	details1	details2
Common		
Barrel connector		3A
Power supply	12V	5A
Custom PCB	link points to main repository pa
3D printed frame	link points to main repository pa
Flat ribbon cable	10pin	3m colored
Screws	M3	Head cap
Raspberry pi and cables		
Capacitor	16V	680µF
Capacitor	16V	220µF
Diode	20-60V	3A
Inductor	3.6A	33µH
Screw terminal	2pin	6A
Switching volt reg (LM2596)	45V	3A
Raspberry pi 3	Pi 2 will also work	
PiCamera	V1 or V2 work	better if it already
HDMI cable	0.5m	
USB cable	A to micro B	
SD Card	16gb	micro SD
Screws	M3	Head cap
Arduino and cable		
Arduino Nano	Atmega328	
socket terminal strip	20 pin	2.54 spacing
USB cable	A to mini B	0.3m

Essential. Arduino & PCB only needed if modules to be added

	details1	details2
LED Ring		
Adafruit neopixel ring	12 LEDs	
Screw terminal	3pin	6A
Capacitor	16V	680µF
Capacitor	16V	220µF
Diode	20-60V	3A
Screws	M3	Head cap
Inductor	3.6A	33µH
Switching volt reg (LM2596)	45V	3A

recommended

	details1	details2
LED Matrix (added to Ring power circuit)		
Adafruit LED matrix	8X8	with backpack
Screws	M3	Head cap
Screw terminal	2pin	6A

optional

	details1	details2
Fluorescence module		
LED(violet – High power)	3.9V	350mA
Reflective collimator	6°	17.5mm
Heat sink	36X36X12	
Resistor(High power)	11W	12Ohm

<table>
<tr><td rowspan="11">optional</td><td>Excitation filter</td><td colspan="2">Roscolux #381</td></tr>
<tr><td>Emission filter</td><td colspan="2">Roscolux #12</td></tr>
<tr><td>Screw terminal</td><td>2pin</td><td>6A</td></tr>
<tr><td>Capacitor</td><td>16V</td><td>680µF</td></tr>
<tr><td>Capacitor</td><td>16V</td><td>220µF</td></tr>
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<tr><td>Inductor</td><td>3.6A</td><td>33µH</td></tr>
<tr><td>Switching volt reg (LM2596)</td><td>45V</td><td>3A</td></tr>
<tr><td>Screws</td><td>M3</td><td>Head cap</td></tr>
<tr><td>Resistor</td><td>1/4W</td><td>270Ohm</td></tr>
<tr><td>Transisitor (BC368)</td><td>20V</td><td>1A</td></tr>
</table>

	Focus Servo (added to Fluorescence power circuit)		
optional	Screws	M3	Head cap
	Servo motor	5V	
	Screw terminal	3pin	6A

	Peltier module		
	H-Bridge (L298N)	Multiwatt 15	
	Fan	5V	40X40X20
	Capacitor	100V	0.1µF
	LED RGB	4V	20mA
optional	Resistor	1/4W	220Ohm
	Resistor	17W	1Ohm
	Resistor	1/4W	270Ohm
	Resistor	1/4W	1kOhm
	Transisitor (BC368)	20V	1A
	Peltier element	15.4V	6A
	Screw terminal	2pin	6A
	Heat sink	36X36X12	
	Temp sensor (AD22100-KT)	TO-92	for negative temp

	Off Grid module		
optional	Lead-acid Battery	12V	7,2Ah
	Charger	12V	600mA

Extras

HDMI to VGA dongle	Optional
Red filter (optional)	Roscolux #19
Monitor	
Keyboard & mouse set	USB
Soldering iron	
Solder	1mm
Thermal paste	
Third Hand	
Screw driver	3.5mm

likely already available

details3	quantity	unit price (€)	total* (€)	total** (€)
2,1mm int pin	1	0.47	0.47	0.47
2.1mm pin	1	18.65	18.65	0
age. User should go	1	5	5	5
age. User should go	1	5	5	5
AWG-28	1	1.99	1.99	0
12mm long	2	0.05	0.1	0.08
Electrolitic	1	0.43	0.43	0.08
Electrolitic	1	0.08	0.08	0.08
Schottky	1	0.18	0.18	0.03
Ferrit	1	0.6	0.6	0.29
2.54mm	1	0.24	0.24	0.22
TO-220-5	1	3.8	3.8	0.23
	1	37.5	37.5	37.5
/ has the lens	1	18.99	18.99	10.4
	1	1.55	1.55	1.54
	1	1.5	1.5	1.99
Class 10	1			8
6-20mm long	20	0.05	1	1
	1	22.9	22.9	1.98
8.5mm height	2	0.27	0.54	0.11
	1	1.95	1.95	0.59
			122.47	**74.59**
	1	6.71	6.71	1.6
	1	0.36	0.36	0.2
Electrolitic	1	0.43	0.43	0.08
Electrolitic	1	0.08	0.08	0.08
Schottky	1	0.18	0.18	0.03
6mm long	1	0.05	0.05	0.03
Ferrit	1	0.6	0.6	0.29
TO-220-5	1	3.8	3.8	0.23
			12.21	**2.54**
blue	1	10.7	10.7	3.18
6mm long	1	0.05	0.05	0.03
	1	0.24	0.24	0.22
			10.99	**3.43**
130mW	1	8.79	8.79	0.1
CLP17CR	1	2.33	2.33	0.5
	1	1.15	1.15	1.15
axial	1	0.65	0.65	

