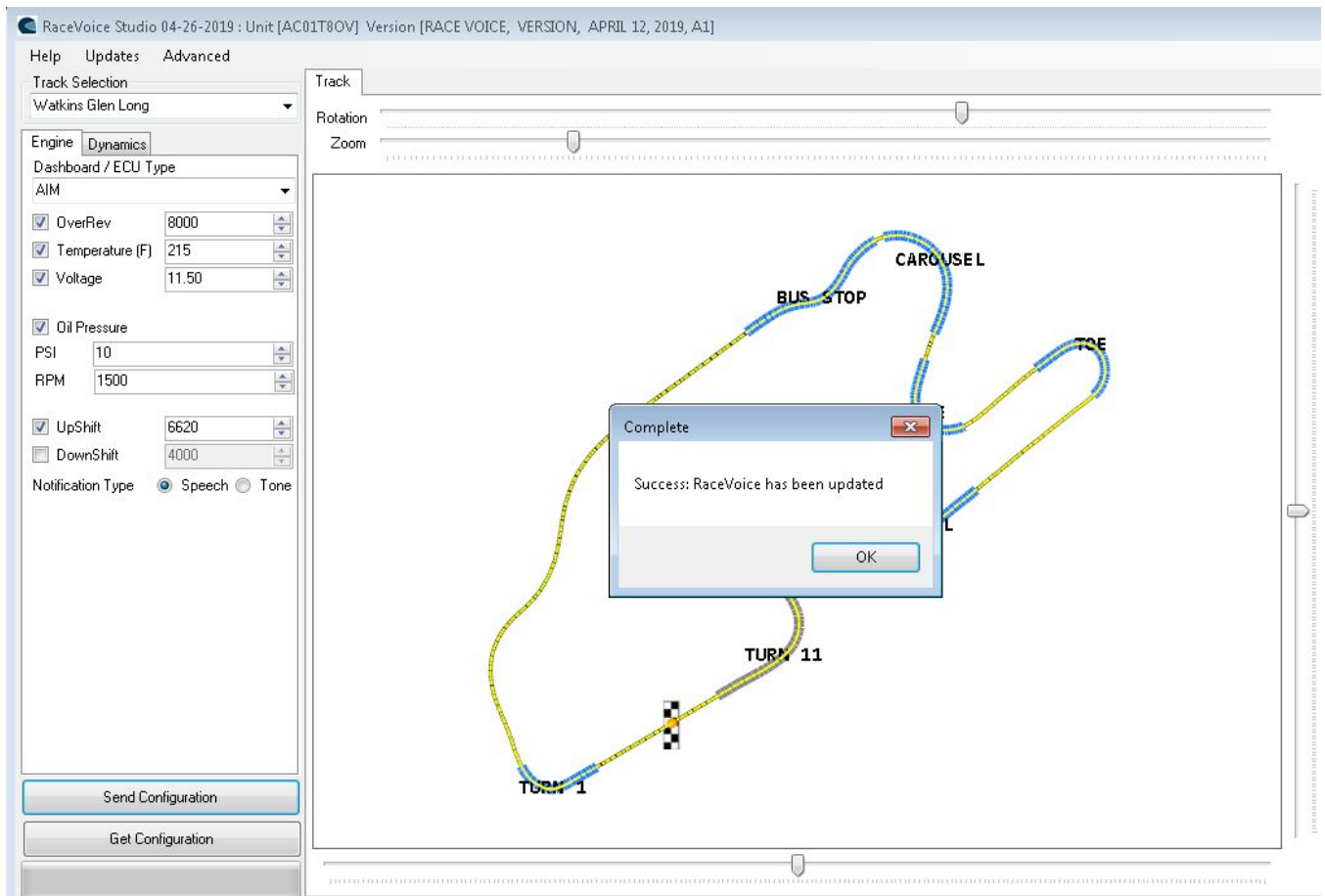


Download your Setup to RaceVoice

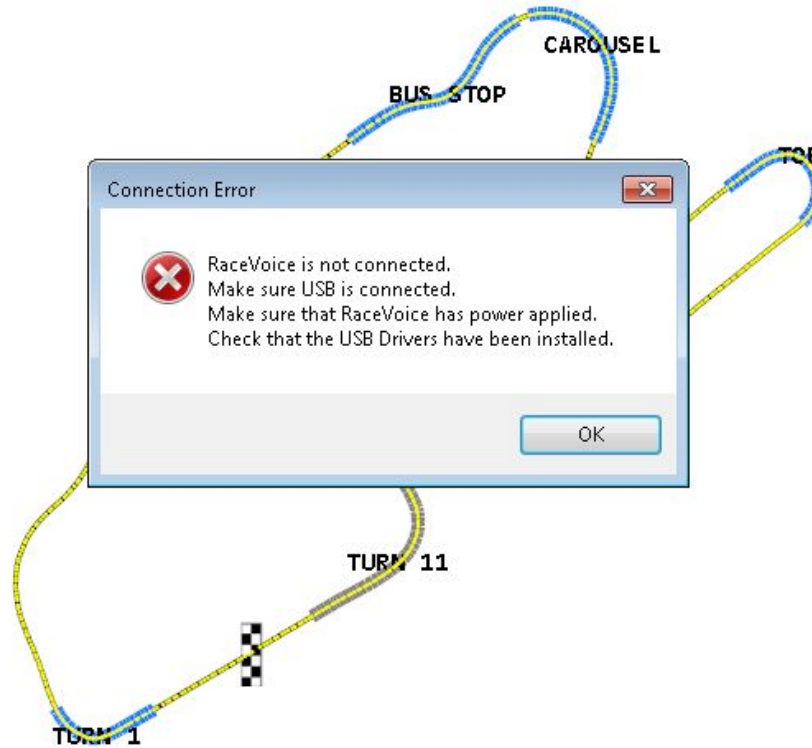
After selecting the track and the values for the Engine, Dynamics, Speeds, and Splits, click the “Send Configuration” button to download the settings to the RaceVoice unit. Ensure that the RaceVoice unit is powered on and the USB port is connected. The green status bar in the lower left should begin moving to show that data is being transferred.



Once complete, a message showing “Success RaceVoice has been updated” will be displayed.



If the update process fails, an error message similar to below will be displayed.



