

Introduction

The "classic" way of doing astrophotography is to use a telescope with a camera and lots of accessories such as guiding scope or OAG / Filter wheel / Dew Heaters / guide Camera / etc in combination with a PC / Laptop. This setup requires to extend long cables for data and power distribution that goes out of the mount and to your laptop which is a couple of meters / feet away from your EQ mount/setup.

For better cable management and mobility, we recommend the use of the Ultimate Powerbox in combination with a "PC Stick" or a mini PC (e.g Intel NUC). The small factor PC can be placed as "piggyback" on the Ultimate Powerbox (or under the Ultimate Powerbox).



Our main concept is to operate your mini PC, remotely, using your tablet / laptop's Wifi. This adds great mobility in the field and it is a perfect solution for a "grab and go" setup.

Most people are going to say that the power of the mini PC is not enough for astrophotography sessions.

<u>Trust us, it is more than enough!</u> Nowadays these boxes have an i5 and i7 intel CPU inside with plenty of RAM.



Mini PC is configured as a WiFi Hotspot. Using a tablet / laptop or even your smart phone you can connect to this WiFi SSID and by Remote Desktop (RDP) or TeamViewer you can connect to the Mini PC and control your equipment.

Advantages:

- **Cable Management** (every cable is tightly placed close to the telescope axis).
- **Grab and Go**: You can have everything prepared on the telescope. Fix each cable and device near the telescope (CCD, Filter Wheel, OAG, Guide Camera). Put the optical tube inside a carry bag and when you are ready just place the telescope on top of your Equatorial mount.
- **Single 12V power supply**: You don't need to carry inverters to provide a constant 220 / 110V AC power supply to your laptop during the night. Most mini PC require DC 5-12V.
- **Battery consumption**: Imagine that without a laptop inverter working all night long, you need a smaller battery as your power consumption is lower.
- **Mobility**: Your whole setup is light weighted. Battery is smaller, think also that you don't need to carry a chair and a table to place your laptop close to your setup.
- **Operation range up to 100m**. <u>You can remotely connect to your equipment</u>. You don't have to be close to your gear. Control your setup from inside a tent or from your warm fireplace / house. Mini PC work independently and you can only connect, frequently, via Teamviewer or RDP to monitor your session.
- **Reduce Light Pollution** in surrounding area: Your laptop's monitor is big and bright. If you don't use a laptop close to your equipment you eliminate the emitted light towards your equipment. Visual observers who are close to you will respect that. ^(C)

Step 1: Setup a Mobile Hot Spot

Most Mini PC have pre-installed "Windows 10 Home Edition". There are some limitations (remote desktop/ WiFi hot spot) in the functionalities of Windows 10 Home but we'll bypass them by using 3rd party software.

We strongly suggest to download and install "Connectify" which turns your PC into a WIFI hotspot.

You can find it here: <u>https://www.connectify.me/</u>

Please notice: The free version is OK for what we want to use it for.



It takes a couple of minutes to install the software and it required a reboot to enable the WiFi hotspot functionality.

After reboot open "Connectify" and click **Settings -> Startup Options**.

Select "Always" when it asks you to resume-hotspot on boot-up. This is very important! You always need the WiFi hotspot ON.

(Connectify Hotspot 2019						
	Settings	Tools	Help	Upgrade Now			
	Startup Options						
	Display		•				
	NAT Options		+				
	Adva	inced	•				

Connectify Startup Options – – ×					
Control how Connectify Hotspot 2019 runs when you turn on your computer					
Connectify Hotspot 2019					
Start interface on login (includes tray iteo) Resume Hotspot on boot-up Disable All On Boot - Interfaces and services will be disabled when starting Windows					
Disable All Off boot - interfaces and services will be disabled when starting windows					

Select -> Create a... **WI-FI HotSpot** Internet to Share: You can also select None Network Access: Routed Hotspot Name: Connectify-**Your-Name** Password: Set a password for your Hotspot

😕 Connectify Hotspot 2	-		×			
Settings Tools He	elp Upgrade Nov	v				
🛔 Hotspot Stopped				Q		
Settings Clients						
Create a						
Wi-Fi Hotspot	Wired Router	Wi-F	i Repea	iter		
Internet to Share			Help m	ne pick		
🗢 Pegasus_Plus (Wi-F	0			•		
Network Access						
Routed			•	MAX		
Hotspot Name	5					
Connectify-Astro			8	PRO		
Received						
xadylab9				Hide		
Circural I			_			
Allow Internet Access				PRO		
Allow Local Network Access PRO						
Ad Blocker						
	Start Hotspot					

Click "Start Hotspot"

Hooray! Your Mini PC is now a WIFI HotSpot.

Step 2: Configure TeamViewer in your Mini PC

Download and install the latest Teamviewer: <u>https://www.teamviewer.com</u>

Click Extra -> Options

Tick the **"Start TeamViewer with Windows"** and setup a password.

⊕	TeamViewer				
Connection Extras	Help Feedback	Insert partn			
Ð	TeamViewer options	TeamViewer options			
General Security Remote control Meeting Computers & Contacts Audio conferencing Video	Most popular options Hover your mouse over options to get additional info Important options for working with TeamViewer Your display name PEGASUS				
Custom invitation Advanced	login to and logout from your computer and even reboot remotely I you have to do is to predefine and remember a password along with your ID. The personal password is required because the default password is randomly generated and for ecurity reasons changed with every start of TeamViewer) Password Confirm password Image: Start TeamViewer with Windows OK Cancel				

Θ	TeamViewer				
Connection Extras Help	Insert partner ID				
•	TeamViewer options	×			
General Security Remote control Meeting Computers & Contacts Audio conferencing Video Custom invitation Advanced	TeamViewer options Most popular options Important options for working with TeamViewer Your display name PEGASUS Start TeamViewer with Windows Choose a theme Light Receive insider builds Network settings Configure Wake-on-LAN Configure Incoming LAN connections accept				
	Account assignment By assigning this device to a TeamViewer account it can be remotely managed and monitored without your intervention. No assignment yet. Assign to account OK				

Moreover, select to "Accept" Incoming LAN connections

Click **OK** to save all of these settings.

Hint: You can also choose Remote Desktop. (RDP) as a way to remotely connect to your small factor PC. Windows **Professional** includes a Remote Desktop Server available. Unfortunately, Windows Home does not support that.

If you want to use a 3rd party RDP server and you know what you are doing you can download and install the latest version of RDP Wrapper library from: <u>https://github.com/stascorp/rdpwrap/releases</u>

Step 3: Configure TeamViewer in your Remote Laptop / Tablet

- Use your laptop / tablet / smartphone to connect to the WIFI Hotspot name you previously configured: Connectify-Your-Name
- Download Teamviewer in your laptop / tablet / mobile phone and use the Connectify IP of your new WIFI Hot Spot. Usually Connectify uses the following static IP: "192.168.137.1"
- Place this IP in your Teamviewer client (in the partner ID box) and click Connect.

Control Remote Computer
Partner ID
192.168.1.37.1
Remote control
File transfer
Connect

You are now connected to your small factor PC. Use all programs in the same way

Photo below is a real example of operating our setup through an Apple Pad and using SGPro. Sequence Generator Pro



Enjoy and clear skies!