PIKVM



Use cases

- Fix broken systems
- Upgrade remotely without worry
- Format the drive and load new distros remotely
- Change BIOS settings
- Change settings in GRUB
- fsck root partitions
- Fix viruses remotely
- Load any live distro remotely

Pros

- Open,free,self-hosted
- Save petrol (no driving for miles to hit a power button)
- Upgrade systems with the ability to fix remotely
- Covid safe
- Stay at home more and see the family
- Fun to put together
- Headless install



Materials



Basic

Part	Store	Cost
Lusya HDMI -> CSI	AliExpress	36.15
USB-C/PWR Splitter	Tindie	5.44
Raspberry PI 4B 4GB	Element14	90.09
HDMI splitter (A3134E)	Altronics	79.95
3 x HDMI cables		
Total		211.63

HDMI -> CSI [PIC]



HDMI -> CSI [Details]

- High FPS (100ms latency)
- Compression control
- Better quality than USB to HDMI
- Better connection
- CHIPSET: TC358743

USB-C/PWR Splitter [PIC]



USB-C/PWR Splitter [Details]

- PI4 & PI Zero have On-The-Go (OTG) Ports
- Splits power & data to separate connectors
- Keyboard & Mouse control
- Mass storage connection

ATX control (optional)								
Part	Store	Total						
4 x OMRON G3VM-61A1	RS	16						
4x 390 Ohm resistors.	Altronics	0.4						
2x 4.7k Ohm resistors.	Altronics	0.4						
Total		16.8						

OMRON G3VM-61A1 MOSFET



Installing

https://github.com/pikvm/pikvm#diy-gettingstarted

Variants

I'm using Variant 3 which is;

- Raspberry PI 4
- HDMI to CSI
- USB-C OTG power data splitter

Ref: https://github.com/pikvm/pikvm#setting-upthe-hardware

PIKVM

- Pl Arch Distro
- Open-source (no java/flash/.NET)
- TightVNC
- Customisable
- Optional hook up to Arduino for extra control of hardware
- read-only (use rw/ro to switch)
- Custom MJPEG video streamer for speed

Download

wget https://pikvm.org/images/v2-hdmi-rpi4.img.bz2

NOTE: v2 is used for variant 3.

Flash image

pikvm/flashing_{os.md} at master · pikvm/pikvm · GitHub

• Flash onto SD Card with balena Etcher or 'dd'

Upgrade

Boot & go to IP address in web browser
 Click terminal

3. Upgrade

su

default password root

rw

pacman -S raspberrypi-firmware=20210112-2 pacman -Syu reboot

Change password for web

ssh root@10.1.1.8
rw
kvmd-htpasswd set admin
ro

NOTE: 10.1.1.8 is a static IP set in my pfSense box. PIKVM is set to DHCP.

Change password for root

ssh root@10.1.1.8
rw
passwd
ro

Interface

Features

- Web based
- Access to terminal
- Virtual keyboard
- 30fps view of screen
- Load ISO & IMG files
- Access ATX (Power & LEDS)

Features

- Send magic keys
- Control GPIO
- WOL
- Ability to use IPMI BMC, IPMI SoL, Redfish and Wake-on-LAN to control the server
- Macros

Screen

- π -kvi	m			Shortcuts 🤉	ුරි Macro	J	(***)	Mass S	Storage 🤉		🖴 ATX 🤅	L	•	- C	System ٦
F	Stream — 800x600 / 1 fps Aptio Setup <u>Utili</u> ty - Copyright (C) 2011 American Megatrends, Inc						Statı Imaç	us: Discor ge: archi	nnected linux-2018.	07.01-i6	86.iso	T	Rem	ove	
	Boot Configuration Setup Prompt Timeout Bootup NumLock State	1 [Off]	Number of setup acti 65535(0xFF) waiting.	seconds to wait fo lvation key. FF) means indefini	te		Drive	e mode:	CD-ROM F	lash 629.87 MiB	of 2.96 GiB us	ed			
	Quiet Boot CSM16 Module Verison	(Disabled) 07.64	were the t				Upl • Co	oad new onnect d	rimage rive to Serv	/er	Start • Disconi	nect dr	Abort ive		J
	Dotion ROM Messages Interrupt 19 Capture Boot Option Priorities Boot Option #1	[Force BIOS] [Enabled]	++: Select	Screen											
	Boot Option #2 Hard Drive BBS Priorities CD/DVD ROM Drive BBS Priorities	[Disabled in BBS Order]	<pre>tl: Select Enter: Sel +/-: Chang F1: Genera E2: Previo</pre>	It Virtual Keyt									Pt/Sq	ScrLk	× P/Brk
			F3: Optimi F4: Save & ESC: Exit	ized Re	@ # \$ 2 3 4 W E) % 5 R	р 6 т	карана (Т (Т (Т) (С)) P				Home	PgUp PgDn
	Version 2.11.1210. (Copyright (D) 2010 American M	egatrends.	Caps Lock	A S D				J K			Enter 4			
				Ctrl Win	Alt							Shift Ctrl			
Server: localhost.lo															