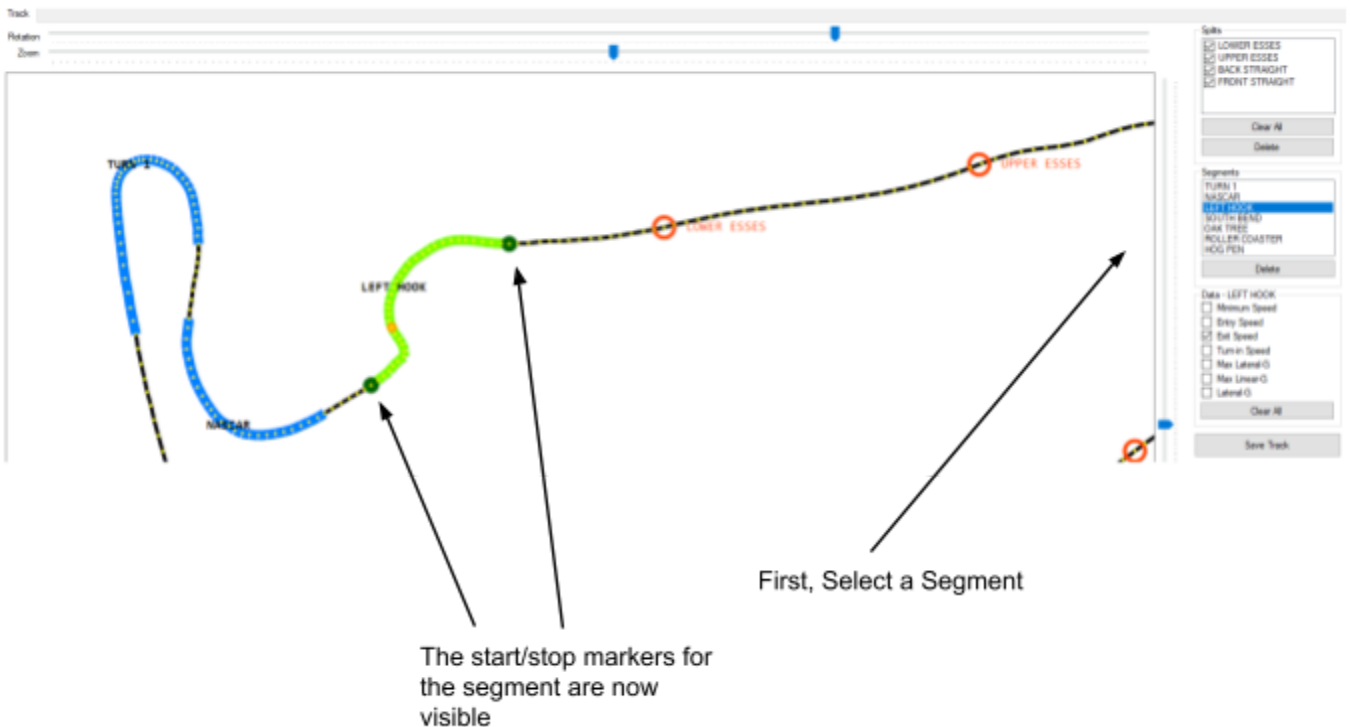
Double check that RaceVoice is powered on, with a USB connection to the PC, and that the drivers for RaceVoice have been installed.

Track Map Personalization

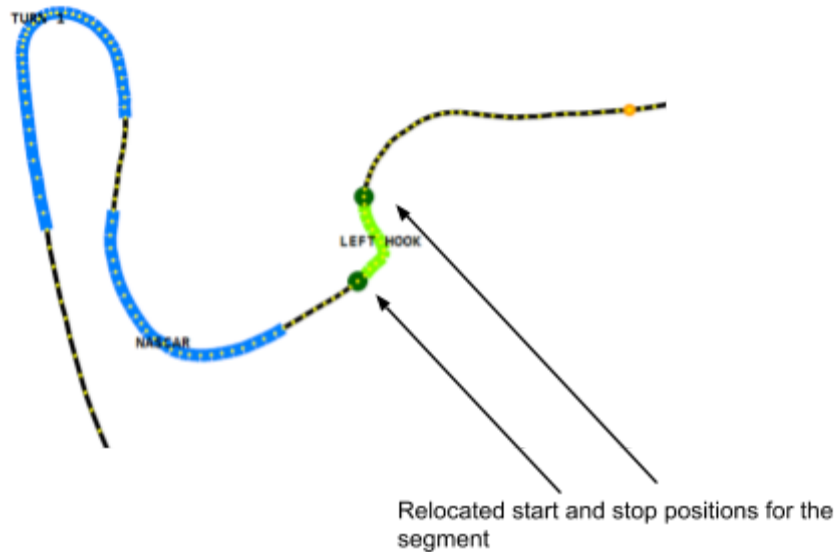
RaceVoice Studio allows the user to adjust the pre-defined track maps and save these adjustments. The user can move/add/delete/change both the segments and split points on the track.

Adjusting a segment

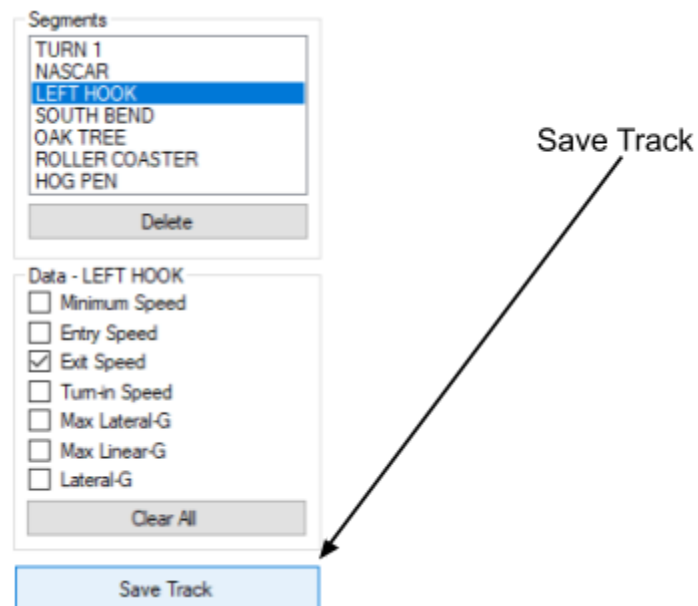
To adjust an existing segment, select the name from the Segment list on the right side of the screen. The selected segment will then be highlighted and the start and stop markers will be visible as two circular points at the end segment boundary.



Position the mouse over the start or stop markers and hold down the left mouse button. The marker can then be dragged along the track to change the start/stop locations of the segment.

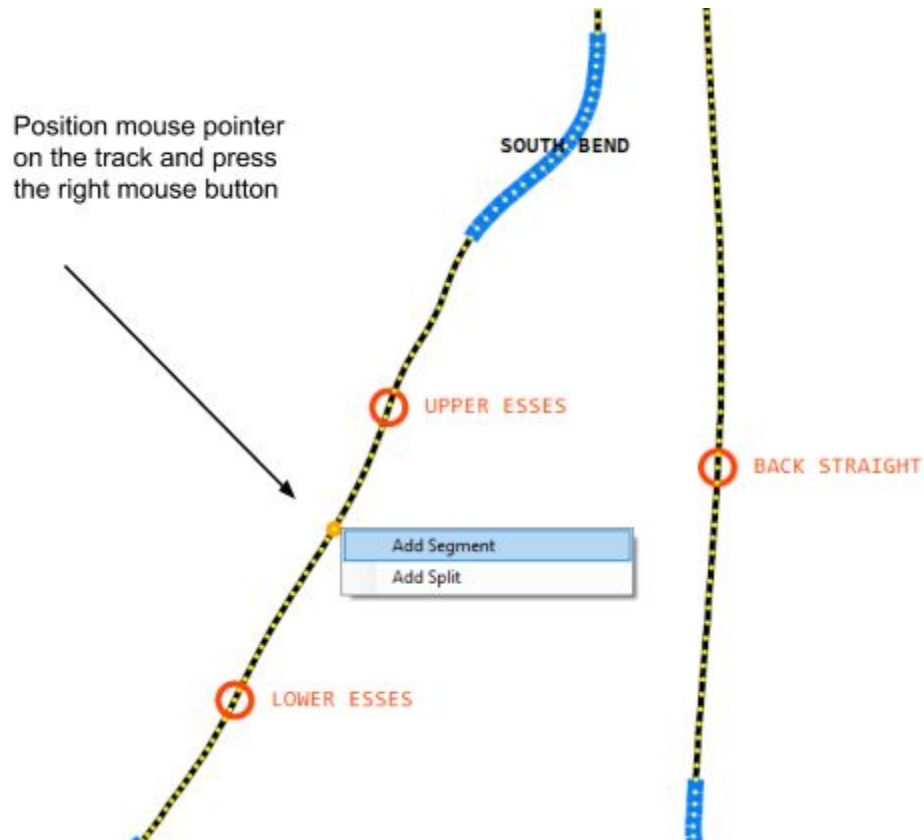


After finishing the segment adjustment, press the “Save Track” button on the right side of the screen to save the track adjustments to the PC.