	0.001	10.2	10.2	0.1
	0.001	10.2	10.2	0.1
	2	0.24	0.48	0.44
Electrolitic	1	0.43	0.43	0.08
Electrolitic	1	0.08	0.08	0.08
Schottky	1	0.18	0.18	0.03
Ferrit	1	0.6	0.6	0.29
TO-220-5	1	3.8	3.8	0.23
6mm long	1	0.05	0.05	0.03
carbon film	1	0.11	0.11	0.01
0.8W	3	0.08	0.24	0.02
			39.29	**3.16**
6mm long	1	0.05	0.05	0.03
cont. rotation	1	6.99	6.99	3.8
	1	0.36	0.36	0.2
			7.35	**4**
	1	2.4	2.4	0.93
	1	7.5	7.5	2.13
Electrolitic	2	0.04	0.08	0.03
4 pin	1	0.58	0.58	0.11
carbon film	3	0.11	0.33	0.03
Axial	1	0.97	0.97	0.79
carbon film	1	0.11	0.11	0.01
carbon film	1	0.11	0.11	0.01
0.8W	1	0.08	0.08	0.02
40X40X4.1mm	1	17.1	17.1	1.98
	4	0.24	0.96	0.88
	2	1.15	2.3	3.2
ɔs use AT variant	1	3.4	3.4	3.35
			35.92	**13.47**
	TOTAL		**228.23**	**101.19**
Allows the FlyPi to b	1	19.8	19.8	6
charger for the lead	1	8.2	8.2	2
			28	**8**
	Off grid TOTAL		**256.23**	**109.19**

1	20.99	20.99	3.7
1	17.6	17.6	
1	89.95	89.95	
1	15.95	15.95	
1	4.99	4.99	
1	3.2	3.2	
1	7.99	7.99	
1	9.95	9.95	
1	3.99	3.99	

TOTAL	**174.61**
Grand total	402.84

Opportunity for substantially saving cost by sourcing elsewhere

can be sourced cheaper from overseas, or improvised from an old Laptop adapter
Estimate - prices vary widely and drop substantially when ordering in bulk
Estimate, based on material cost. If a 3D print service is required (e.g. as no 3D
This is "just" a cable supply - can be sourced from anywhere, e.g. from an old com

Can be sourced cheaper from overseas
Can be sourced slightly cheaper from overseas. Alternativelty the apporox half-pri
Can be sourced cheaper from overseas, or pieced together from individual compo

Approximate and depending on configuration - see Assembly Manual

Can be sourced dramatically cheaper from overseas

Can sometimes be sourced slightly cheaper from alternative suppliers

Can be sourced cheaper from overseas

Can sometimes be sourced slighty cheaper from alternative suppliers

There are many UV LEDs available, many of which are substantially cheaper
helpful to focus the light, but not essential

A full roll of filter costs 10.2 Euro, but less than 0.1% is needed

Can be sourced cheaper from overseas

_____

_____

Can be sourced cheaper from alternative suppliers

_____

_____

Can be sourced cheaper from different suppliers. Alternatively, any old CPU fan w

Can be sourced substantially cheaper from different suppliers

Can be sourced cheaper from different suppliers.

all prices in euros

Can be sourced signficantly cheaper from overseas
Can be sourced signifcantly cheaper from overseas

all prices in euros

*if mostly sourced from same supplier in Germany; **if prepared to "shop around" and/or improvise

https://www.aliexpress.com/item/10pcs-Breadboard-friendly-2-1mm-DC-Barrel-Jack/32818058518.html?spm=2114.searc
https://www.aliexpress.com/item/1-PC-12-v5a-ac-100-v-to-100-v-converter-dc-12-v-adapter-5/32804289949.html?spm=21
https://github.com/amchagas/Flypi
https://github.com/amchagas/Flypi
nputer or printer
https://www.aliexpress.com/item/50Pcs-M3-Alloy-Steel-Screws-Hex-Socket-Round-Head-Cap-Black-Screw-Furniture-Fas

