TRUE COURSE
SIMULATIONS

User Manual

C172 MR ITD

Operation & Support Guide

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C172 MR ITD – Quick Start Guide Checklist

1. Power & Login

- Confirm power cords are plugged in
- Set power switch to ON
- Press power button on pedestal to power on
- Login password: 8347 (unless otherwise set)

2. Auto Software Launch

Wait for the following to start automatically:

- SteamVR with base station detected
- Somnium VR1 Tool application
- True Course Simulations Website

3. Choose Flight Mode

- P3D Free-Flight: Double-click desktop icon
- TCS Courseware: Log in at website
    - Use your email + password & start a lesson from the dashboard

4. Headset Setup (Somnium VR1 Ultimate Edition)

- Top Strap: Rests across top of head
- Rear dial: tighten or loosen on face
- Adjust for a clear view (like binoculars)

5. In-Flight Controls (Yoke)

- **Black Button**: Recenter view (origin reset)
- **Red Button**: Pause / Un-pause simulation

6. Track Progress

- Go to Dashboard > Progress on the website to view completed lessons, quizzes & scores

📞 **Need Help?**

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Overview

Below is the operation guide for the C172 MR Immersive Training Device (ITD). ITD is the abbreviated term that we use to refer to the simulator. This guide gives a general overview of using the ITD from logging in, navigating the courseware, troubleshooting and more. We respond as quickly as possible to any support inquiries, but we ask that you please refer to this document first before reaching out for support to reduce the workload of the support team. Thank You.

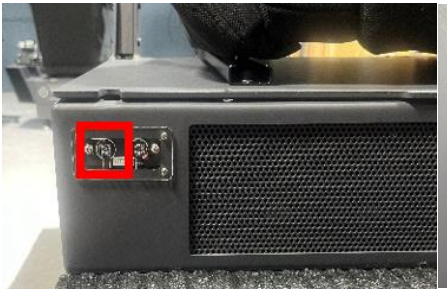
Startup

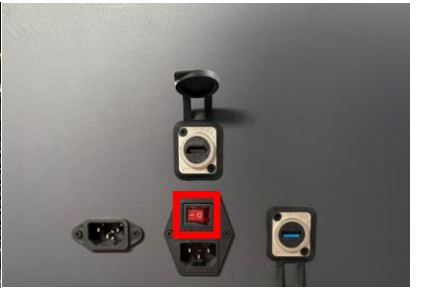
Wake screen/login

The ITD should be left on unless there is a specified reason for it to be shut down. To wake up the computer, move the mouse or click any key on the keyboard for the screen to pop-up if it hasn't already. If the ITD is shut down and needs to be turned on, follow the steps below.

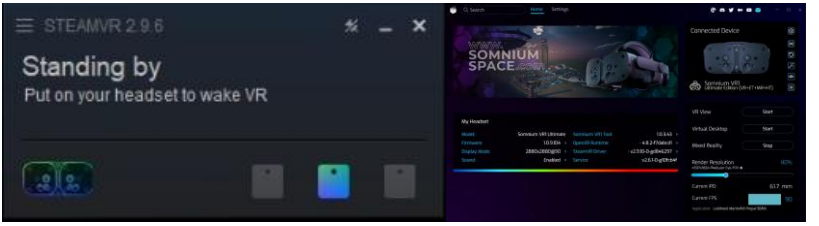
Turn on/login

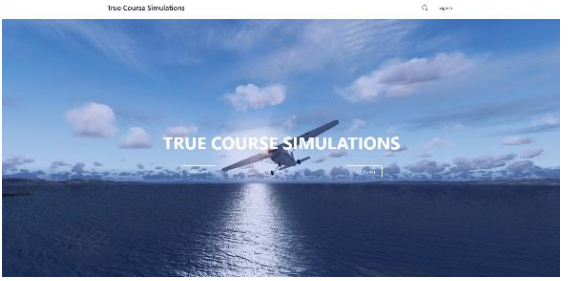
Make sure the power cords are plugged into the front of the ITD and the power switch is in the "on" position. Turn the ITD on using the power button that is located on the front side of the seat pedestal (just below the seat).





When logging in, the password is **8347** as default. This may be different if your institution has opted to change it. Once the computer has logged in, please wait for the automatic programs to open. These programs should include Steam VR, VR1 tool application and True Course Simulations website.





Before loading any simulated lessons, follow the steps below giving an overview of the HTC Vive Pro 2 VR headset and basic adjustments and calibration methods to make sure it works best for you.

Somnium VR1 *Ultimate Edition*

Headset Adjustment

The top strap adjusts the depth that the back of the headset rests on your head. The dial on the back of the headset can be twisted to tighten or loosen the headset on your head.

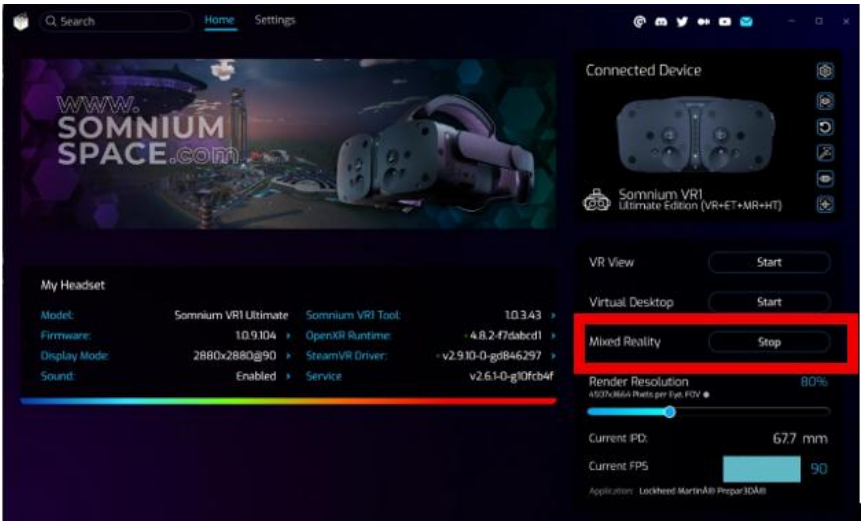
There are four buttons located on the top of the headset. From left to right these buttons as they're currently programmed as:

- Turns on/off the mixed reality portal
- Measures your IPD (interpupillary distance)
- Nothing programmed
- Displays all screens together inside of the headset.

Note, if the visual is at first blurry, try adjusting so the headset fits snug against your face with your eyes centered with the lenses. You can also make minor adjustments up and down to find this center point. Think of this like looking through binoculars. There is a "sweet spot" where the image is clear.