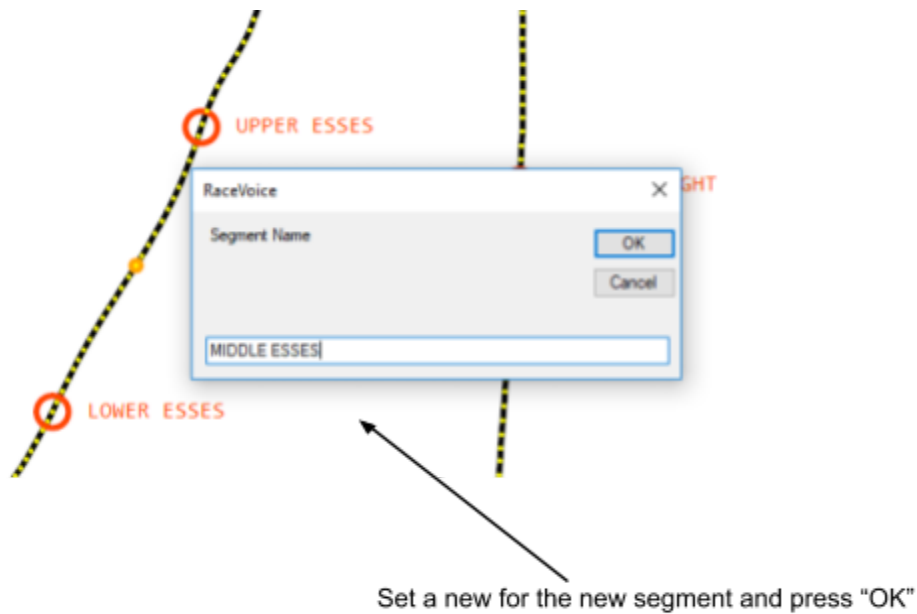
Add Segments and Splits

The user can add a new segment to the track map by positioning the mouse on the track and pressing the right mouse button. A menu will appear to allow the user to add a segment or split.

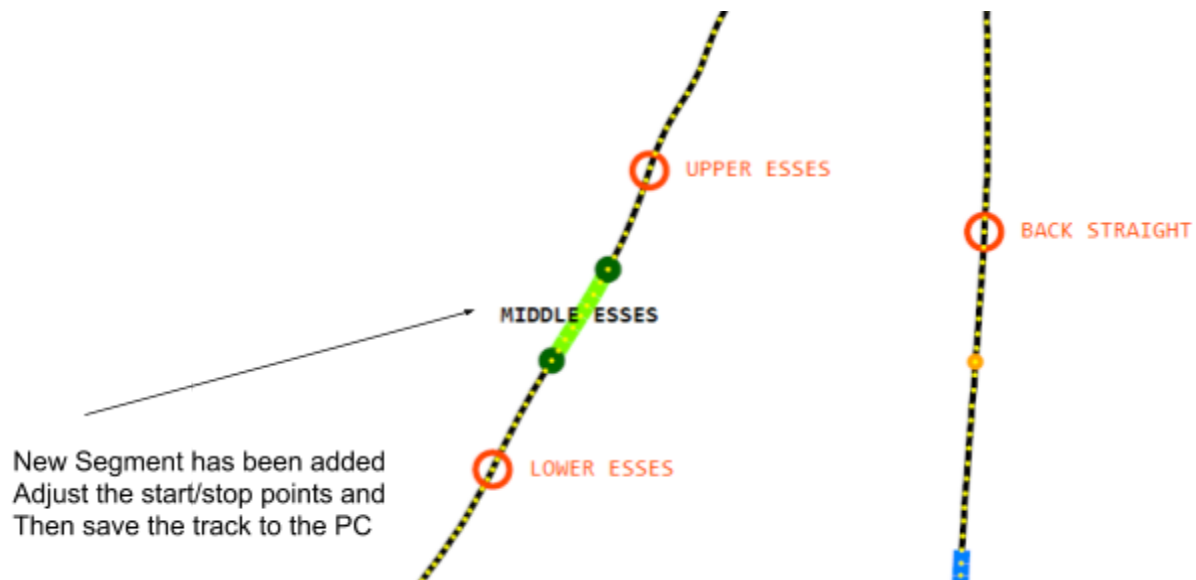


Once the menu appears, select the "Add Segment" using the left mouse button.

Enter a name for the new segment and press the “OK” button to create a base segment on the track at the location where the mouse is positioned.

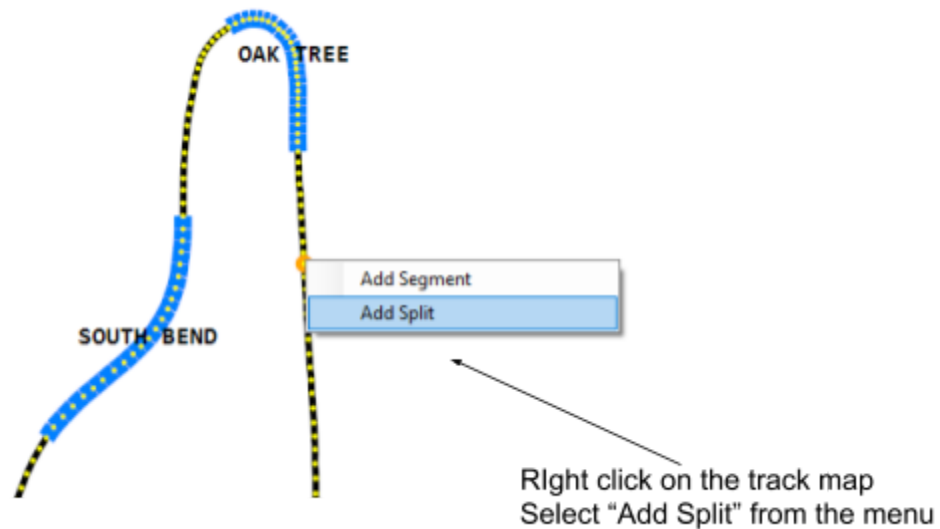


Once the new segment is added, select the segment from the menu and adjust the start/stop points. After completing this process, press the “Save Track” button to save the new track map to the PC.

