

KE6GYD PORTABLE GO KIT (By KE6GYD Ver 1.8 2020-5-20)

My goal was to build a deployable MESH Portable Go-Kit that that will operate from 12v DC, minimize setup time, and minimize the chance of incorrectly connecting the devices under stressful situations. I need to give credit to Bret (K6BAT) for many of the ideas this kit utilizes.

The kit allows for any node device (*NanoStation, PowerBeam, etc.*) to be used. You'll need to set it up to work with your particular camera and phone since they might require different voltages.

While the 24v DC Ubiquiti nodes seem to operate down to 12v DC, I have built the kit to power them at their designed voltage.

Basic Contents: *(Full Parts List and links for where to purchase at end of document)*

- NetGear GS105eV2 Switch
- PolyCom VVX-410 VoIP Phone
- 12v DC to 24v & 46v DC Converters
- 20-22" Plastic Tool Box
- Various Networking and PoE Injectors
- Assorted lengths of Cat 6e Shielded Ethernet (75', 50', 15', etc.)
- Couplers for Ethernet cables

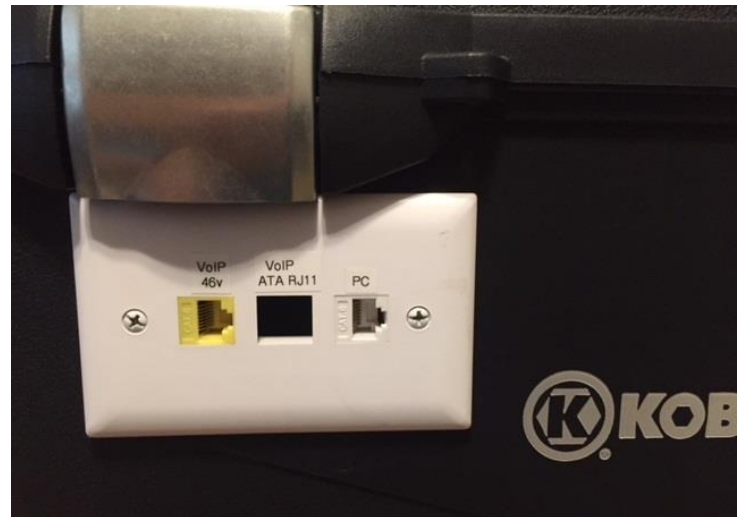


THE BOX – 20” or 22” Plastic Tool Box

Walmart or Home Depot may have something in a 22” size that works well. The box pictured is from Lowes that is not available anymore so any box of similar proportions will work. I also purchased the Keystone Ethernet Plates at Lowes.

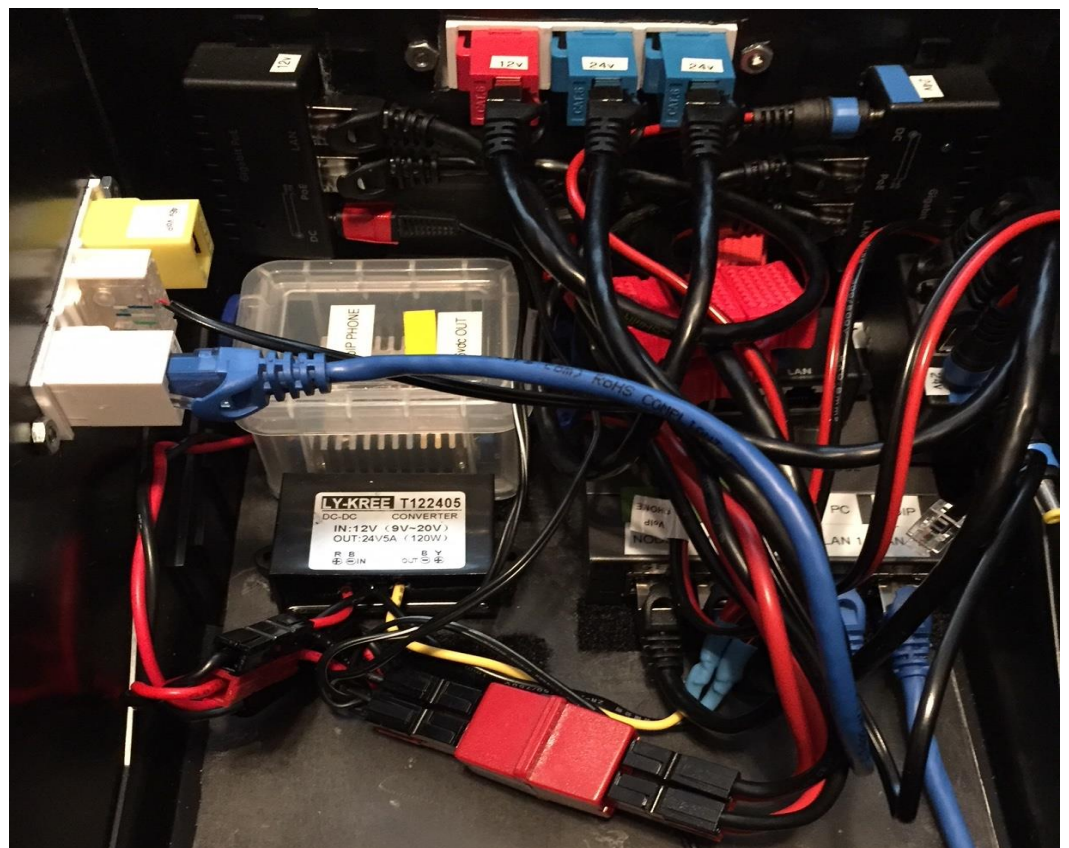
Cut holes in the box to mount:

- A side plate for three Keystone Ethernet couplers to connect Node 1, 2, and an IPCam
(I used colored couplers to designate different PoE voltages (Amazon), however, if the jacks are properly labeled and colored tape is used, it will work just as well if you don't want to purchase 5 packs of each color.)
- A front plate to mount three Keystone Ethernet couplers for PC and VoIP Phone.
(One can choose to mount a single six port plate instead of two three ports for all devices.)
- A dual Powerpole panel mount on the side to connect external 12v DC power to the internal components and to connect an external solar charging system. *(Powerpoles are fused individually.)*



THE SWITCH & PoE INSIDE THE BOX

I mounted the NetGear GS105E switch and the 12v DC to DC converters for PoE power with Velcro to a piece of plastic that is also Velcroed to the bottom of the box.



DROK DC to DC Converter for VoIP Phone:

Since the PolyCom VoIP phone requires 48v DC, a DC to DC converter was required. A Drok® 150watt DC to DC converter was used costing about \$15 on Amazon that has an adjustable output up to 46v DC. The converter is placed in a .14Liter “Really Useful Box®” for protection since the PC Board was exposed on the bottom and could short out or be damaged by static discharge due to handling. It fit snugly after slightly shaving down the heat sink with a file on both sides. Holes were drilled in the side for the input and output wires. I did not drill any vent holes. After running this for over a year constantly at home, there was no heat issue.



A red/black wire with a PowerPole on the end was used for the input. The output used a 2.1mm x 5.5mm pigtail to the PoE injector to send power to the phone.

LY-KREE 12 to 24v DC to DC Converter

The Ubiquiti Nodes require 24v DC. The Ly-Kree device (shown) was used. The output is fixed at 24v DC and can handle up to 5 amps. I spliced three 5.5mm x 2.1mm barrel connectors to a single converter to provide 24v DC to Node 1, 2 (if needed), and any other 24v DC device such as a Ubiquiti G3 IPCam. If your camera uses other voltages, then use the appropriate converter if needed. However, having the extra pigtail may come in handy if another 24v DC device needs to be powered.



Color Code

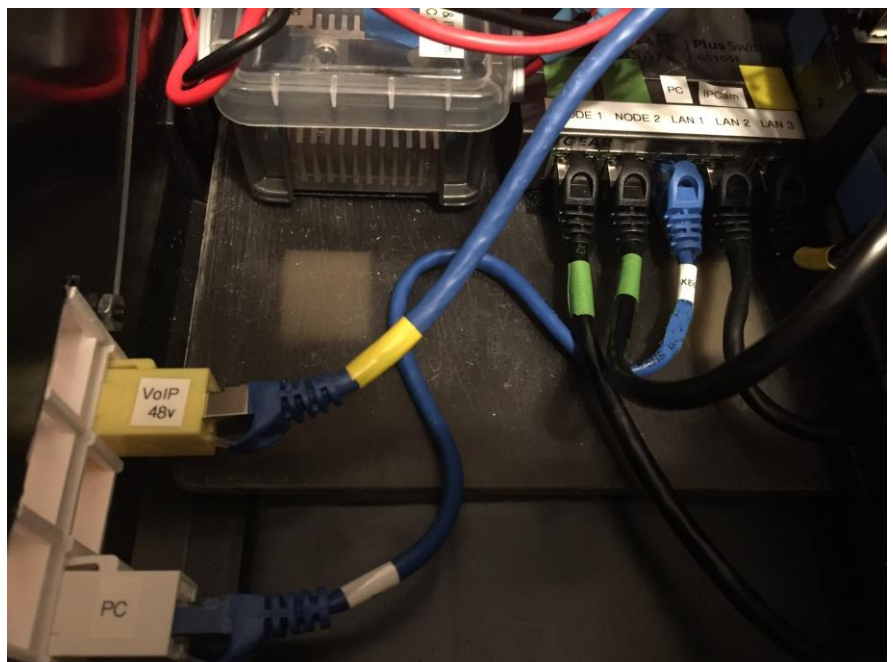
I used a color-coding system by applying colored electrical tape to Ethernet cables, power wires and plugs to designate the different voltages involved. I also used colored Ethernet couplers. This will hopefully avoid blowing out devices. This color code made sense to me. Might be good to standardize.

