Insta360 Pro

Unofficial
User Manual

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Tips & Tricks

Basic tips

-Clap/slate at the beginning of every shot. You've gotta be able to sync all 6 cameras if something goes wrong.

-Real-Time Stitching (RTS) is all you will really need for most use cases.

      -Desktop stitching should be avoided at all costs unless you have a powerful gaming or editing rig with a modern video card

-RTS and Template-based stitching simply calibrate the stitch for a specific distance from camera. An object that gets too close will stitch wrong, as will far away objects. Optical Flow goes through and re-aligns the images frame-by-frame so they stich cleanly.

-Calibrate your camera for every shot, every time. ESPECIALLY if you use RTS.

-Send the camera back to the main menu in between shots to save the battery

      -Recording video, the battery lasts about 1 hour, 5 minutes

      -In "ready" mode, the battery lasts about 1 hour, 50 minutes minutes

      -On main menu, the battery lasts about 5 hours, 45 minutes

-Think of your 360 camera as another person in the room. Where would be an interesting place to stand? Where do you get the best view? Put the camera there.

-Always try to have _some_ movement in the shot.

-Regularly check for updates. They're putting one out every couple of days right now

Advanced Tips

-I haven't verified yet, but I believe you can attach a router to your Insta360 pro to dramatically boost its wifi broadcasting range.

-You can build all of your custom settings into QR codes for ridiculously easy saving and sharing. Text one to your friend, your DP, or your buddy borrowing it for the weekend.

-The folks at Insta360 have said that you could livestream directly from the camera by plugging a 4G dongle into the USB-C port. I'd love to test it

-Isolated Exposure mode lets each lens meter and expose for itself, which is very helpful for scenes with a single bright object or zone but can lead to a weird, mismatched sky. Use with caution

-Available in app only

-Flat mode is a not-quite-log profile which helps to maximize dynamic range. It is reasonably gradable for an 8-bit 4:2:0 image and holds highlights better than the stock picture profile

-Available in app only

-The wifi network generated by the camera is pretty weak. For best results you need to have a direct line of sight and be within 10-15 feet.
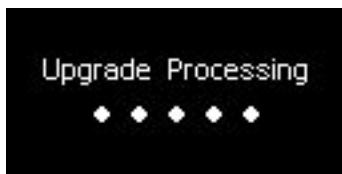
Firmware Updates

-Download latest firmware by visiting this page

-Load the .bin file onto an SD card/ USB drive

-Insert that card/drive into the camera, then turn it on

-After a few seconds, you will see this screen:

-The dots will fill in one by one, and when the process is complete, it will reboot itself

-You're all updated and good to go!

Software

Stitching Software

-AutoPano Video Pro

> Kolor (now owned by GoPro) is top dog right now. Their Autopano Video Pro (AVP) software is fantastic, but relatively useless without the full suite of products, including AV Giga. The full suite goes for $750 at the time of writing

-VideoStitch Studio 2

> This is another strong contender for the most full-featured stitching software. To my eye, it seems to be aimed at a more cinematic audience and features an interface more familiar to users of programs like After Effects or Avid. Cost is $295 last time I checked

-Mistika VR

> Mistika claims to have the fastest stitching on the market. I haven't tested that, but it seems worth noting. I have zero experience with the software, but it is a subscription service - $50 a month. Easier to justify if you're dipping your toes in the water.

-Insta360 Stitcher

> Insta360's software is not great, but it has the advantage of being free. It is horrifyingly unstable on my iMac, but works fine for me on Windows. It generally lacks the granular controls of other, more expensive systems, but it has no higher ambitions. It is basically just a plug-and-play stitcher.

-Insta360 Studio

> This software is built for their consumer-grade cameras. It has no stitching capabilities, only exports in 1080p, and is almost useless for editing. It plays back fully-stitched mp4s and lets you set in/out points on them. That's about it.

-WonderStitch

> This is Z-Cam's official stitching software. It looks to be pretty full-featured, but requires a Z-Cam serial number to authenticate. That makes it pretty useless for the rest of us

Editing Software

-Adobe Premiere can edit 360 video natively, as long as it is pre-stitched.