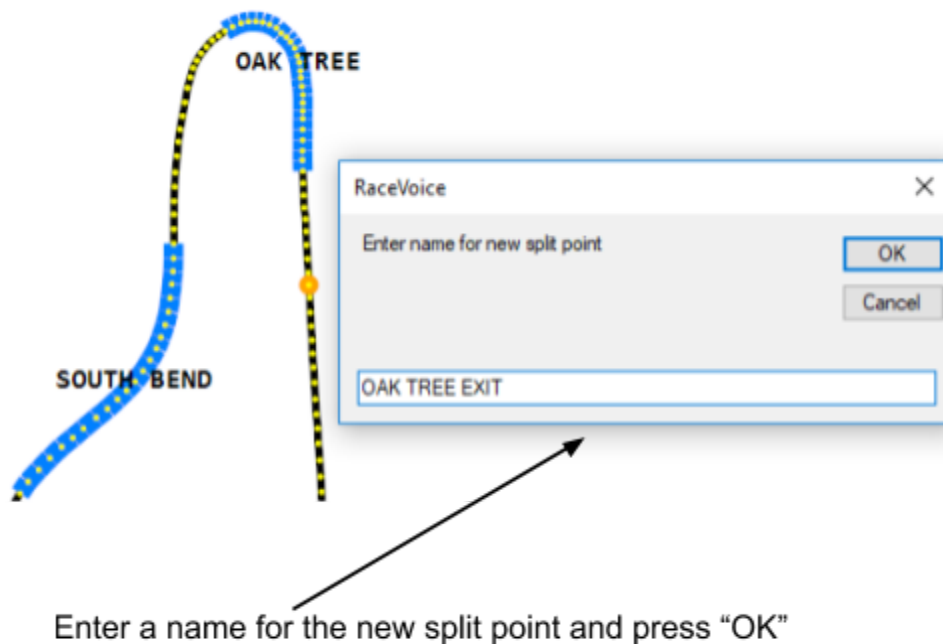


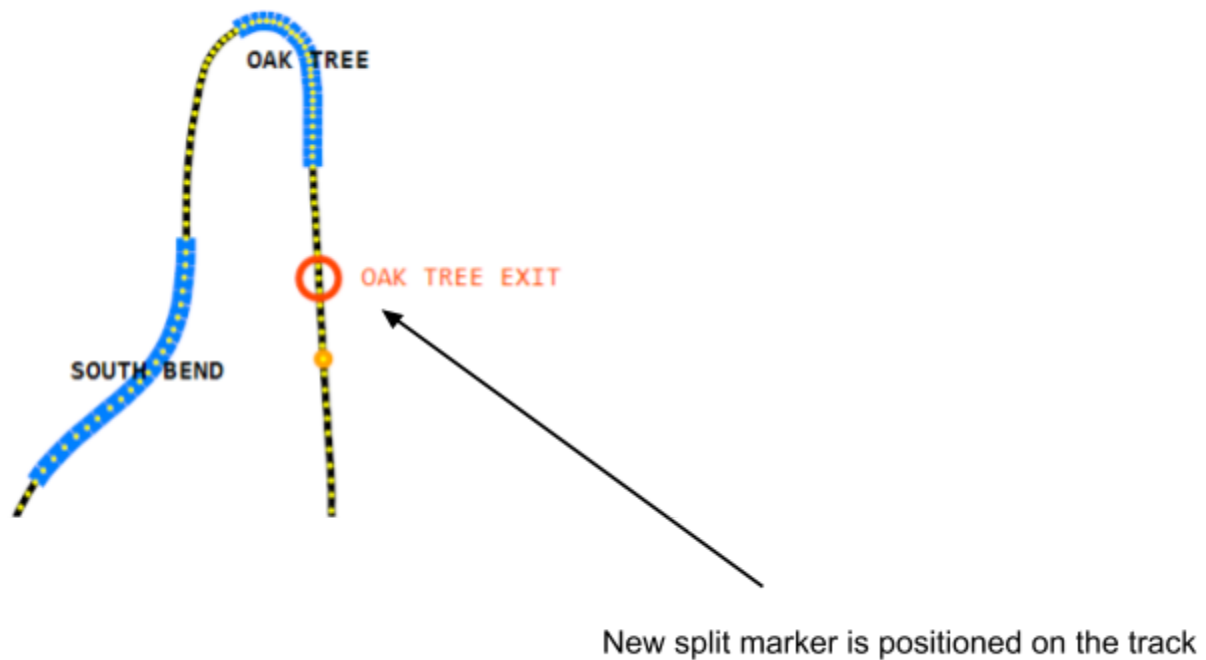
Performance metrics for the new track segment can be selected and then the new track configuration can be downloaded to the RaceVoice unit.

A similar process is available for adding new split marker points to the track map. Position the mouse on the track map and press the right mouse button.



Enter the name for the new split as shown below.





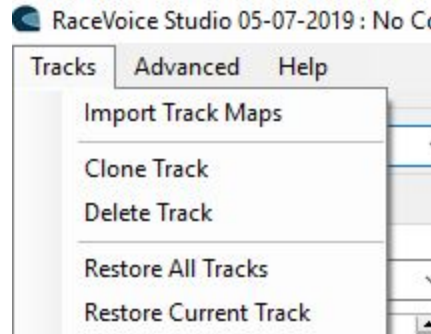
Once the new split is added, it can be enabled/disabled using the “Splits” menu on the right side of the track. The user should also press the “Save Track” button to save the new track map to the PC.

Deleting Segments/Splits

A track segment or split marker can be deleted from the current map. In order to do this, click on the segment or split name shown in the menus on the right side of the screen. Then press the “Delete” button and the selected segment/split will be removed. Once completed, press the “Save Track” button to commit and save the track updates to the PC.

Track Management

The following section(s) discuss the Tracks menu in RaceVoice Studio.



Import a Track Map

RaceVoice Studio allows the user to import a track map from a 3rd party data system. The formats available are

- Aim Formatted ZTRACK files

- Generic CSV files consisting of two columns. First column must be GPS latitude, second column must be GPS longitude. No other data should be present in the generic CSV file.

Clone a Track

The user can “clone” the currently selected track to create multiple versions with independent names for each version of the track. This can be useful for test/qualify/race/rain driving where the user may want to have specific corners enabled for various track activities.

Delete a Track

The user can delete the currently selected track and remove it from the PC’s track database.



Restore All Tracks

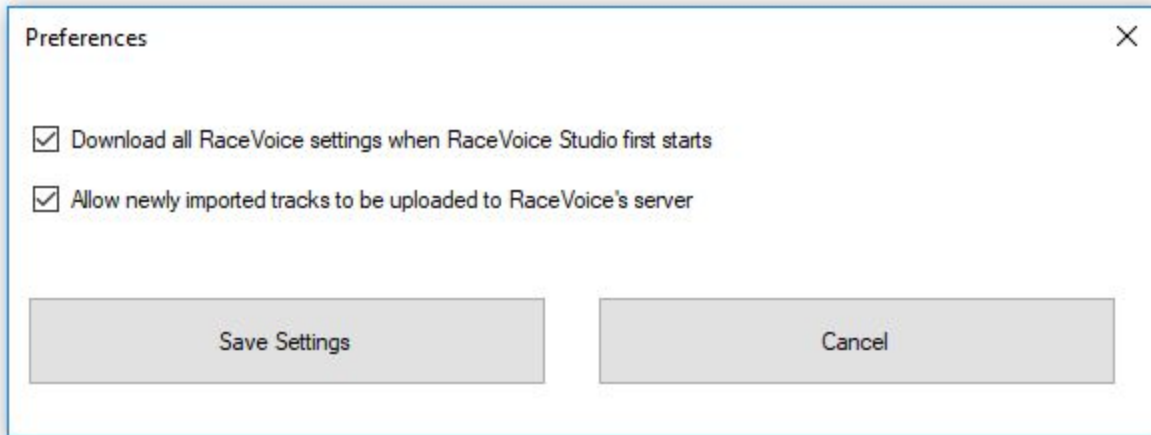
The user can select a full restore of all tracks from RaceVoice's server. This option will remove ALL tracks on the users PC. The base tracks will then be downloaded from the RaceVoice server.

Restore Current Track

The user can restore the currently selected track from RaceVoice's server. This option only affects the selected track. The track must also be available on RaceVoice's remote server. User imported and/or cloned tracks are not stored on the server and will not be updated.

Preferences

The Advanced menu allows the user to access the Preferences control for RaceVoice Studio as shown below.



The option "Download all RaceVoice settings when RaceVoice Studio first starts" is used to control how RaceVoice studio interacts with the RaceVoice unit at the time the software is started. The default setting is used to download all configuration data from the RaceVoice unit and display it in RaceVoice studio. This behavior can be disabled by the user. If disabled, the user can still download all configuration data from the RaceVoice unit using the "Get Configuration" button available in RaceVoice Studio.