12v DC - Red

24v DC - Blue

48v DC - Yellow

Green was used to designate a node connection, not voltage.



ETHERNET CABLES

I used Cat 6 shielded patch cables inside. Shielded may not be needed but I chose to be cautious.

PoE Injector.

A PoE injector is needed to send the desired power to any device that has PoE capability. Bret found these for about \$5 each. They'll work for any voltage required by your device as long as you connect the correct voltage to the DC input jack on the injector.



Parts List for KE6GYD MESH Go-Kit

20" Plastic Tool Box or equivalent: 20"L x 9"W x 10"D Minimum outside dimensions

Cat6 Wall Jack three hole Plate (2 ea)

<https://www.lowes.com/pd/Legrand-Nylon-CAT6-Wall-Jack/50110924>

NetGear GS-105Ev2 5 Port Switch (1 ea)

https://www.amazon.com/dp/B00HGLVZLY/ref=twister_B01AKLC5NI?encoding=UTF8&psc=1

12v DC to 24v DC Converter (1 ea)

<https://www.amazon.com/gp/product/B01EFUHF6>

Drok® Adjustable DC to up to 46v DC converter (1 ea)

<https://www.amazon.com/gp/product/B01E283VYM>

“Really Useful Box®” .14 Liter are available at office Max or Depot

Alternate DC to DC Converter 12-48 volt.(If Drok® is not available)

<https://www.amazon.com/uxcell-Converter-Regulator-Transformer-Waterproof/dp/B01N8W4P45>

18 Ga 2.1mm x 5.5mm Pigtail

https://www.amazon.com/gp/product/B072BXB2Y8/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&psc=1

PoE Injectors: (4 ea)

<https://www.poetexas.com/products/gpoe-1-wm>

PoE Injector/Splitter (1 ea)

<https://www.amazon.com/gp/product/B00NRHNPJA>

2.1mm x 5.5mm coupler (2 ea)

<https://www.amazon.com/gp/product/B00QZDSR3I>

Blue Keystone Cat6 Keystone couplers (1 package of 5)

<https://www.amazon.com/gp/product/B01MV71UGH>

White Keystone Cat6 Keystone couplers (1 package of 5)

<https://www.amazon.com/gp/product/B0116T7XMQ>

Blue Patch Cables – Cat6 Shielded 1' (Pack of 5)

<https://www.amazon.com/gp/product/B00BIPSHQK>

Black Patch Cables – Cat6 Shielded 1' (Pack of 5)

<https://www.amazon.com/gp/product/B00HEM54DK>

Black Cat6 Shielded 20' (2 ea) For Node and Camera (If used)

<https://www.amazon.com/gp/product/B00ER7M79E>

PowerPole Panel Mount (1 ea)

<https://powerwerx.com/powerpole-connector-chassis-mount-4>

PowerPoles (Set of 10)

<https://powerwerx.com/anderson-powerpole-connectors-30amp-bonded>

PHONES-Couple of options

Or the VVX 410 (This is refurbished-you can get new also)

<https://www.amazon.com/Polycom-2200-46162-025-included-Certified-Refurbished/dp/B07DRPCB9Z/>

(OR can use any basic VoIP phone, check with Oliver first for compatibility. Recommend that it works off of 12v DC or higher. PoE type is preferred. Find on Ebay, or Refurbished sites)

Misc Items:

One might want to purchase some additional lengths of Ethernet cables. These can allow, if necessary to get a better line of site to a relay node (cell site), the node to be placed further away than your portable operating station.

RJ45 Cat6 Shielded Couplers (Pack of 5)

<https://www.amazon.com/gp/product/B00IO3HLF2>

50' Cat 6 Shielded Ethernet cable

<https://www.amazon.com/gp/product/B004NPL4YE>