    -Import the stitched footage like you would with anything else

    -Drop it on a timeline like you would with anything else

    -Click the little wrench icon under your Program View, go to "VR," and click enable

    -Edit the footage like you would with anything else

    -When exporting, don't forget to check the box that says "This video is VR" at the bottom of the 'video' tab to preserve your metadata.

-FCPX does not natively support 360 video right now, but with a couple of free plugins it can certainly be made to work! MacBreak Studio also has a fairly meticulous process walkthrough

    - 360 VR Viewer allows you to preview your 360 video in-app

      -FX Factory also sells much more powerful plugins

    -Seed offers a plugin called Offset that allows you to easily position your initial orientation where you need it

    -YouTube's own Spatial Media Metadata Injector will get you ready to upload to any major platform once you have your final export ready

-Avid Media Composer has gotten onboard the 360 train by partnering with Mocha

    -I don't edit in Avid at all, but this video should answer all the basic questions

Metadata

-Exiftool is probably the most common tool for patching in metadata

    The command is: "exiftool -ProjectionType="equirectangular" photo.jpg"

      # 'photo.jpg' is the photo you want to tag

-For those of us that are less command-line savvy, Exif Fixer features a real GUI

    It is a lot less powerful than exiftool, but it's plenty good enough for me

-theXifer.net can do it all on a web-based platform.

    You can't directly mark your photos as 360, but if you tag them as being shot with a dedicated 360 camera (Like the Ricoh Theta S), Facebook can figure it out.

-And just to be safe, here is Facebook's official best practices guide to metadata!

Workflow

Basic Workflow

-Format your recording device (SD card, USB drive) to exFAT.

-Turn the camera on. Hold the record button for about 3 seconds, then release. It sounds dumb, but it will not power on if you hold the button too long. Don't ask me why.

-Set your camera where you want it, then scroll to calibration. Once you start the process, step away from the camera until the LEDs stop blinking (~10 seconds).

-If you are moving the camera during the shot, go to settings and scroll down until you see "gyro calibration." Make sure the camera is able to sit still, then activate. Do not move it until the LEDs stop blinking (10-15 seconds).

-I recommend turning off the fan - see "Audio" for more details.

-If you want, then connect your phone for previews and advanced controls. See "Connection" for more details

    -If you are livestreaming, this step is mandatory

-If this is your first time using the SD card or USB drive, the camera will want to test its write speed before you record video. This may take a few minutes.

-Select your mode, set your settings to taste, and off you go!

Audio

-If you are intending to use the onboard audio in any way, I recommend turning the fan off and not using RTS. The camera can record for about 15 minutes before it shuts down to cool.

    -Go to settings, and scroll down to "fan". Turn it off.

    -Scroll further down to "spatial audio," and turn it on

    -You last stop here is to "sample fan noise." I believe The Insta360 Pro uses a technology similar to Bose noise-cancelling headphones. It samples the sound and produces sound at a wavelength precisely engineered to cancel it out. Pretty cool in theory.

-Note: the fan will still run during any filming that requires RTS. The processor just can't handle the load. Sorry

-The Insta360 Pro now records Spatial Audio. The upshot is that when you turn your viewer/head in playback, the audio *should* track with its actual source across the full 360

-Previously the outputs of all 4 microphones were mixed down into one mono track

-There is, of course, a standard 3.5mm input jack and USB input on the bottom as well. Your cheapest Ambisonic/spatial audio solution would be a Zoom H2N. Past that, things get real expensive real fast. But if you want expensive, I'd recommend you give the Sennheiser Ambeo a look.

-I need to figure out where the audio files are being saved. They certainly aren't embedding in the mp4s consistently.

-4K RTS videos are fine. Maybe the stitcher program is acting up again

File Structure and Organization

The Insta360 Pro currently doesn't have any way of maintaining an internal clock. When connected to a phone or computer, it can reference their clock and timestamp files accordingly. If not, it defaults to just marking everything as 2013.

# Connections

Connection

-Wifi modes:

-In AP (access point), the camera generates its own wifi signal. Connect your phone to the network "Insta360 Pro xxxx," password 88888888. That's eight eights.