If still unclear, you can adjust the IPD using the slide on the right underside of the headset. This is different from the previously mentioned measuring of the IPD that can be done by pressing the second button on top of the headset.

This headset can be used for Virtual reality and Mixed Reality. The difference being, with mixed reality, there is a camera passthrough cutout that allows the real world to blend with the virtual world. The following goes over how to enable, adjust, and use Mixed Reality.

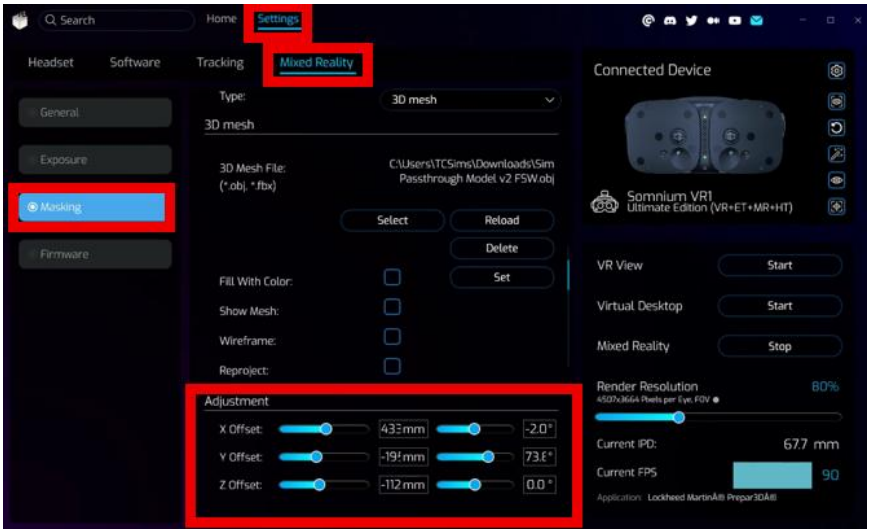


From the VR1 application home page, you can click on start, next to Mixed Reality, which will activate the cutout that is programmed to fit the layout of the G1000 dashboard. As described previously, you can also press the first button (from left to right) on top of the headset to enable this.

The position of the cutout is tied to the tracker on the front of the sim, therefore there should not be a need for large adjustments, if any at all. Things should be lined up accurately each time, but if that is not the case, follow the next section to make any adjustments needed.

Mixed-Reality Adjustments

Although the portal cutout should be fixed in place by the tracker located on the front of the ITD, there may be a need for minor adjustment of the cut out, so it lines up more precisely with the real G1000 panel and glareshield. Below is the page you will need to find so those adjustments can be made.



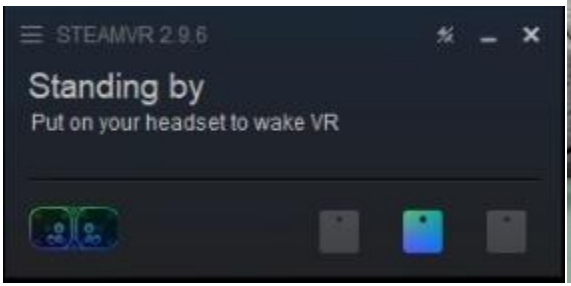
Locate the settings page, then the Mixed reality tab and finally the masking page. Here you can use the slider on each offset to adjust the cutout as well as the degree for each axis. A more precise way to adjust is to click on the dot for the slider then use the arrow keys on your keyboard to gradually shift the portal.

Base Station

The base station (also known as lighthouse) enables the headset to determine its position and orientation in real time. It can be set up anywhere in front of the ITD to allow for accurate tracking as you move with the headset on. For the Somnium headset, only one base station is needed for tracking. Therefore, it is preferable for the base station to be set up centered and above the ITD to give it even tracking on both sides.

You typically do not need to configure the base station manually, but it's important to verify that it is tracking correctly. Check for a green light on the lighthouse and that SteamVR

indicates that it is connected (refer to the images below). This ensures a reliable and immersive VR/MR experience.

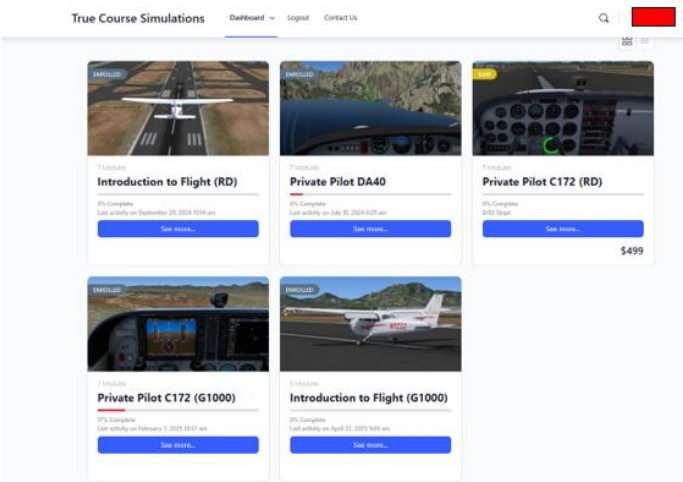


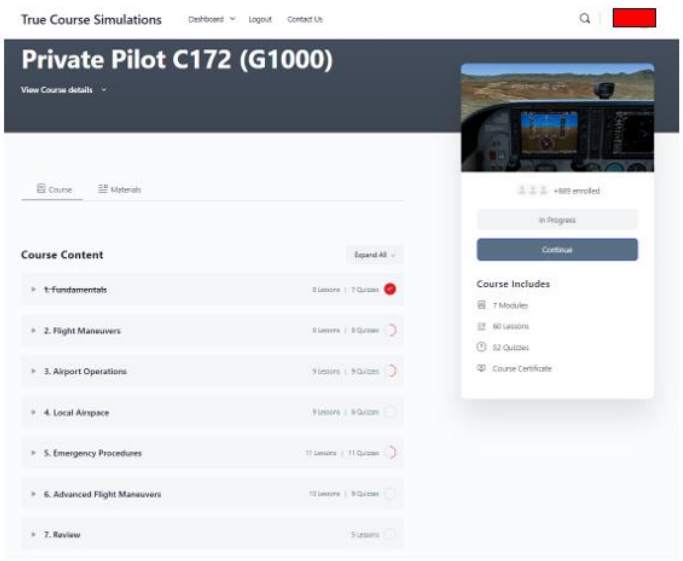
Operation of the ITD

There are two ways the ITD can be flown; in “free flight” or the courseware that is loaded using your unique login through the TCS website.