The option "Allow newly imported tracks to be uploaded to RaceVoice's server" is enabled by default. If the user imports a new track map (Tracks-->Import menu) and this option is enabled, RaceVoice studio will upload the imported track to the remote server. This track will then be reviewed by technical support and scheduled for inclusion in the track database. This feature allows all RaceVoice users to collectively build the database of tracks and improve the overall experience with RaceVoice. This behavior can be disabled by the user.



Advanced Users

The following section(s) discuss topics for more detailed technical usage and operating environments for RaceVoice.

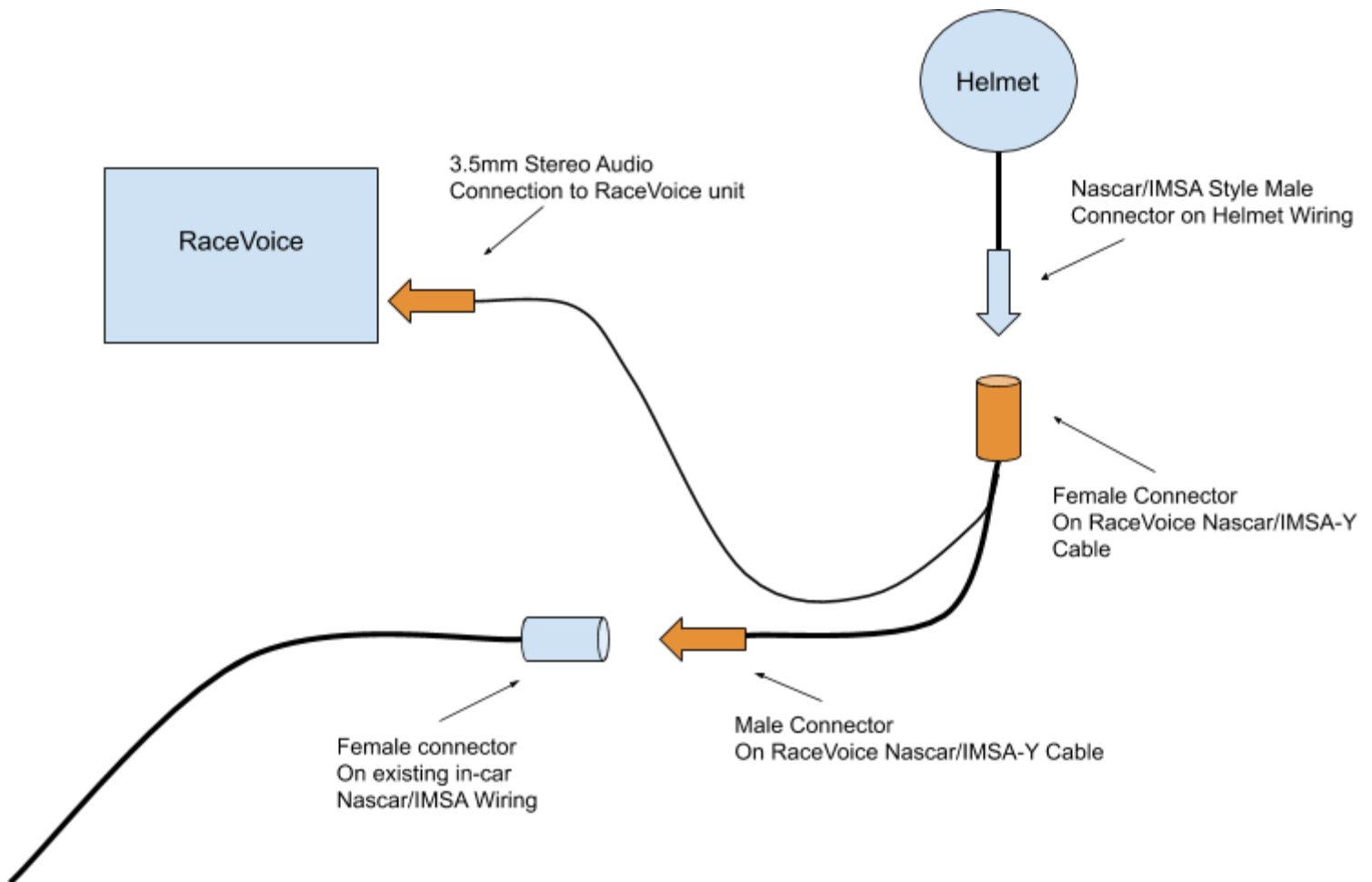
Using RaceVoice with IMSA or NASCAR Wired Radios

The RaceVoice unit provides an internal 3 Watt audio power amplifier with capacitive output coupling for driving earbud style receivers. Certain race cars may already have an in-car radio system for communication with pit-crew. RaceVoice can be used in parallel with an existing radio.

A "Y-Cable" is available for purchase that will connect between an NASCAR/IMSA wired radio harness and existing helmet/NASCAR/IMSA wiring in the vehicle. The "Y-Cable" provides a 3.5mm male connector for the audio output on the RaceVoice unit. Using this "Y-Cable", the driver can hear both the radio and the RaceVoice unit.

Note that this cable is a passive cable, so there may be times when RaceVoice is issuing voice alerts while a pit-crew member is also talking on the radio. In this case, both messages will be heard at the same time.

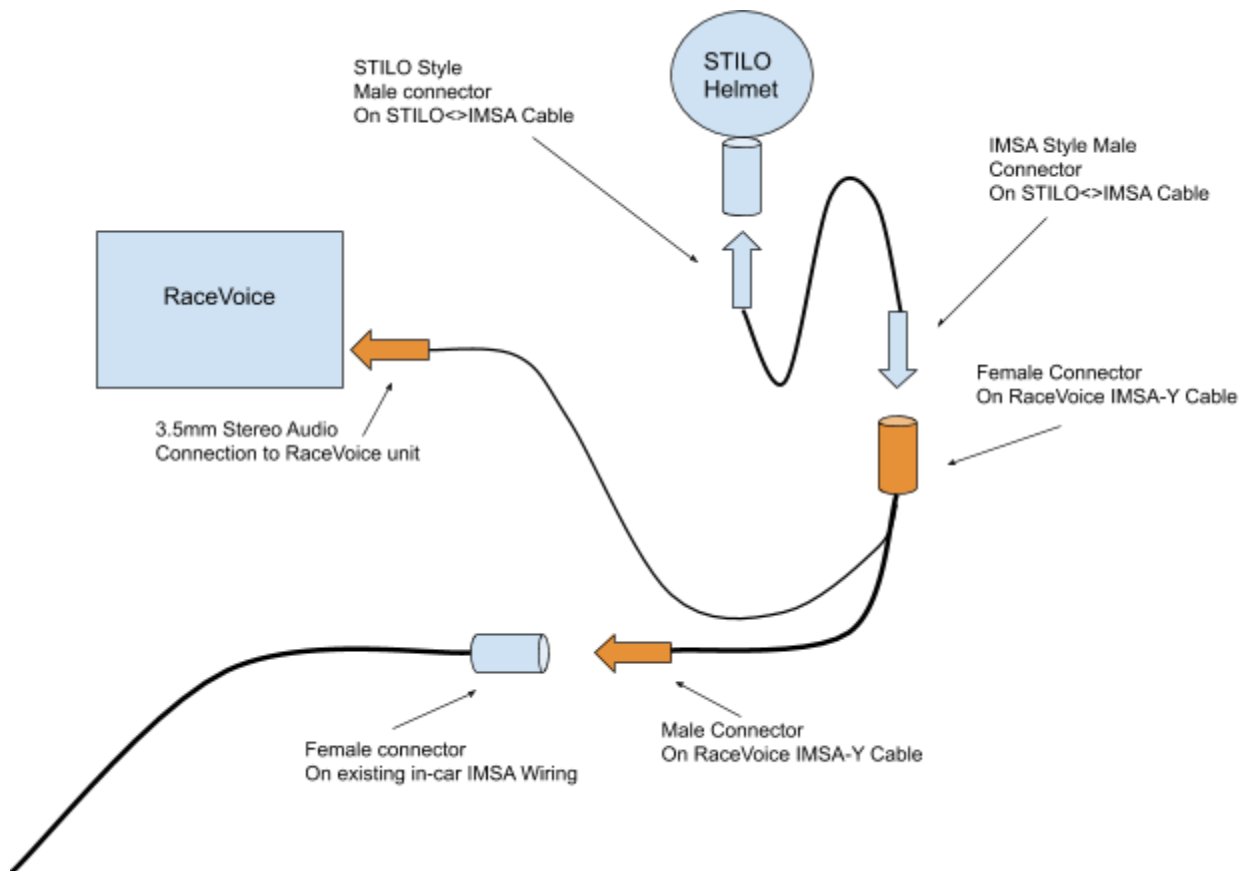
The typical connection diagram for installing a RaceVoice NASCAR/IMSA-Y cable system is shown below.