-In Wifi mode, the camera will connect to your existing wireless network, like a printer would. Tap the QR code symbol in the top-left corner of the app, go to the wifi tab, and enter your network info. Generate the QR code from that, and hold it in front of one of the Insta360 lenses to scan. It should now be connected to the network

-Ethernet modes:

-DHCP mode is used when you want to hardwire your Insta360 Pro into the router for a more stable connection than wifi. It will assign an IP address to your camera on the fly, which you then type into the control app on your desktop. There are more potential failure points with this method, but also less room for error if you're not computer savvy.
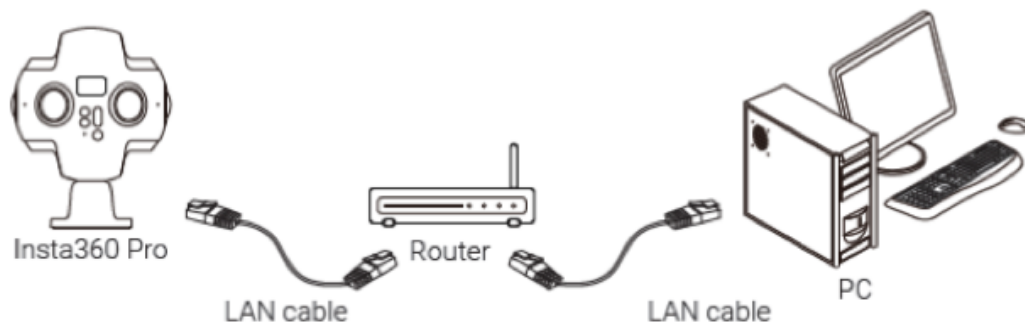
-Direct mode does exactly what it says on the box: it allows you to plug directly into your computer, either by ethernet or through the included USB adapter. I have yet to connect

successfully though. Please please please email me if you have. The following is just Insta360's instructions, word for word.
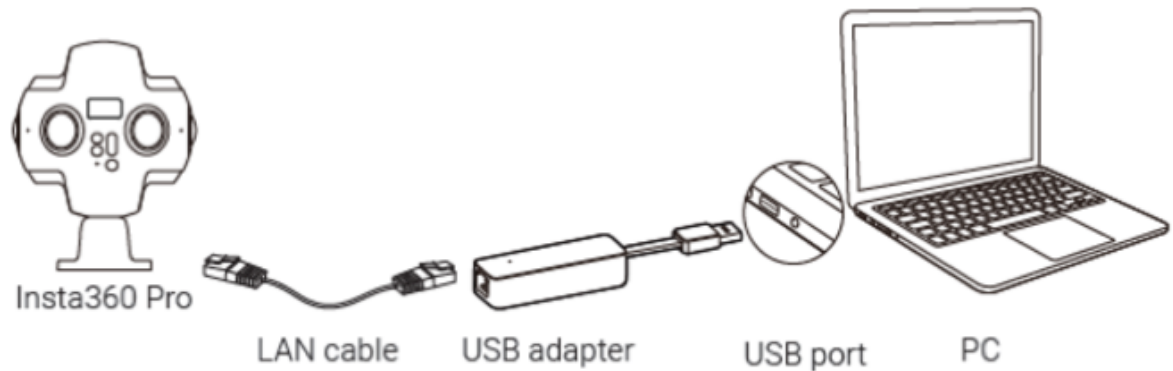
WINDOWS

-Select the wireless network connection

-right click it and select the properties

-Select internet protocol version 4 (TCP/IPV4),double click it or click the properties

