Preparing a Windows 10/11 Computer for Occultation Recording

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The recent updates are a few comments related to some differences between Win 10 and Win 11.

Please be aware that the product and techniques described in this document are changing frequently. For the very latest advice we suggest you post a query on IOTAoccultations<at>groups.io.

Note that some of the computers I describe below are no longer available. Also, I do not advise purchase of any of this hardware as used or even as refurbished.

This set of suggestions is based on how I prepare small Windows computers and tablets to use as occultation recorders for remote occultation capture using a NTSC or PAL camera. The hardware being attached directly to the computer is the StarTech video digitizer, the SVID2USB232. The software packages installed are IOTA Video Capture, the SVID2USB232 driver, and lagarith compression. The web addresses for these are given at the end. Everything else, as much as Windows allows, is removed. They operate unattended and automatically from remote and often unprotected sites. *Other software such as SharpCap can also be set to record automatically and unattended, providing options for use of digital video cameras. That use is not covered in these instructions.*

Most of our occultation recording machines are small, Windows computers used for nothing other than recording occultations. We use a mix of computers including iView sticks, small laptops, and NUCs. All the original computers have small SSD drives, 32 or 64 GB, but those have become difficult to find. The most recently purchased ones have larger drives.

The assumption is made in these instructions that the computer is only used for occultation recording, and that there is only one user, with administrator status, on the computer. This will not work if there are multiple users or multiple purposes for the computer.

This process may take several hours.

1. Set up your account to be the administrator.
2. Windows automated setup for laptops first wants to connect to a Microsoft account, verify the legitimacy of the Windows OS, and apply whatever updates are in the queue. We have a separate Microsoft account only used with these computers. Let the setup proceed but try to avoid as much as possible all the extras. Every computer setup so far has been different. The goal is to get to the point where Updates displays a green checkmark and the message "your system is up to date". Some computers have a modified setup which allows a local account and do not require a Microsoft account. If you want a computer which you will never connect to the internet, that is fine. If not log in with a Microsoft account. Windows 11 may want to do the updating in the background. The updates do need to be completed first. If updates are done later, they may change the settings and add unnecessary software that can interrupt the occultation capture.
3. Download the software you want to install for occultation observing. The locations where the software described in the following as well as much more can be found in https: //occultations.org/observing/software/ and https:

//www.asteroidoccultation.com/observations/ The StarTech drivers are on the Star Tech web site, at https: //www.startech.com/en-us/support/drivers-and-downloads.

4. Check Settings>Windows>Update to be sure the updates have completed. Once they are done, disconnect the PC from the internet by setting the WiFi to airplane mode and never connect again.

5. Reduce how much assistance Cortana provides, only allow saving files on the machine, turn off all the ads, apps, diagnostics as requests are presented during the initialization process. Again, how much is presented is quite variable from computer to computer, based on what the seller has installed.

6. Turn off any of the manufacturers sharing, using, updating, notifications.
   a. Settings>Accounts>Sync your settings. Set them to off. This feature does not seem to be present in Win11.
   b. Settings>System>Shared Experiences (Win 10) or Settings>System>Nearby sharing (Win 11). Set those to off.
   c. Settings>System>Notifications. Set these to off
   d. Focus Assist: Select "Off" for notifications. It is not clear if the "Automatic Rules" described in Focus Assist apply without notifications, but they are unnecessary.
   e. Settings>Apps>Startup Turn off OneDrive and Teams. That is not an option in Windows 11. Instead, in Windows 11, uninstall OneDrive
   f. Settings> Personalization>Taskbar (Windows 11) Consider turning off Widgets and Chat, neither of which work without the internet and both can be annoying if you accidentally run your mouse cursor over them.