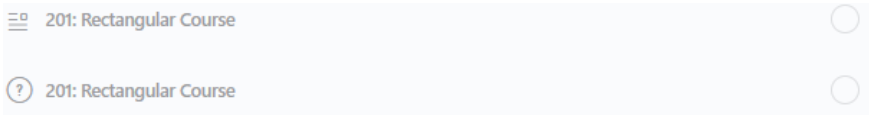
Courseware

Your login for the courseware, once your account has been created, will be your full email as the username and the password will be “changeme”. This is the default password and can be changed by going to your account once logged in. This is located at the top right of the page. Once you are logged in, you can select the course from the dashboard page which will take you to the module tabs. Each module can be expanded using the drop-down arrow and individual lessons can be completed.



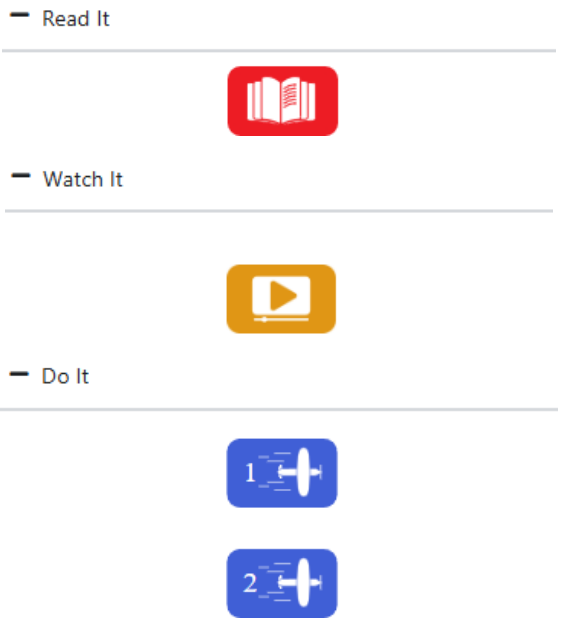


For each lesson there are two lines as shown below:



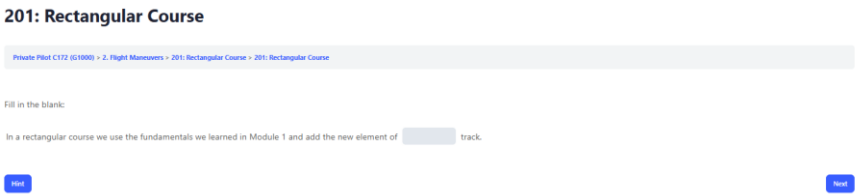
The lessons lines that have this symbol next to them:  include videos, briefings and simulated lessons. Below is what the page will look like when you click on the lesson number.

The briefings are located under “read it”. The video(s) are located under “watch it”. The simulated lessons are located under “do it”.



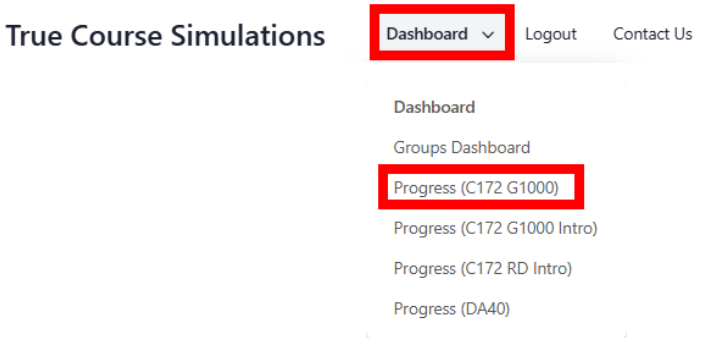
Note: there may be more than one briefing / video / simulated lesson.

The lesson lines that have this symbol next to them:  indicate the quiz associated with what was learned in that lesson.

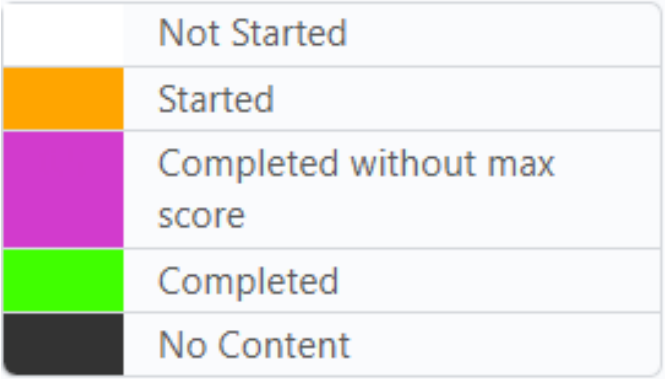


The quiz contains boxes to fill in with your answer and once completed, are graded with feedback on what you got correct/incorrect.

All this information, once completed, is recorded and can be found on the dashboard dropdown on the homepage of the website, under progress.



Under your progress page you can keep track of what you have successfully completed, started but haven't finished, or still need to start. The color-coded legend below explains what each color means:



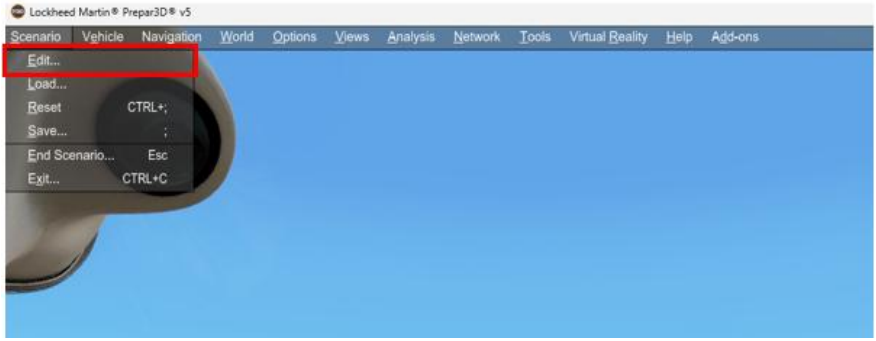
Note: each element in each lesson can be done as many times as the student wants until the desired score is achieved.