-Input the IP address:192.168.1.100 -Subnet mask:255.255.255.0

Then open the Camera control app, and input the IP address 192.168.1.188
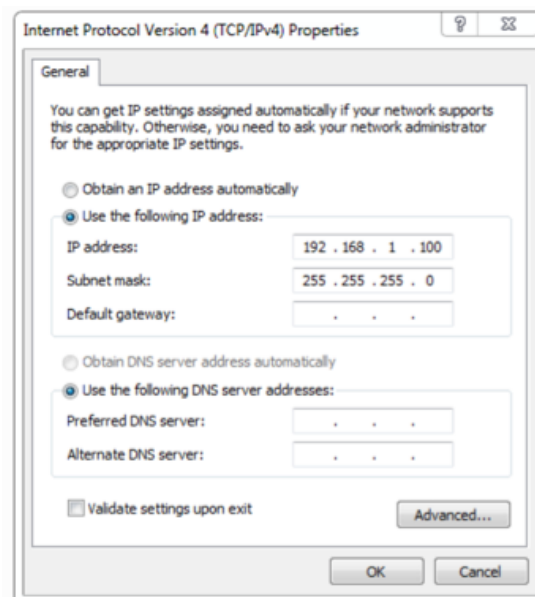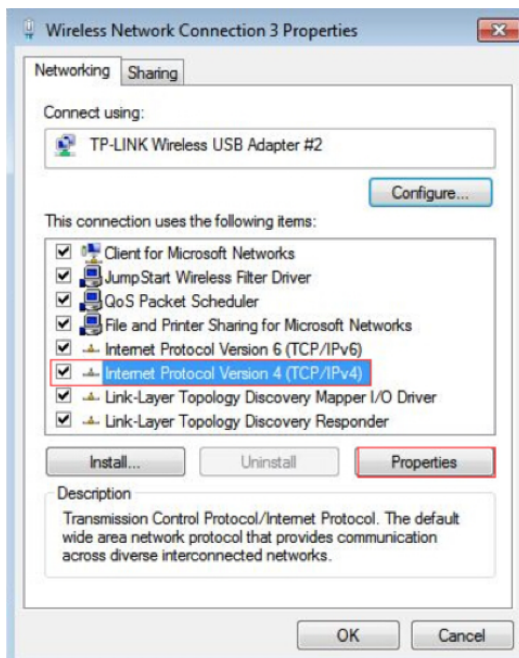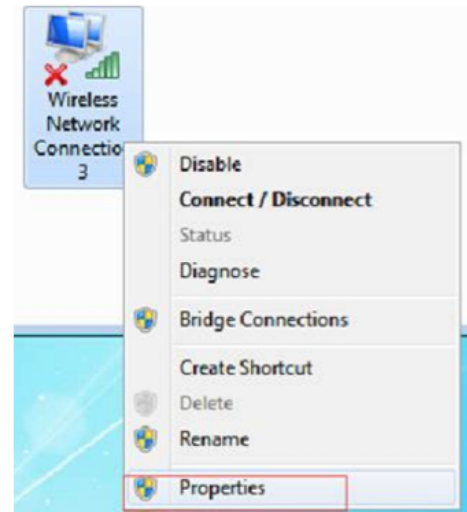
MAC

-Click the apple menu then select System Preferences

-Look for Internet & Wireless section, and click the network (either ethernet or USB depending on your connection)