NOTE: In all cases, the driver should begin with the volume knob and digital volume control set for low volume. Then slowly increase the volume level(s) to allow for comfortable hearing of RaceVoice's announcements.

Using RaceVoice with STILO Helmets

RaceVoice can be used with STILO Helmets and connects in a similar manner to the diagram shown on the previous page. The connection diagram for a STILO helmet is shown below.



In applications with the STILO helmet that provides internal speakers (not earbuds) the driver can further boost the volume of RaceVoice through the software. Please refer to the section “Configure Voice Output” for details on how to adjust the baseline volume.

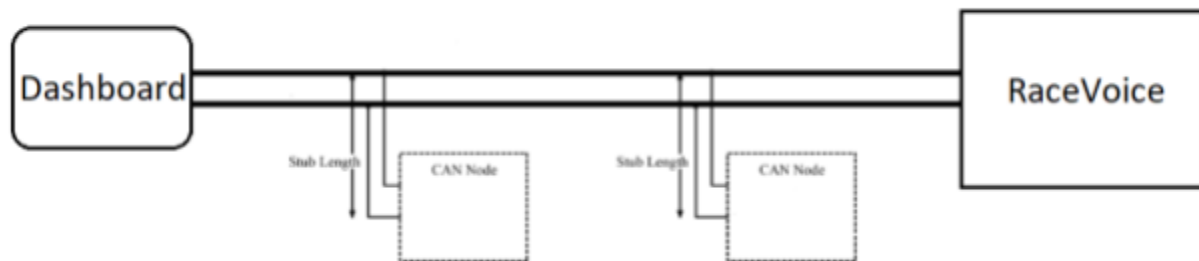
NOTE: This requires that the car is wired with IMSA style wiring and the driver is using a STILO to IMSA converter cable in their current installation.

NOTE: In all cases, the driver should begin with the volume knob and digital volume control set for low volume. Then slowly increase the volume level(s) to allow for comfortable hearing of RaceVoice’s announcements.

Baud Rate and Multiple CANBus Devices

The RaceVoice unit is primarily designed to be the only device on a dedicated CANBus connected to a datalogging dashboard system similar to the AIM MXL2 or MoTeC C125. RaceVoice can be used with any dashboard that allows configurable CANBus messages to be issued from the dash.

However, RaceVoice may be shared with a limited number of devices on the CANBus as well. RaceVoice provides a fixed internal 120-ohm CANBus termination and this cannot be disabled. As such, it is recommended that RaceVoice is physically positioned at or near the end of the CANBus wiring.



In this case, the following recommendations should be used

- 1) Dashboard device should have internal termination enabled
- 2) RaceVoice should be positioned at the physical end of the CANBus wiring
- 3) Other devices on the same CANBus should have internal termination disabled
- 4) Connections to other devices should be made as short as possible (i.e. Stub Length)

Alternative connection recommendations

- 1) Dashboard device should have internal termination disabled
- 2) RaceVoice should be positioned at the physical end of the CANBus wiring
- 3) A second device, with internal termination enabled, should be placed as close as possible to the dashboard with a minimum stub length on the CANBus wiring

To further support multiple devices, the user can adjust the data rate of RaceVoice using the “Advanced-->BaudRate” menu in RaceVoice Studio. Select the desired baud rate (125Kb/ 250Kb/ 500Kb/ 1Mb) and download the new configuration to RaceVoice.

NOTE: Compatibility with other CANBus devices is not guaranteed and the user/installer should completely understand the physical and digital requirements for multiple CANBus devices. Further, RaceVoice should NEVER be placed on the same CANBus as an ECU or any other device that controls any aspect of the vehicle engine, suspension, dynamics, or other vehicle operating states.



RaceVoice CANBus Template

RaceVoice uses a dedicated CANBus connection to receive a combined data stream of both ECU values and internal dashboard values. The datastream is configured in the software for the dashboard. The table below details the required address, lengths, and contents for the values that must be sent to RaceVoice. Using this information, a CANBus template can be constructed for a variety of dashboards/loggers other than the examples in this manual.

RaceVoice uses the 11-bit CANBus address format and requires a Big Endian (high byte first) data format. The default data rate is 250Kb/s, addresses listed below are in hexadecimal format; data should be in 16-bit format, with the exception of Latitude and Longitude which are 32-bit format each. In the table below Byte [0] refers to the first byte in the data payload on the CANBus. All values are transmitted as unsigned integers with the exception of GPS coordinates and certain lap time values. Note: These examples all related to the transmission of english measurement units such as reported by AIM dashboards.

Recommended Transmission Rate is 10Hz			
Address 0x50	Bytes	Description	Comments
	[0:1]	Throttle Position, value between 0 and 100	
	[2:3]	Engine RPM, value between 0 and 21000	
	[4:5]	Vehicle Speed, value between 0 to 255	May be GPS MPH speed or any other speed sensor source.
	[6:7]	Front Brake Pressure in units of PSI	Note: this is an optional value

Recommended Transmission Rate is 10Hz			
Address 0x53	Bytes	Description	Comments
	[0:1]	Accelerometer Y-Axis (Lateral Acceleration) Presented as a value between 0 and 1000 where the last two digits represent the decimal portion of the acceleration value. Example: Lateral G of 1.65g would be presented as 165	Typically use a multiplier of 100 to generate proper data format
	[2:3]	Accelerometer X-Axis (Linear Acceleration) Presented as a value between 0 and 1000 same format style as Y-Axis	Typically use a multiplier of 100 to generate proper data format
	[4:7]	Unused	

Recommended Transmission Rate: 1Hz			
Address 0x55	Bytes	Description	Comments
	[0:1]	Water Temperature (or similar temperature value) In units of integer degree Fahrenheit values between 0 and 255	
	[2]	Oil Pressure configuration byte	Used to configure PSI or switch mode
	[3]	Oil Pressure (or similar pressure value) in units of PSI between 0 and 255. Maybe also be a 0/1 or 1/0 state for reading an "oil switch" value	
	[4:5]	Battery Voltage (or similar voltage value) in units of tenths of a volt. Example: Voltage 13.4 would be transmitted as 134	Typically a multiplier of 10 is used
	[6:7]	Unused	

Recommended Transmission Rate: 10Hz			
Address 0x56	Bytes	Description	Comments
	[0:3]	GPS Latitude Value, presented as a signed 32-bit value. Example: 42.341028 Latitude is presented as 42341028 within the 32-bit value space Hex representation is 0x028612A4	Typically use a multiplier of 10 Million
	[4:7]	GPS Longitude Value, presented as a signed extended 32-bit value. Example: -76.928861 Longitude is presented as -76928861 within the 32-bit value space Hex representation is 0xFB6A28A3	Typically use a multiplier of 10 Million