7. Be sure the power settings are appropriate. Also, it may well be worth your while to explore all the possible locations, such as advanced power options under power plans, not available on all machines, but a possible location for settings. Browse through all of available options in this area. The ones given are my suggestions, but each instantiation of Windows can have more – or less – of these, many of which can interrupt an observing session with a request or attempt to connect to an internet service.
   a. Settings>System>Power & sleep. Set to never sleep.
   b. Control Panel>Power options. Look through these and set everything to Never or Do Nothing. This avoids sudden power off, sleeping, or hibernating if an inadvertent bump of a power button happens when using the computer in the dark.
   c. Under Settings>Accounts>Sign in options: select Never for when to be required to sign in after being away from the computer
   d. (Win 11) Settings>Accounts>Sign-in options>Additional settings: Set the "only also Windows Hello sign-in" to off. This is important if you wish to set your machine to start up automatically upon turn-on.
   e. (Win 11) Settings>Accounts>Sign-in options>Additional settings: Set "If you've been away, when should Windows require you to sign in again?" to Never. Also, be sure the Dynamic lock is not enabled
   f. (Win 11) Settings > System. Search among these options for things that would require the computer to request access to something external. I've already listed several, another probably not desirable is Remote Desktop, which can be turned off.

8. To keep a laptop running with the lid closed, type lid into Cortana. That will take you to the control panel power options for deciding how to respond when lid is closed. If "do nothing" is selected, the screen goes dark when closed but the machine keeps running. The lid needs to be closed and the screen off for remote operation. The occultation recording can continue with the lid closed, the laptop is less detectible with no screen, and the battery life is longer.

9. Every piece of software that will not be used for occultation recording – MS Office stubb, games, Xbox, MS Cloud and its supports, is removed. Not everything can be removed, but it can be turned off. If you are very certain your computer will never connect to the internet, also consider removing or turning off whichever security system is on your machine. Windows Defender cannot be completely removed. Go to Settings>Apps and select the ones to uninstall from the list.

10. Set the time zone to UTC, and the automatic time update from external sources to never.
    a. Control panel > Date and time >change date and time, >Change time zone, and >internet time
    b. Or via Settings>Time and language to turn off set time automatically. Note that manually setting the time to the second may only be available via the Control Panel's Date and Time option command.

11. Install IOTA Video Capture, Lagarith compression, and the SVID2USB23 driver. The SVID2USB23 has been replaced with the SVID2USB232 but driver package is still labeled as SVID2USB23. Under the Windows folder, you will find the correct driver, setup.5.2021.030.2.exe. Run that and ignore all the others in the package, which will drivers for all versions of the SVID's.
    a. Install the SVID2USB23/232 driver by executing setup.5.2021.030.2.exe. Do this before attaching the SVID as the Windows system has a competing driver it will install if the SVID is detected before a driver is available. The default Windows driver does not work.
    b. Install Lagarith by running the automated install, LagarithSetup_1327.exe.
    c. After installing everything, start up IOTA Video Capture with the SVID2USB attached and check that it is seen by the program. Under Input Device, it should show as USB 2861 for the SVID2USB23 and USB 2868 for the SVID2USB232. Check to see that Video Capture has access to the lagarith Codec.
    d. Issues identified: *Most computers have no problem with the SVID2USB232 and the driver described. But we know that some Win10 computers have not been able to use the SVID2USB232, where there are multiple dropped frames as the data are not being transferred to the computer rapidly enough. This is not a problem with the older SVID2USB23; however that unit is no longer available.*
    e. **TO INSTALL THE OLD VERSION** which will not work with the SVID2USB232, but does with the SVID2USB23. Do not plug in the SVID2USB23; Windows will install it's own, non-functional, driver if you do. The drivers are in a ZIP file from StarTech. Extract them all to a directory of your selection. Go to the subdirectory Windows and run the Setup program.
    f. If Windows has installed its own driver, Steve Preston's instructions on occultations.org/observing/educational-materials/equipment/analog-video-recording-in-windows/install-startech-drivers/ has instructions on how to manage that.