-Type the IP address:192.168.1.100 and Subnet mask: 255.255.255.0

-Open the Insta360 Pro control app and type the IP address 192.168.1.188
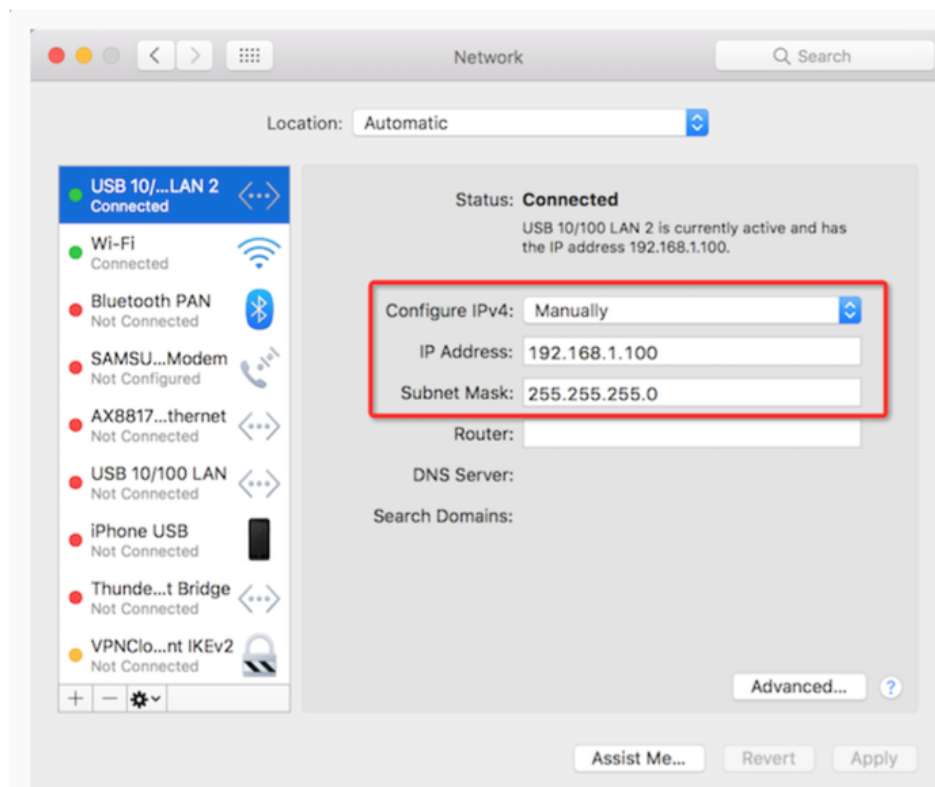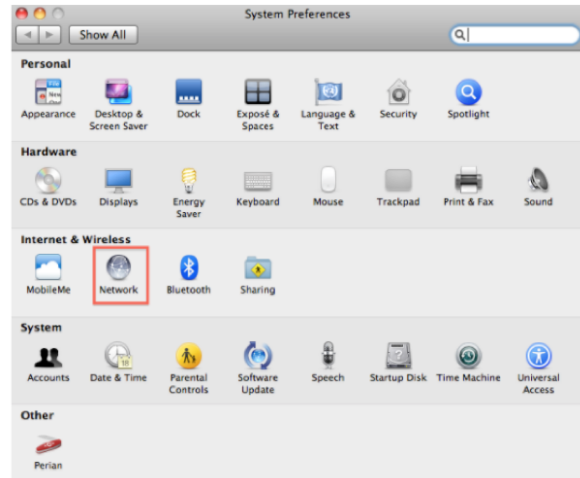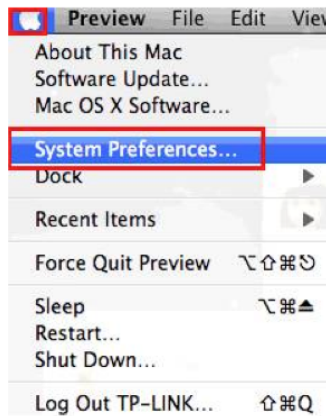
Livestreaming

Quick Tips:

-You need a sturdy connection, especially at higher resolutions. Ethernet wins every time

-When on a desktop, Google Chrome is your friend. It is the most stable option by far

-Youtube only supports live 360 video through Events, not Stream Now

-Run a speedtest before you begin your stream. Set your target bitrate a little below the maximum possible speed on your network.

-If something goes wrong with the stream and you need to take it offline, do so from the encoder/app/camera. If you close the YouTube or Facebook stream, the url and stream key will reset. Your viewers will have to get a new link, you will have to restart the encoding process, and you will lose a lot of time. Be smart about it, friends.

-YouTube/Facebook streams will remain open and live even if you close the tab, window, or browser

-Beware of Content ID! YouTube can now scan your audio in real time for copyrighted material

-For some idiotic reason, you cannot generate a stream at any resolution lower than 4k in camera. Connect a phone or computer for more options

-You can record AND stream at the same time.

     -However, the recording is limited to the resolution of the stream.

1) Direct to YouTube/Facebook

This is the method I would recommend for most people. The Insta360 Pro is not a small handheld camera you would use to stream an impromptu roadtrip. You *could,* but it is more intended for studio use or controlled, pre-planned shoots. For this method you will need a computer (Mac or PC) and a strong, stable internet connection. Preferably, you'd have a direct ethernet connection into the router or network.