Recommended Transmission Rate: 1Hz			
Address 0x57	Bytes	Description	Comments
	[0]	Message Trigger Byte for Message #1	Set to value of '1' to trigger a message. Set back to value of '0' to remove message trigger
	[1]	Message Trigger Byte for Message #2	
	[2]	Message Trigger Byte for Message #3	
	[3]	Message Trigger Byte for Message #4	
	[4]	Message Trigger Byte for Message #5	
	[5]	Message Trigger Byte for Message #6	
	[6]	Message Trigger Byte for Message #7	
	[7]	Message Trigger Byte for Message #8	

Recommended Transmission Rate: 5Hz			
Address 0x5A	Bytes	Description	Comments
	[0:1]	Current Lap Number range for 0 to 32000	
	[2:3]	Current Lap Time in units of milliseconds.	
	[4:5]	Best Lap Time in units of milliseconds	
	[6:7]	+/- Best Lap Time value in units of milliseconds. This is a signed value to allow for PLUS or MINUS lap time measurements	

Example Template with Front Brake PSI

Brake pressure in PSI

<input checked="" type="checkbox"/>	CAN ID (hex)	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
<input checked="" type="checkbox"/>	0x50	SRF TPS		SRF RPM		GPS Speed		FrontBrake	
<input checked="" type="checkbox"/>	0x53	AccelerometerY		AccelerometerX					
<input checked="" type="checkbox"/>	0x55	SRF ECT		SRF OIL P		Battery			
<input checked="" type="checkbox"/>	0x5A	Lap Number		Lap Time		Best Time		+- Test Best Time	
<input checked="" type="checkbox"/>	0x56	Latitude				Longitude			

Note: Brake PSI (typically front brake) should be added in bytes 6-7 of Canbus ID 50h

Example Template with Brake and Wheel Speed

<input checked="" type="checkbox"/>	CAN ID (hex)	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7		
<input checked="" type="checkbox"/>	0x50	SM PEDAL ANGLE		←HL	SM RPM	←HL	GPS Speed	←HL	SM BRAKE PRESS	←HL	
<input checked="" type="checkbox"/>	0x53	LateralAcc		←HL	InlineAcc	←HL	VerticalAcc	←HL			
<input checked="" type="checkbox"/>	0x55	SM ECT		←HL	SM OIL P	←HL	Battery	←HL			
<input checked="" type="checkbox"/>	0x5A	Lap Number		←HL	Lap Time	←HL	Best Time	←HL	+ Test Best Time	←HL	
<input checked="" type="checkbox"/>	0x56	Latitude				←HL	Longitude				←HL
<input checked="" type="checkbox"/>	0x51	SM WHSPD FL		←HL	SM WHSPD FR	←HL	RL SPD WHEEL	←HL	RR SPD WHEEL	←HL	

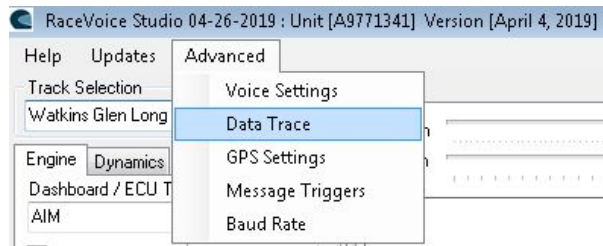
Wheel Speed values assigned to CanID 0x51



Checking Real Time Values

Once RaceVoice is installed in the vehicle and the dashboard is configured with the CANBus profile, the user can verify that RaceVoice is getting the expected values from the dashboard.

This can be done by selecting the “Data Trace” option under the Advanced menu in RaceVoice studio and launching the Real Time View window.



The Real Time View window will read values approximately once per second from the RaceVoice unit and display them on the PC. Ensure that the values make sense for the actual running conditions of the vehicle and GPS locations.

If the values are not correct and you are using a CANBus setup that was downloaded from RaceVoice.com, then contact support@racevoice.com for assistance.

If the values are not correct and you have made your own CANBus profile, check the scaling factors/conversion units in your profile.

Note: GPS may reflect incorrectly if the vehicle is inside of garage or otherwise in a poor GPS reception area. In this case RaceVoice may announce the phrase “GPS ERROR”. Reposition the vehicle to a location with a clear GPS signal if this occurs.



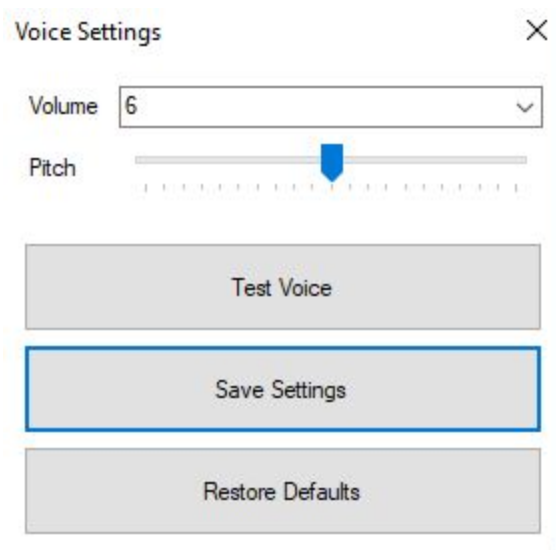
Configure Voice Output

RaceVoice Studio allows the user to adjust the baseline volume of the audio output. This feature can be useful to get the best sound quality for both earbud style or speaker style helmet/headsets.

Launch the “Voice Settings” under the Advanced menu from RaceVoice Studio.

This will display the Volume and Pitch Adjustment control. The user can then adjust the baseline volume level as well as the vocal pitch of RaceVoice. Changing the pitch can be useful to help move the tone of the RaceVoice speech announcements away from the tone of a loud exhaust and may help certain drivers hear the announcements more clearly.

Select a volume between 1 to 10, and click the “Update Volume” button. Clicking the “Test Voice Level” will trigger the RaceVoice unit to announce its power-on/startup message. The message can be used to help tune the volume level.



The baseline volume control is in addition to the physical volume knob on the RaceVoice Unit. The default volume of 5 should be suitable for all applications. However, more or less audio amplification can be customized to help get the best sound level for both earbuds and speaker style helmets.

CAUTION: Using ear bud devices with too high of a volume can result in permanent hearing damage. Always start with low baseline volume and gradually increase the baseline and/or volume knob on the unit to obtain a suitable audio level.



Configure GPS Settings

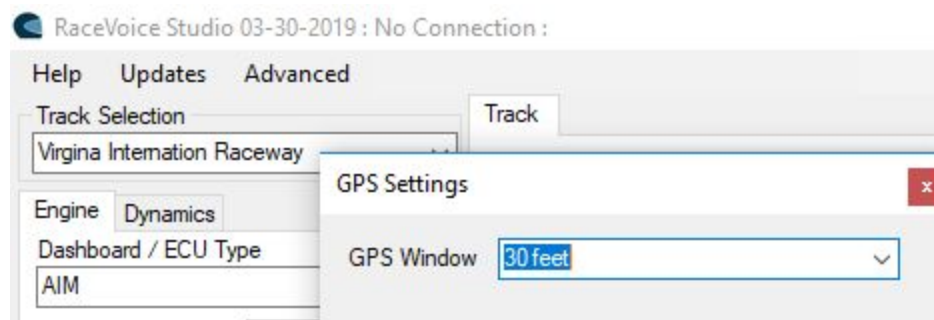
RaceVoice studio allows the user to change the GPS “Window Size” that RaceVoice will use for tracking the car around the racetrack and triggering splits/segments/etc based on GPS locations.