https://www.aliexpress.com/item/20-pcs-Electrolytic-Capacitors-High-Frequency-16V-680UF/1814798466.html?spm=2114
https://www.aliexpress.com/item/10-pcs-Electrolytic-Capacitors-High-Frequency-16V-2200UF-10X25MM/1821586609.htm
https://www.aliexpress.com/item/10PCS-Lot-New-Original-1N5822-IN5822-Schottky-Diode-3A-40V-DIP-Wholesale-Electro
https://www.aliexpress.com/item/Inductor-8-10mm-33UH-frequency-ferrite-330K-0-8Amp-10-PVC-Radial-Leaded-Power-ir
https://www.aliexpress.com/item/10pcs-2-Poles-2-Pin-2-54mm-PCB-Universal-Screw-Terminal-Block-Connector/3277448
https://www.aliexpress.com/item/LM2596T-5-0-LM2596-TO220-5pcs-lot/32457405052.html?spm=2114.search0104.3.59.7
iced RPi2 also works.
https://www.aliexpress.com/item/RPI-2-raspberry-pi-2-camera-Adjustable-Night-Vision-5-megapixel-OV5647-sensor-Came
https://www.aliexpress.com/item/3FT-9FT-0-3M-1M-2M-3M-5M-7-5M10M-High-speed-Gold-Plated-Plug-Male/327081688
https://www.aliexpress.com/item/NEW-Universal-Purple-short-20cm-Flat-Cable-USB-A-Male-to-Micro-B-Male-USB-Data/3

https://www.aliexpress.com/item/Freeshipping-10PCS-Nano-3-0-controller-compatible-with-arduino-nano-CH340-USB-driv
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https://www.aliexpress.com/item/High-Quality-75cm-100cm-USB-2-0-A-male-to-MINI-B-V3-5-PIN-5P/32801510782.html?s

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https://www.aliexpress.com/item/10PCS-Lot-New-Original-1N5822-IN5822-Schottky-Diode-3A-40V-DIP-Wholesale-Electro
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https://www.aliexpress.com/item/Inductor-8-10mm-33UH-frequency-ferrite-330K-0-8Amp-10-PVC-Radial-Leaded-Power-ir
https://www.aliexpress.com/item/LM2596T-5-0-LM2596-TO220-5pcs-lot/32457405052.html?spm=2114.search0104.3.59.T

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https://www.aliexpress.com/item/20pcs-Black-White-30-45-60-Degree-XP-E-XP-G-XT-E-LED-LENS-Reflector/322141327-
https://www.aliexpress.com/item/Silver-Tone-Aluminum-Cooler-Radiator-Heat-Sink-Heatsink-40x40x20mm/32764361078.
https://www.reichelt.de/11-Watt-axial/11W-AXIAL-12/3/index.html?&ACTION=3&LA=2&ARTICLE=1506&GROUPID=3120

https://www.rosco.com/uk/german/filters/roscolux.cfm
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https://www.reichelt.de/Blei-Vlies-Akkus-12V-Panasonic/LCR-12V-7-2P-1/3/index.html?ACTION=3&LA=5&ARTICLE=265
https://www.reichelt.de/Ladegeraete-fuer-Bleiakkus/LADER-AS/3/index.html?ACTION=3&LA=5&ARTICLE=115306&GRO

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https://www.reichelt.de/HANNS-G-HE225DPB/3/index.html?&ACTION=3&LA=446&ARTICLE=130197&artnr=HANNS-G+
http://www.reichelt.de/Keyboard-Mouse-Sets/CHERRY-JD-0800DE/3/index.html?&ACTION=3&LA=2&ARTICLE=154150&
https://www.reichelt.de/KOLBEN-FP-30/3/index.html?&ACTION=3&LA=446&ARTICLE=89497&artnr=KOLBEN+FP+30&S
https://www.reichelt.de/Solder/LZ-FE-1-0-100/3/index.html?&ACTION=3&LA=2&ARTICLE=30439&GROUPID=557&artnr=
https://www.reichelt.de/TG-WLPA-015/3/index.html?&ACTION=3&LA=446&ARTICLE=156447&artnr=TG-WLPA-015&SEA
https://www.reichelt.de/Holders-Vices/HALTER-ZD-10MB/3/index.html?&ACTION=3&LA=5700&ARTICLE=145605&GROU
https://www.reichelt.de/Standard-soft-finish/WIHA-302-3-5/3/index.html?&ACTION=3&LA=2&ARTICLE=28685&GROUPID
https://www.reichelt.de/Blei-Vlies-Akkus-12V-Panasonic/LCR-12V-7-2P-1/3/index.html?ACTION=3&LA=5&ARTICLE=265!

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304_10137_10060_10302_10
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155_438_10154_10056_10055_1005
_10068_10193_10194_1030
_10308_10304_10137_10060_1
137_10060_10302_10155_438_

_10068_10193_10194_1030
5_10151_10068_10193_101
 or maybe this would work https://www.reichelt.de/11-Watt-axial/11W-AXIAL-12/3/index.html?&AC

3_10194_10308_10304_10137_10060_
068_10193_10194_10308_103
_10060_10302_10155_438_10
068_10193_10194_10308_1030
194_10308_10304_10137_10060
1_10068_10193_10194_1
_10308_10304_10137_10060_1
1_10068_10193_10194_103
137_10060_10302_10155_438_
0065_10151_10068_
0304_10137_10060_10302_
0193_10194_10308_10
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