YouTube

-First up, connect the desktop control app to the camera using one of the methods listed above.

-Once you establish the connection, toggle over to the live-stream screen.

-In the side menu, set your mode to Custom RTMP Server

     -RTMP is a standard live-streaming protocol supported by all major platforms

-Switch over to your browser (preferably chrome) and open YouTube

-Go into Creator Studio, then click Live Streaming on the lefthand column

-Directly below that, select Events, then click New Live Event on the top right

-Go to Advanced Settings, and check the box for 360

-Select Basic Ingestion, then specify your preferred resolution/bitrate.

-Under "Select your Encoder," choose other. This brings up the RTMP info

-Back to the Insta360 app! In the livestream options, you will see two fields for URL and Stream Key. Copy/paste them from the YouTube settings page.

     -Stream Key is actually called Stream Name on YouTube

-Then click the big red LIVE button at the bottom to begin the stream

-Return to YouTube, and click over to Live Control Room

-If your status is Good, then click Preview to see your live feed

-If your status is bad, then check your internet connection and try again

-If your status is non-existent, you have probably messed up the Stream Key.

     -When all else fails, start from scratch.

 -Finally, press Start Streaming to make your feed live to the public!

Facebook

-First up, connect the desktop control app to the camera using one of the methods listed above.

-Once you establish the connection, toggle over to the live-stream screen.

-In the side menu, set your mode to Custom RTMP Server

　　　　-RTMP is a standard live-streaming protocol supported by all major platforms

-Switch over to your browser (preferable chrome) and open facebook.com/live/create

-Click Create Live Stream, and select the destination page/group

　　　　-check the box for "This live stream is a 360 video"

-Back to the Insta360 app! In the livestream options, you will see two fields for URL and Stream Key. Copy/paste them from the Facebook page.

-Then click the big red LIVE button at the bottom to begin the stream

-Return to Facebook, where you should now see a preview of your video

　　　　-If you do not, then check your internet connection and try again

　　　　-If you still do not, you have probably messed up the Stream Key.

　　　　　　-When all else fails, start from scratch.

　-Finally, press Go Live to make your feed live to the public!

2) From your iPhone/iPad

Insta360's walkthrough on their website is a lie. The process described does not work with the Pro. Instead, you will follow the exact same steps as listed above - only this time, you have to navigate those tiny menus on your iPhone. It can be done, but I don't personally recommend it. Like, at all.

3) Wirecast or some other professional platform

The Insta360 Pro can also act as a regular input device for dedicated livestreaming setups. You just set your mode as HDMI instead of RTMP. This generates a continuous feed for the program/switcher to do with as it chooses. Follow the relevant instructions for those devices to set up your stream.

Accessories

Stands

-I use this Manfrotto travel tripod - but most tripods in this weight class would do the job. The footprint is narrow, the center post extends quite a ways, and head is easy to adjust. Plus it folds down small and weighs next to nothing!

-I've tried larger, sturdier matthews grip stands, but honestly that's overkill for 90% of the use cases. It's just too big and clunky to carry around for long. These are more suited for stationary/studio work.

-Something along the lines of the Grifiti Nootle would probably do the job as well. It's essentially just a light stand with a ball head. I haven't tried it personally, but it looks sturdy enough to do the job

Power

-All power for the camera has to run through the dedicated charging port

-I run P-tap batteries in through a simple adapter cable like this.
    -As long as the specs match those on the Pro's dedicated AC power, it should be fine

Media

-If you're going to go with SD cards, you need fairly fast write speeds to get the full 8k experience. I'd go with Sandisk Extreme or higher

-If you need more space, then you can jack in a USB 3.0 drive. An HDD is technically usable, but I've run into speed issues. Insta360 recommends you use SSDs, and I wholeheartedly agree.

-Lacie Rugged drives are expensive, but they're top-notch and will last you a long time. These are the gold standard, but they're not the only players in the market.

-ADATA SD700 has a rugged rubber body like Lacie at half the price. The loss here is in build quality and durability.
    Check out this comparison for some idea what to expect.