P3D Free Flight Overview

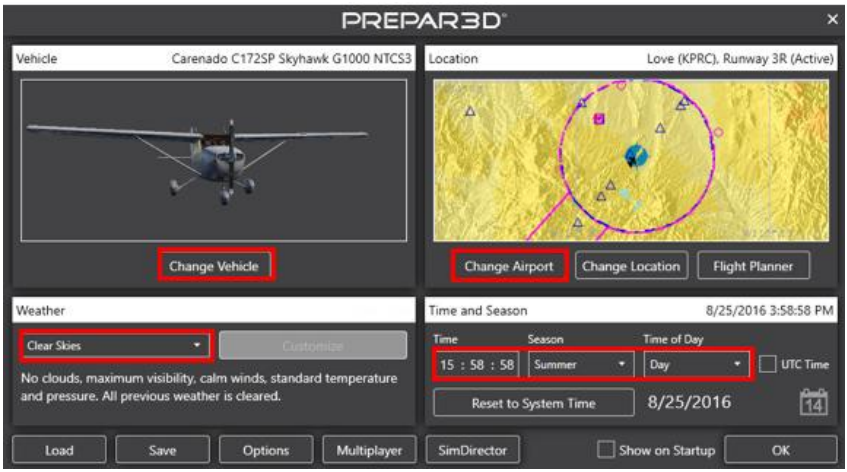
Free Flight is another option for students to practice their flying skills. Prepar3D application can be launched by double clicking the icon on the home screen. The “default scenario is what is loaded initially each time P3D is opened. In free flight, there is no virtual instructor like in a simulated lesson from the course. Rather, you are free to fly however you like, and practice whatever it is you choose. You can also create your own initial conditions which allows you to save scenarios that will start in the various conditions you save them under.

For instance, if you wanted to practice the final approach leg of the traffic pattern you can set up the plane on the final approach and save the scenario in that position. Once it is saved, you can load that scenario repeatedly and it will start you in that position each time. Below is an overview of the capabilities and tools that can be used in P3D for free flight.

Edit Scenario



At the top left of your screen with P3D open, click on the "scenario tab" then "edit". It will open a page that looks like this:

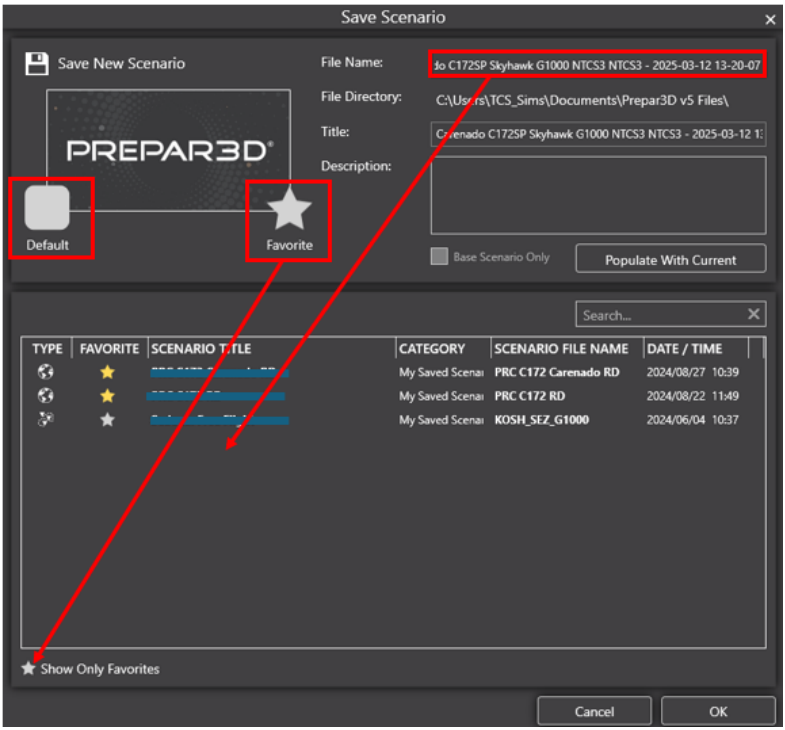


Here, you can change a variety of settings including aircraft, airport, season, time of day, and current weather. Once you have selected your desired conditions, you can click "OK" in the bottom right. This will load in the settings you have changed.

Save Scenario

Once things have loaded back into P3D, you have the option to save that scenario with the conditions you have loaded in. If you would like to save the scenario, go back to the “scenario” tab, but click on “save” this time:

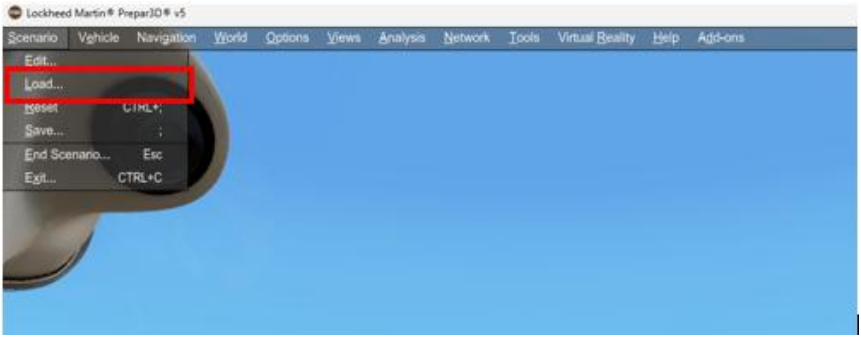
This will open the following page:



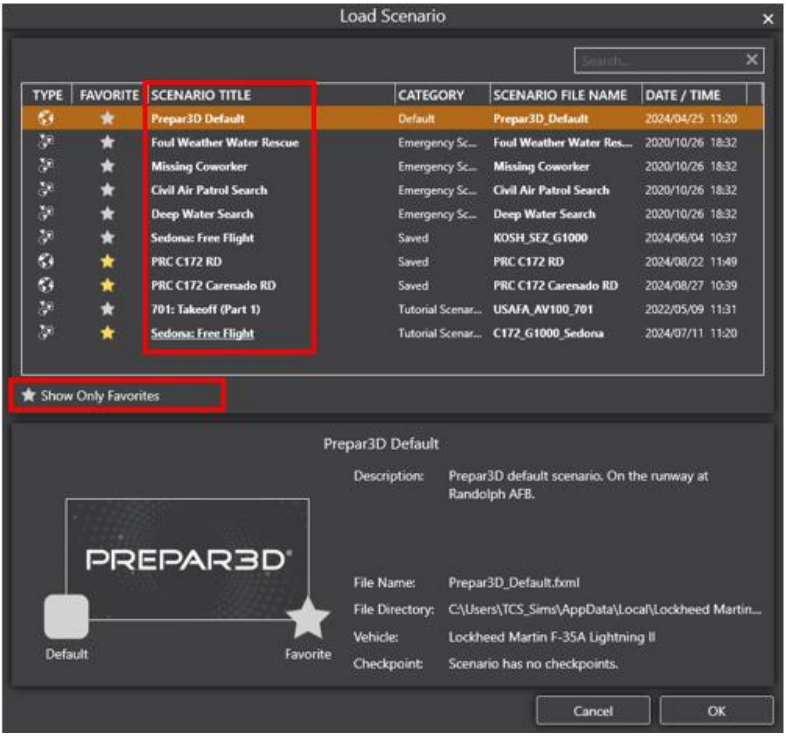
Here, you can title the scenario something fitting as described previously in the “file name” area. Once you have done this, you can click “favorite” which will star the scenario and, if desired, you can click on the bottom star “show only favorites” to only list the scenarios you have favorited. If you want to save this one as your default scenario, meaning that each time P3D is opened in free flight, this scenario will load automatically, click on the ‘default” button. Once you are happy with the selections, press “OK” at the bottom right.