Security

- Use common authorisation between KVM's
- SSL encryption

HDMI splitter

- optional
- can help with compatibility (EDID issues)
- allows a screen + KVM to be connected at the same time

PI-KVM to KVM



- Use one PI-KVM to view multiple computers through a KVM
- Can control a KVM with PI-KVM (ezcoo KVM compatible)

Access to BIOS & Grub

Traditional BIOS

← π -kvm							Shortcuts	<i>े Macro</i>	la Drive	ල් 🖶 ATX	🖳 🛄 📟 🖰 System
	Stream – 1920x1080 / 1	nds, Ind	D.								
		BIOS Information UP-APLO1 R4. BIOS Vendor Compliancy System Date System Time Access Level	n .6 (UPA1AM U [[U U	46)(08/14/2019) merican Megatren EFI 2.5; PI 1.4 Sat 01/23/2021] 06:39:09] Iser	nds C - - - 1 1 19 American	Set the Dat to switch b elements. Default Rar Year: 2005- Months: 1-: Days: deper ++: Select t: Select t: Select Enter: Sele +/-: Change E1: General E2: Previou E3: Optimiz E4: Save & ESC: Exit Megatrends	te. Use between -2099 12 ndent or Screen Item ect 2 Opt. I Help Us Value zed Defa Exit	Tab Date			
Server: localhost.localdomain											Saturday, 23 January 2021

Fancy BIOS

← π -kvm					s	Shortcuts	Macro	left Drive	් 🖴 ATX	🖳 🗔 🖶 System
Stream -	1280x720 / 1 fps		iced Mode				Ţ	×		
	III Main f	Cae Ai Tweaker	Fo Advanced	CE Monitor	U Boot		S Too	2		
	BIOS Information BIOS Version Build Date EC Version ME Version South Bridge Stepping			3402 x64 05/07/2012 MBECE-0022 8.0.2.1410 B3	Choose the					
	CPU Information Intel(R) Core(TM) i7-2 Speed Memory Information Total Memory	2600K CPU @ 3.40GHz		3525 MHz 20480 MB (DDR3)						
	Memory Frequency System Language			1648 MHz English						
	System Date System Time Access Level Security			[Wednesday 01/20/2021] [09:34:31] Administrator	++: Select t1: Select Enter: Sel +/-: Chang F1: Genera F2: Previc F5: Optimi F10: Save F12: Print	t Screen t Item lect ge Opt. al Help ous Values ized Defau ESC: Exi t Screen	Its t			
		Version 2.10.1	208. Copyright (C) 2011 American Megatro	ends, Inc.	-	-		J	

Grub



ATX control

Circuit



Connect to Motherboard



Finished



Overview



Boot remotely from image

Upload image

ro 😥 Drive	් 🖴 ATX	· 🖳 🗖	📟 🖰 System
Mass Storage D	evice emulator		
Status: Uploading	new image		
Image: < Not s	elected >		▼ Remove
Drive mode: CD-	ROM Flash		
I.	Storage: 843.85 MiE	3 of 54.11 GiB used	d
Select image to	o upload	Upload	Abort
New image: MX-18 Upload size: 1.36 0	8.1_386.iso GiB		
	56	%	
Connect drive	to Server	Disconnec	t Reset

Boot

- 1. Select the image from Drive drop down
- Power on remotely through ATX -> Power on (short)
- 3. Select image from boot menu

Share ethernet over USB

pikvm/usb_{ethernet.md} at master · pikvm/pikvm · GitHub

- optionally share PI-KVM's ethernet with monitored computer
- handy for working on 'off-line' servers

Monitoring

pikvm/prometheus.md at master · pikvm/pikvm · GitHub

- Send monitoring info to prometheus
- ATX state
- PI Temp
- GPIO State

Other features

- Video record
- Screenshots

DEMO

https://youtu.be/plP9Y1likRg?t=448

Pre-order

- Pre-order in March, 2021: Pi-KVM
- Complete kit
- There is an announcement list
- Refer to **Discord** for the latest NEWS
- OR DIY for free now

References

- https://github.com/pikvm/pikvm
- Discord PIKVM channel
- Pi-KVM DIY CHEAP Raspberry Pi KVM over IP Prototype Version 3 Review! - You...
- Pi-KVM Raspberry Pi Zero W Installation and Review YouTube
- Making an ATX Control for PI-KVM YouTube
- Simple PiKVM Case by rstcologne Thingiverse
- Pi-KVM: Controlling a 4-port KVM and setting up Tailscale briancmoses.com

Questions

Email	map7777@gmail.com
Twitter	@map7

Github github: map7