The default accuracy of RaceVoice creates a bubble of 30-feet around the vehicle.

Under certain conditions, this may need to be increased. Conditions such as too many buildings near segments (i.e. Turn 17 and Turn 1 at Sebring), cloud cover, and positioning of the gps sensor for the dashboard itself.

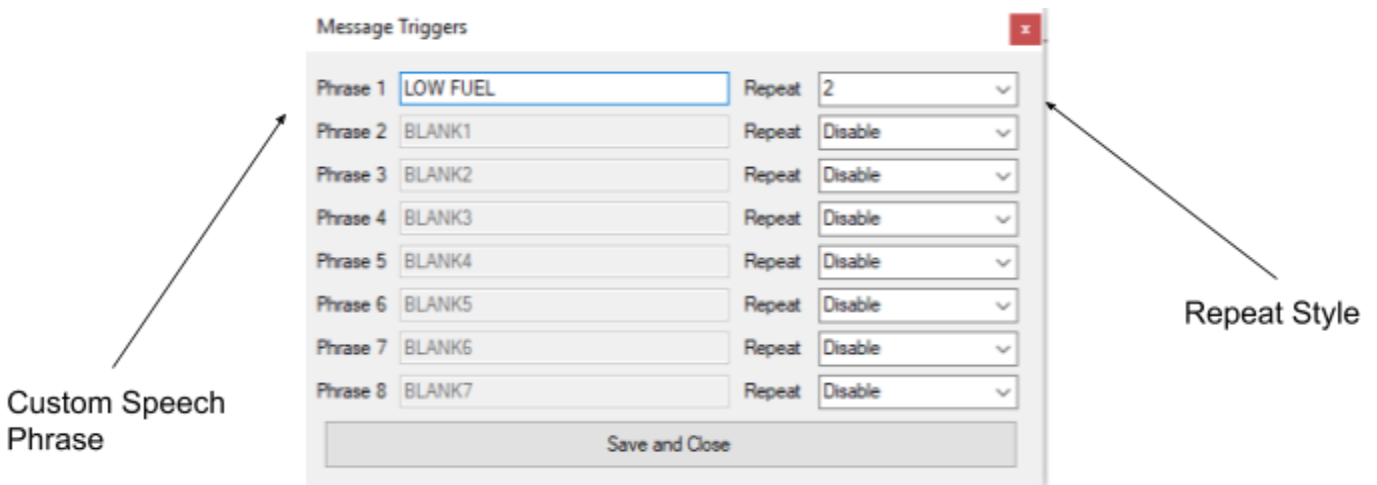
Prior to making any changes, it is recommended that the dashboard GPS sensor is positioned to have an unobstructed view of the sky. The GPS sensor should be located away from metal and should not be under a hood/fiberglass/etc.

If driver finds that RaceVoice is not reporting some segments, then the window size should be adjusted. Increments include 60 , 90, 120 feet windows. Typically a 60 feet window will solve trouble with missing segments under cloud cover or building obstructions.



Configure Message Triggers

RaceVoice provides the ability for the user to create eight(8) new speech messages using the Advanced-->Message Triggers menu.



This menu allows the user to assign new speech phrases for announcement by RaceVoice. Each phrase can be configured to be announced once, or repeated several times, or continuously announced.

The phrases can be triggered using CANBus message ID 0x57 (refer to the CANBus template section of this document). Each phrase is mapped to a single byte in the CANBus message ID, such that when the byte has a value (1) the message will be announced for the number of times defined by the repeat setting.

An example use case of this is a “Low Fuel” indicator. The driver could define a “Trigger Condition” in their dashboard such that when the fuel sensor was below 2 gallons, the trigger condition would be set to a value of (1). This trigger condition value could then be transmitted on the CANBus in byte location (0) using message ID 0x57. When RaceVoice receives the value (1) it will then announce the phrase “LOW FUEL” to the driver.

In order to use this feature, the driver should have complete knowledge of CANBus IDs, message setup, and defining internal variables within the dashboard configuration.

This feature allows a powerful extension to RaceVoice so that it can provide driver/car/setup specific announcements for individual applications.



Troubleshooting

No Audio/Voice at Power On	Check that the unit is getting power Check volume control Use a pair of known good 3.5mm earbuds to check audio output
Audio is weak or hard to hear on track	Check volume control knob Adjust Voice Settings in RaceVoice Studio Reduce wind/road noise by using foam insert style earbuds
Blue LED is not flashing	Recheck dashboard configuration and ensure CANBus message are loaded and that the CANBus data rates match
Green LED is not flashing	Check that the unit is getting power
No USB Connection is found	Check that the drivers are installed on your PC
I hear the phrase "No Connection" announced every few sections	RaceVoice no longer has an active CANBus connection to the dashboard. Check the wiring, and CANBus setup in your dashboard. Check that a configuration without RaceVoice was not accidentally loaded to the dashboard.
Engine values seem wrong? Such as 145 Volts Or 1850 Degrees /etc	This would mean that your CANBus profile has incorrect scaling values. Some systems report values in tenths of degree/volt others in whole numbers/etc. Submit your dashboard configuration to support@racevoice.com for assistance with the profile setup.
I hear a constant "beep" tone when the unit is running	Contact support@racevoice.com as this may require a repair/replacement
I hear the phrase "GPS Error"	This means that the GPS data being received from the dashboard is not correct, this can occur if the vehicle is indoors with poor GPS signal. Use the Advanced-->Data Trace menu to view the GPS values received by RaceVoice, recheck the CANBus profile, move the vehicle outside to get a better GPS signal
My dashboard seems to be resetting	This could be a ground loop or poor wiring between the dashboard and the vehicle. RaceVoice usually derives power from the dashboard itself. Suggestions are to provide a larger power/ground wires to the dashboard and ensure that these wires are not excessively long. Check the alternator to ensure that the alternator is properly charging the battery at idle. Modify the wiring of RaceVoice to provide +12V/Ground directly from the wiring harness of the vehicle instead of from the dashboard. Refer to the power+data cable pinout in this document to locate the +12V/Ground pins on RaceVoice
RaceVoice is not announcing all of the segments/splits	Check the GPS sensor location, make sure it has an unobstructed view of the sky. Adjust the GPS window accuracy of RaceVoice.



Specifications and Pinouts

Dashboard Compatibility

RaceVoice is compatible with any data-logging dashboard that provides an unused and accessible CANBus port. The dashboard software must also allow the ability to configure custom messages/canbus protocol to output values such as throttle position, rpm, latitude, longitude.

RaceVoice has been tested with Aim MXL2, MXG, MXP, MXS, SoloDL/DL2, EVO5, and MoTeC C12X series dataloggers.

PC Compatibility

RaceVoice requires a Windows PC running at least Windows 7, Windows 8 or 10 is recommended. A USB connection is required for communication with the RaceVoice unit. An internet connection is required during software installation.

The internet connection is used to register RaceVoice Studio and obtain track map updates. Once registered, RaceVoice studio may be used without an internet connection (i.e. at a racetrack where there is no available internet). Software updates/track map updates/etc will not be available without an internet connection.

Mechanical, Electrical, Environmental

+12VDC power @ 0.5 Amps max

CANBus data rate 125Kb, 250Kb, 500Kb, 1Mb/s

USB 2.0 compatible Type-B device port

Integrated 1.5Watt max Audio Amplifier, capacitively isolated audio output

Class-III circuit board w/ Urethane Resin conformal coat for humidity/chemical resistance

Operating conditions 70C maximum ambient temperature at 90% Relative Humidity

Extruded aluminum enclosure with ABS faceplates

2.75 inches x 3.00 inches x 1.15 inches (L x W x H)

Weight 8 ounces

Power+Data Cable Pinout