Load Scenario

Once you have saved the scenario, it will close that screen and bring you back to the simulated world. If you want to load a new scenario, go back to the “scenario” tab, this time click on “load”.



The following page will open:



Here you can locate and click on the desired scenario you want to load. You can also narrow the search to only favorites just as previously described in the save scenario section. Once you have the desired scenario selected, click on “OK” at the bottom right and let the scenario load.

Physical & Virtual Adjustments

Whether you’re flying free flight or a lesson from the course, you will want to make sure you’re in a comfortable position physically and in the simulation. Below are a couple of adjustments to ensure your success.

To start with, make sure you are in a comfortable seated position in the ITD. This can be down by lifting the lever under

the front of the seat and sliding to a desired position (refer to right-hand image below). You can also adjust the recline position using the side lever on the seat (refer to left-hand image below).

To re-position yourself in the virtual aircraft (recalibrate origin) look straight forward with the headset on and click the black button on the left side of the Yoke. This will re-position based on the direction the headset is facing. To pause/un-pause the lesson you can either press “P” on the keyboard or use the red button on the right side of the Yoke.

If you are still not in an ideal position in virtual aircraft, you can adjust the eyepoint using the arrow keys on the keyboard. The up and down arrows will move you up and down respectively. The right arrow will move you forward in the aircraft, and the left arrow will move you back in the aircraft.
This is important to adjust when the camera cutout is aligned accurately but the position does not line up in the virtual aircraft.

Troubleshooting

Below are some troubleshooting guides that can help with diagnosing common problems and potentially solving them without having to contact our support team. Our support team is always available to help and will assist as soon as possible if you reach out.

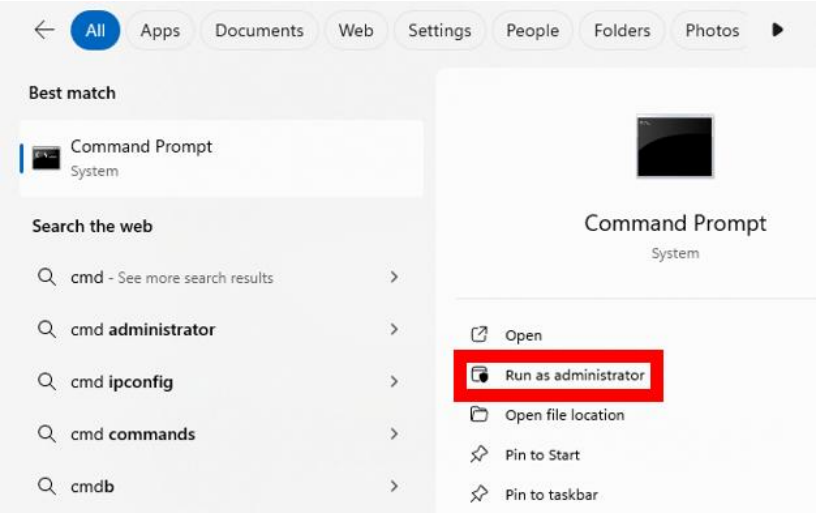
Note: for any maintenance, changes, etc., make sure the computer is thawed so progress is saved.

The best first step to any software related issue occurring is to restart the computer. The software program we use called Deepfreeze is used to maintain an image of the computer. This means that when the computer is in a frozen state (as it should remain unless someone from TCS is working on the computer), after each restart, the computer will return to the previous state it was in before changes were made. This allows for intentional or accidental changes made to not affect the operation of the ITD.

If a restart of the computer does not solve the issue occurring, continue through the following steps and try the various tools that may help with diagnosing the problem you are experiencing.

CMD Prompt Scripts

Search for CMD Prompt. It is important that you click "run as administrator" (refer to image below).



Run the system file checker by typing the following script and clicking enter:

SFC /Scannow

Let the script run, it may take a minute or two. Once complete if it did not find any corrupt files you can close CMD prompt.

If the scan did find and replace corrupt files, type the following script and click enter:

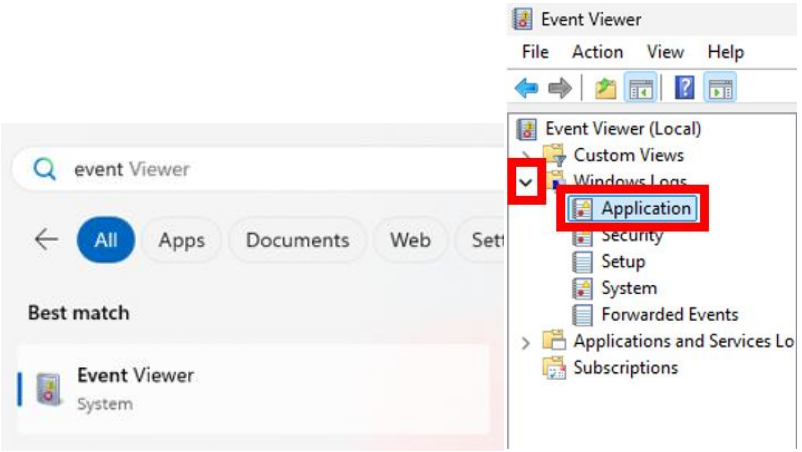
DISM /Cleanup-image /online /restorehealth

Let the script run, this will also take a minute or two. Close CMD prompt once it has completed.

