






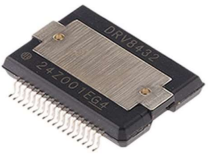

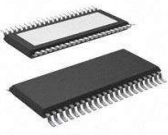




**GAMMA COOL BOX  
BILL OF MATERIAL**

June 2018, by Mej

**TOTAL 236 €**

Ref	Details	Unit cost [€]	Quantity	Total cost [€]
<b>Modules 124 €</b>				
Fan+Radiator GAMMAX_200	 <p>12V, 200mA 4pin connector 95W 30dB</p>	12.0 €	5	60 €
Peltier TEC1-07108HT	 <p>30x30x3.5mm 8.5V/8.5A</p>	5.0 €	2	10 €
Peltier TES1-3105	 <p>15x15x5mm 3.5V/5A</p>	3.0 €	2	6 €
Power supply RS-150-12	 <p>Input: 88-264V / 47-63Hz Output: 12V / 12.5A (150W) 199x98x38mm ! Without cable !</p>	34.0 €	1	34 €
DC/DC buck LM2596 module	 <p>Step-down. 3A max Manual potentiometer</p> <p>IC alone cost 3-4€ per 10 on elec suppliers...</p>	2.0 €	1	2 €
MCU Arduino Leonardo	 <p>ATmega32U4 5V/16MHz Native USB core 60kHz 8 bit PWM</p>	10.0 €	1	10 €
RF NRF24L01 module	 <p>RF module compatible MCU Arduino</p>	2.0 €	1	2 €

Ref	Details		Unit cost [€]	Quantity	Total cost [€]
<b>Drivers 16 €</b>					
Dual Full-Bridge	DRV8432	 GND to Vcc output (Vcc = 12V) 7A/channel, 12A peak PWM ctrl Custom SSOP (14x16mm_Pitch0.65mm)	5.6 €	1	6 €
L	DENO-23-0001	 2000uH - 16A max NOT shielded TH, Ø23mm	1.0 €	2	2 €
Dual Full-Bridge	DRV8412	 GND to Vcc output (Vcc = 12V) 3A/channel, 6A peak PWM ctrl HTSSOP-44-EP (8x14mm_Pitch0.635mm)	3.5 €	1	4 €
L	HCTI-330-5.2	 330uH - 5.2A max shielded TH, Ø32mm	1.2 €	2	2 €
Single bridge	DRV8830	 0.5V to 5V output (Vcc=6V) 1A max, 1.5A peak I <sup>2</sup> C com MSOP-10 (5x3mm_Pitch0.5mm)	1.0 €	2	2 €
<b>Other ICs 8 €</b>					
GPIO Expender	PCA9555	SOIC-24 16 GPIO expender, I <sup>2</sup> C com 7.5x15.4mm_Pitch1.27mm	0.9 €	1	1 €
I <sup>2</sup> C Fan controller	MAX31790	QFN-28-1EP 6 channel "4 pin fan" controller 4x4mm_Pitch0.4mm	2.4 €	1	2 €
I <sup>2</sup> C Temp sensor	MCP9904T-A	VDFN-10 1 internal + 3 outside junction sensor 3x3mm_Pitch0.5mm	0.7 €	5	4 €
LDO 5V	MIC5219	SOT23-5 3.3V/500mA, Vin=10V max	0.6 €	1	1 €
LDO 3.3V	MIC5504	SOT23-5 3.3V/300mA, Vin=5.5V max	0.6 €	1	1 €
<b>Passive electronic 6 €</b>					
Connector	2x4 SMD		0.20 €	12	2 €
	1x4 SMD		0.10 €	6	1 €
	Bornier SMD	9A	0.50 €	2	1 €
Q		for thermal sensing	0.05 €	15	1 €
LED	1206		0.05 €	14	1 €
R	1206, 0805		0.01 €	53	1 €
C	1206, 0805, 0603		0.01 €	40	0 €
<b>Raw stock 68 €</b>					
Aluminium	10mm				50 €
Wood	18mm				10 €
Blue Foam	80mm				5 €
FR4 PCM	1.6mm, 35µm Cu				3 €
<b>Miscellaneous 14 €</b>					
Wires	200mm, female, Pitch2.54mm		0.05 €	28	1 €
USB Cable			1 €	1	1 €
power cable			1 €	1	1 €
Screws	M3, 22mm		0.05 €	20	1 €
Thermal paste	15cc syringe		5 €	1	5 €
Soldering paste	Quickchip 15cc syringe, 220°C		5 €	1	5 €