12. For laptops, we prefer the computer set to desktop only, never going to tablet mode. For tablets, set the option under Display to show the desktop. It might be called laptop or computer mode vs tablet mode.
13. Set the computers to bring up Windows without requiring login when turned on.
    a. Cortana has now been divided into a voice recognition piece and a search piece using text, shown as a manifying glass above the circle for Cortana. Do this with the search tool, Cortana > command prompt or on the "Type here to search" blank enter Run. Or, in Win 11, the top line of Control Panel is a blank for search entry, enter Run.
    b. For the Command prompt: <dir> >netplwiz.   *<dir> is the logged in user's name* or, if using Run, enter netplwiz
    c. In the netplwiz menu, check that the user is highlighted, then turn uncheck the "Users must enter a user name and password" at the top of the menu and click apply
    d. A request to enter the user password twice will appear. Enter and click OK. For Windows 11, you need to allow the user passwordas an option, as mentioned in step 7.d. NOTE THAT YOU MUST UNDO THIS IF YOU CHANGE THE NAME OF THE PC.
    e. Type "exit" to leave the command prompt.
    f. Test to make sure this works by restarting the machine.
14. Set IOTA Video Capture to start up at computer boot.
    a. First, make sure the user can see hidden folders. To do this, go to control panel > file explorer options > view and click "show hidden files and folders" then apply. A fast way to get there is to enter "show hidden files and folders" in Cortana, or, under the View menu>Show/hide check the hidden items option. This may not be a hidden folder on a Windows 11 computer.
    b. Then move a copy of the IOTA Video Capture icon to the following directory:

Users\<name>\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup

<name> is the logged in user's name and user directory.

Moving can be accomplished by right clicking on the IOTA Video Capture icon, dragging it to the Startup folder, and selecting "copy" there. **Whenever a new version of IOTA Video Capture is installed, the old copy needs to be deleted from this folder and the new one copied here.**

15. Set the background in Settings>Personalization, or type Background into Cortana. We suggest using a very dark photo or image to make the computer easier to use when observing.
16. To check to that the PC can capture 30 FPS video, record 10 minutes of IOTA VTI output with IOTA Video Capture and look at the captured file with Video Playback to see if there were dropped frames.
17. Test the battery life of the setup. One way would be to schedule 10 seconds of video capture every hour over an 8-hour span and see how many captures are made before the battery dies. When deploying, though, remember that low temperatures can reduce the battery's useful span.
18. Test the clock by setting the time to within a few seconds of GPS time. This can be done manually via Control Panel > Date and Time. Then compare the laptop time with a good time source a day or two later. It should still be within a few seconds of GPS time. The computer clock does not need to be highly accurate but starting recording at a time scheduled in IOTA Video

Capture does depend on the computer clock. One symptom of a failing internal battery (CMOS coin battery) used to maintain the computer memory is the inability to keep good time. For virtually all modern laptops and tablets, replacement of batteries is not a user option. It is a good practice to check the time against GPS before every occultation recording session.

Access to Equipment and Software

Equipment

The assumption is that the user provides a Windows computer, which can be a laptop, a tablet, a NUC, a stick computer, or a desktop. The computer needs USB ports, with USB3 or USB-C preferred but not a requirement. If there is a choice between USB-3 or USB-C, remember that very few peripherals have been made available with USB-C format and will require adaptors.

The recording is made with a NTSC or PAL camera attached to a lens or telescope. One such camera is sold by IOTA, and is described on https: //occultations.org/observing/educational-materials/observing-manuals/.

The camera video output is overlaid with GPS time provided by the IOTA Video Time Inserter, also described on https: //occultations.org/observing/recommended-equipment/iota-vti/.

The video fed to the computer is digitized by a StarTech SVID2USB, current version StarTech SVID2USB232. This is available from Amazon and other dealers. StarTech does not sell it directly.

Software -

The software installed in these instructions is the following:

IOTA Video Capture – freely available from https ://occultations.org/observing/software/.

Lagarith lossless video codec - https: //lags.leetcode.net/codec.html; also free but a donation is requested.

SVID2USB232 driver – Available from StarTech at their product support page, https: //www.startech.com/en-us/support/.

There is considerable other software available for predicting events, coordinating observing efforts, and recording and analyzing occultation data. Most of it is user generated and available for free or a low cost. It can be found through the links on the occultations.org web site.

Final Note

If you experience difficulty in preparing your computer or in using it, you can seek help via the occultations users group forum, IOTAoccultations@groups.io. Information on the group, including how to join, is posted on https: //groups.io/g/IOTAoccultations