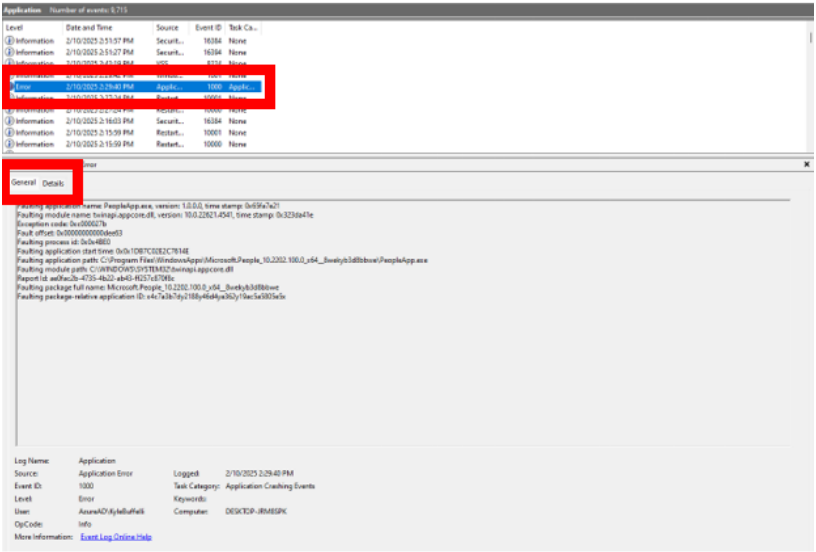
Event Viewer

This tool can help identify possible errors occurring in the software that may be leading to or causing the issue you are experiencing. Start by opening the event viewer by searching for it in the windows search at the bottom of the screen.

Once opened, click on the windows logs dropdown (to the left) and click on application (refer to images below for help).



Here you can scroll through the various events and look for the ones labeled as Error with a red icon next to it. When you click on the event, it will populate with a description of the event and usually include an error code or identifying number.

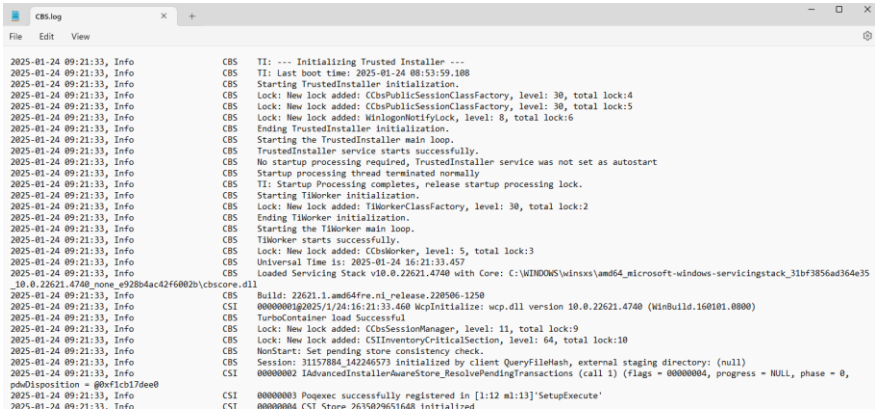


Unless you are familiar with these codes, it will not make any sense to you, but you can reach out to one of us at True Course and we will assist in troubleshooting from here.

If you are up for troubleshooting further, ChatGPT is a great resource for helping to diagnose issues. An easy way is by copying and pasting the description of the error and it will explain what could be causing errors and potential ways to fix it.

Windows Logs

You can also check the Logs file for windows to see if there is any indicating messages in there. For this open file explorer on the bottom task bar and go to this location: C:\Windows\Logs\CBS and open the CBS text document. Here you can scroll to the bottom for the most recent logs. The document will look like this:



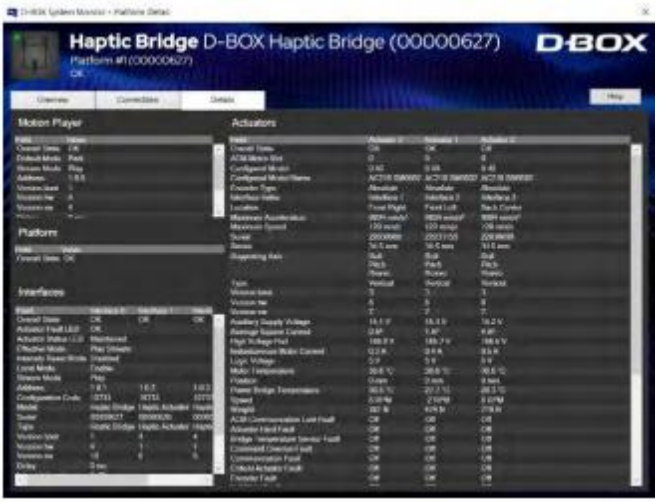
This will take a more detailed look because you will need to read the most recent lines to see if it is stating any kind of error or warning. From there, you can diagnose further on your own using ChatGPT or another source or contact True Course support and we will help with further diagnostics.

D-BOX

D-BOX uses specific software to configure the actuators in a specific way and sync with P3D to work with the flight simulation. Sometimes there are updates or errors that can cause D-BOX to not work properly. Since D-BOX is a physical component and uses software to work, there are two places where issues can occur and diagnosing/fixing them will differ depending on what category the issue falls under.

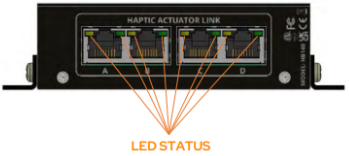
To start, one of the first areas to check, and as preventive maintenance, check regularly even when things are working properly, is the actuators remain clear of any items such as cords and cables that can get caught in between the actuators. Cables are the leading cause of malfunctioning actuators that we have seen, and in most cases require a complete replacement if a cord is caught.

For software related issues, the best first place to check is System Monitor, which you can search for in the windows search bar (refer to image below).

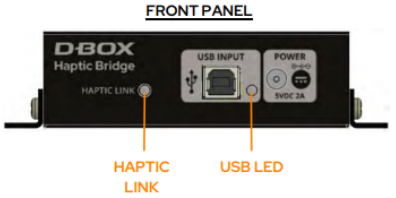


Here, you can click on the motion platform and see if there are any red indications and if so, on which actuators. If you click on the tab labeled “details” you can usually find the cause of this failure. It should be red text, and most of the time it is some kind of travel fault. Resetting the platform can be useful attempt to fix the error but not a guarantee.

If there are less than 4 actuators indicating on the system monitor, that means there is disconnect between the haptic bridge and the missing actuator or between the power and the missing actuator. You can check by opening the seat and finding the haptic bridge behind the computer tray. The lights should indicate green. Below is a chart from D-Box that describes what the color of the lights indicates on the haptic bridge and the solution if they are not green.



LED STATUS	STATUS	SOLUTION
Blinking amber 	No Motion Player detected / no communication.	Make sure the USB cable is properly connected (both ends). **Do not use a USB HUB.**
		Make sure you have the latest version of D-BOX HaptiSync Center installed (**see section 8.2**).
	System fault or haptic actuator has not been set to the right voltage.	Verify that all Haptic Actuators are set to your region’s power voltage (**see section 3**).
	Actuator fault	Use the D-BOX System Monitor software to see the system fault (**see section 10.5**).
Blinking amber & green 	Haptic Actuators communication issue.	Make sure the Haptic Actuator power and RJ45 cables are properly connected.
		Make sure the RJ45 cables are connected into the right ports of the Haptic Bridge (**see section 6**).
	The system is operational	-



HAPTIC LINK LED	USB LED	STATUS	SOLUTION
○	○	Haptic Bridge is not powered	Make sure the power supply is properly connected.
🔴	🔴	No USB connection is detected	Check that the USB cable is properly connected (both ends). **Do not use a USB HUB.** Make sure you are using the original USB cable provided with your controller. Make sure you have the latest version of D-BOX HaptiSync Center installed (**see section 8.2**).

HAPTIC LINK LED	USB LED	STATUS	SOLUTION
🟡	🟡	Unit is ready to operate but the platform is in *Park*	Make sure your platform is enabled.
🟢	🟡	The platform is enabled but no haptic is sent	USB LED should turn green as soon as you stream haptic data to your haptic system.
🟢	🟢	The device is operational and receiving motion data (or silence data)	-

Source: https://www.d-box.com/hubfs/Help-Center/G5HapticSystemUserGuide

Flight Controls

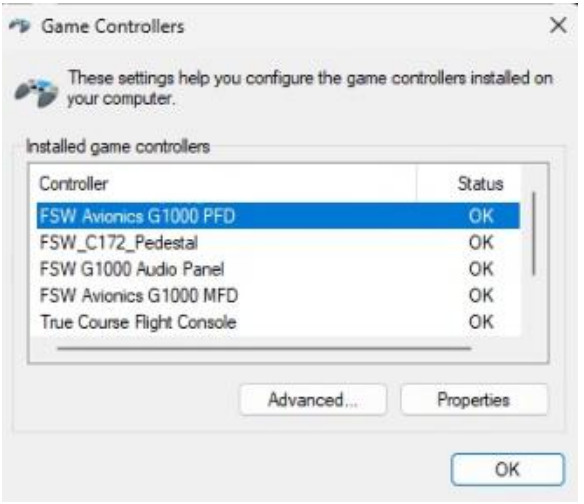
Our custom-made C172 G1000 panel was made to match the real cockpit of a C172 with a G1000. All aspects of the G1000 are functional from Autopilot to flight planning.

When you fly in free flight, the default scenario should load all the panels in the correct orientation as seen below. These displays will remain black with the True Course Background when P3D is not open.

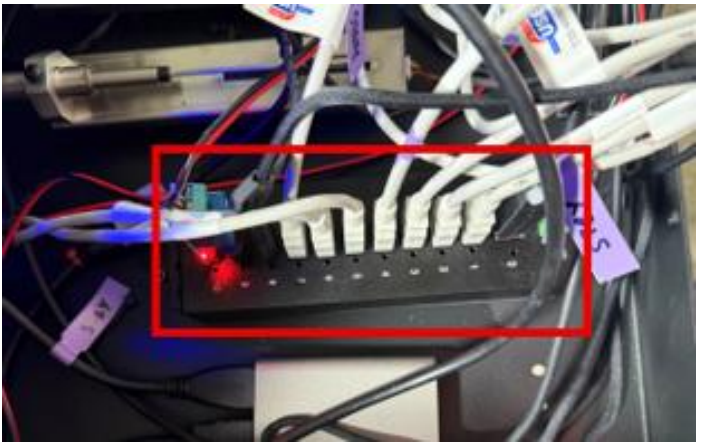
All you need to do is un-pause the scenario and you're ready to fly. If you have enabled Mixed Reality (this process is described above under Somnium VR1 Ultimate Edition), you are fully immersed in Virtual reality with a seamless blend of the G1000 panel.

If any adjusting for the camera passthrough cutouts is needed, this process is described above under the section covering the Somnium headset. If the cut out is aligned but the position is not accurate in the virtual aircraft, use the arrow keys on your keyboard to shift the virtual position and line up the real-world cutouts. This is described in the Physical and Virtual Adjustments section above.

For basic troubleshooting with a flight control that is not working properly or at all, start by checking to see if the control is connected. The easiest way to do this is by searching and opening the "set up USB game controllers" application and checking to see that all the controls are showing up. This page should look like this:



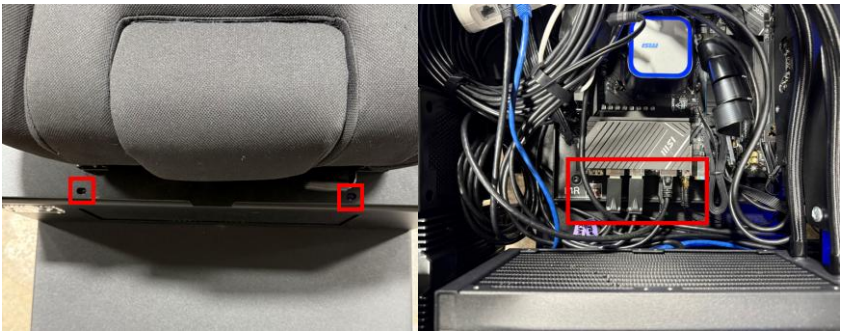
The flight controls on this C172 MR ITD are wrapped up into one unit. All these controls are contained within the dashboard. They are plugged into a USB hub (as shown below) in the back of the dashboard console and then run to the motherboard of the computer (located under the seat).



The image above is of the hub inside of the dashboard. Each cable is labeled with what controller it goes to for easy wire tracing. This can be accessed by removing the screws for the access panel in the back of the dashboard console.

If you are removing this cover, be careful of the power cord into the tracker mounted on this access panel. Remove the cord first before removing the access panel.

If the controller is not showing up, another place to check is the motherboard and may just need to be reseated to reconnect. These cords are color coded or labeled so you can identify which cord goes to which control. To open the seat, remove the two thumb screws shown in the image below.

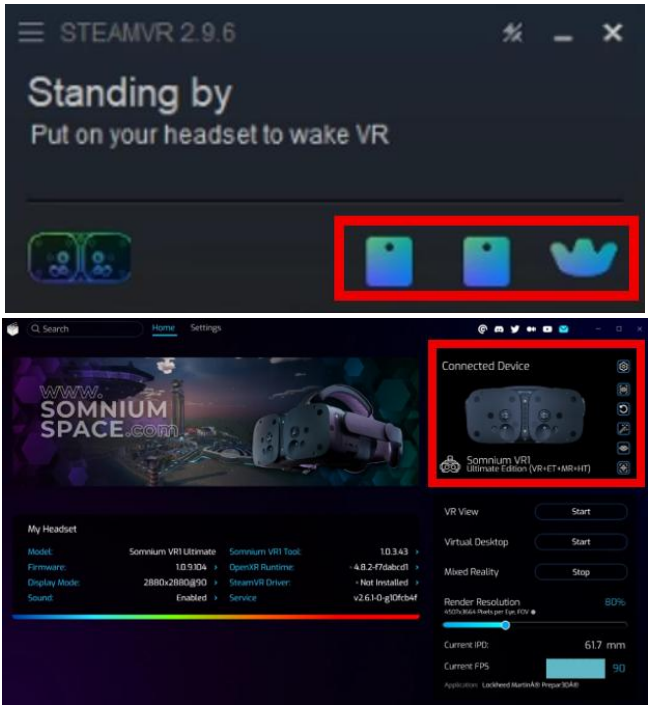


From here you can locate the USB cable you are looking for by using the color-coded chart below:

C172 - MR CABLING / WIRING SCHEMA				
COLOR	DEVICE	TYPE	MINIMUM LENGTH	SOURCE
YELLOW	RUDDER	USB A-B	6'	USB-HUB
WHITE	DASH HUB	USB 3.X A-B	6'	PC
GREEN	D-BOX	USB A-B	2'	PC
BLACK	FRONT PLUG - USB/HDMI	USB A-A	6'	PC
RED	VIDEO HUB	USB EXT	6'	PC
N/A	MONITOR	HDMI	4'	V-HUB
YELLOW	HOBBS-RELAY-PWR	DC-18AWG	3' (custom)	DC 12V
RED	PC - DASH POWER	DC-18AWG	7'	DC 5V
YELLOW	PC - DASH POWER	DC-18AWG	7'	DC 12V
ORANGE	ALL VR HEADSET	USB - DP	N/A	GPU / PC
N/A	E-NET PLUG - FRONT	RJ45	5'	
N/A	E-NET PLUG - REAR	RJ45	2'	
N/A	E-NET SW to FLAPS	RJ45	3'	

Somnium VR1 Headset

The first step to troubleshoot the Somnium headset is to check that the VR1 application home screen indicates that the headset is connected and steam VR indicates that the base station and tracker are on and connected, as shown below.



If these images do not match what yours looks like, begin by closing both programs and reopening them to see if they connect. If there are still issues with connecting, restart the computer to give everything a reset. If there is still no sign of connection and the headset screen is blank, contact TCS support.

TCS Support

Main Support Contact

Support@tcsims.com

+1 (928) 830-5957 (this number will ring all three support team contacts)

Support Team Contacts

AJ Smith (Director of Customer Success) | Aj@tcsims.com
+1-928-547-0762

Cannon Smith (Director of Technology) | Cannon@tcsims.com
+1 928-547-0764

Kyle Buffelli (General Manager) | Kyle@tcsims.com
+1-928-547-0766

Support & Maintenance

For support and maintenance on each ITD deployed we used two main pieces of software that help us manage the computers we have deployed across various parts of the world. Below is an overview of how they work and how we utilize their capabilities to support our customers.

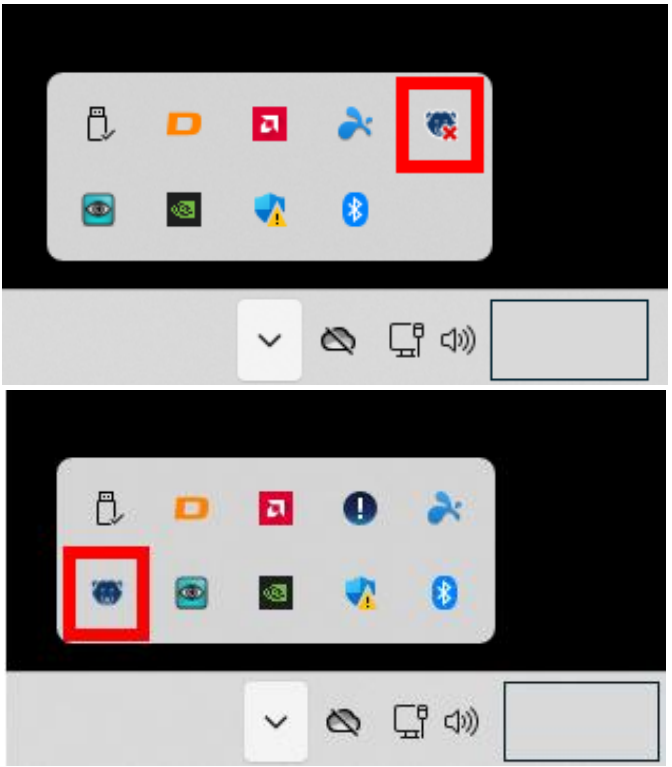
DeepFreeze

Deep Freeze is a system restore software developed by Faronics. It's designed to protect and preserve computer configurations by "freezing" the desired system setup. When Deep Freeze is activated on a computer, any changes made during a user session, whether files are downloaded, settings altered, or malware is introduced, are completely wiped out

upon reboot. The system is restored to its original, frozen state, like nothing happened.

Remember that any changes you make will not be saved unless the computer is thawed first. This software is password protected and allows our maintenance team at TCS to “thaw” the computer which then allows changes to save.

You can determine the state that the computer is in (thawed or frozen) by checking the application center from the arrow in the lower right-hand corner of the screen (refer to image below). The bear icon with the red x on it indicates the computer is thawed (changes made to the computer will save). The bear icon with no x indicates frozen (changes made to the computer will not save).



Maintenance Period

The Maintenance Period is a scheduled window of time when Deep Freeze temporarily "thaws" (disables its protection) so that updates, patches, installations, or system maintenance tasks can run and save after a reboot. When the maintenance period ends, the system can automatically re-freeze itself, preserving any legitimate changes made during that window.

These updates can include but are not limited to: Windows updates, application updates, cleanup scripts or scheduled tasks. These maintenance periods are set by us at the backend, usually during the middle of the night, so it does not affect the use of the ITD. It all aims to keep your ITD automatically up to date, so it does not interfere with your use.

Splashtop

Splashtop Remote Support is remote access and management software designed for IT professionals, managed service providers (MSPs), and businesses. It allows IT teams to remotely access, monitor, and manage computers and servers from anywhere, without needing to be physically present at the machine.

This is the main remote desktop tool that we utilize to quickly and efficiently help customers with software or hardware troubles on their ITD. Most software related issues can be solved by us remotely due to this program. This also allows us to quickly handle support calls since we can assist from essentially anywhere in the world if we have a Wi-Fi connection on both ends. This allows us to perform tasks such as file transfers, remote reboot, downloads, updates and more.