

Reverse Costing analysis



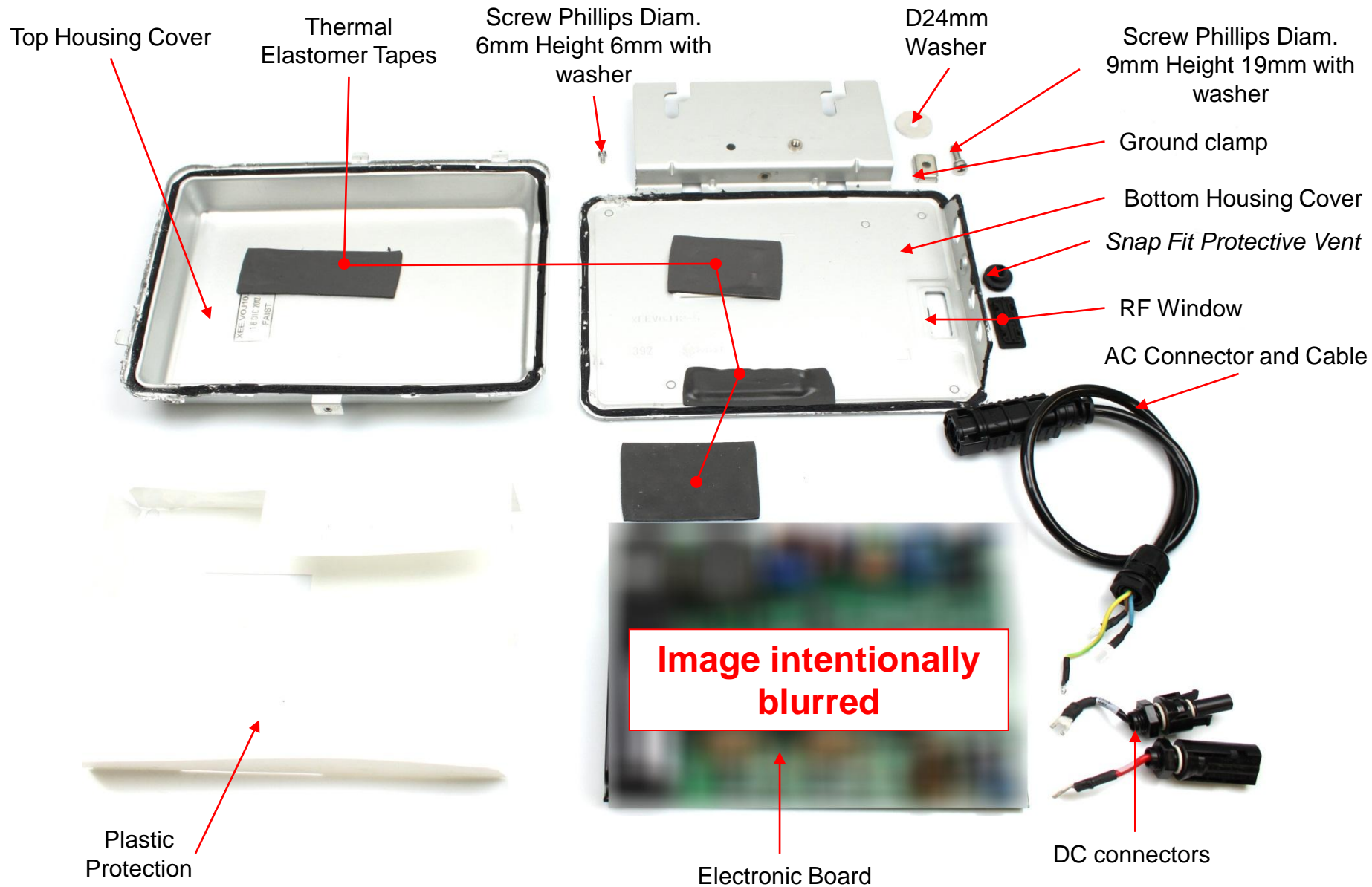
Micro inverter 250W Model: Micro-0.25-I-OUTD-230

March 2013 – Version 1
written by : David Le Gac

DISCLAIMER : System Plus Consulting provides cost studies based on its knowledge of the manufacturing and selling prices of electronic components and systems. The given values are realistic estimates which do not bind System Plus Consulting nor the manufacturers quoted in the report. System Plus Consulting is in no case responsible for the consequences related to the use which is made of the contents of this report. The quoted trademarks are property of their owners.

1. Overview / Introduction.....	3	3. BOM Cost.....	50
– Differences Unveiled		–Assessing the BOM	
– Introduction		–Estimation of the cost of the PCB	
– Company Profile : Power-One		–Estimation of the cost of the Electronic Boards	
– Main Features		–Assessing the Housing, Mechanical Parts	
– Specifications overview of the Aurora Micro-0.25-I		–Material cost breakdown	
– The course of the analysis			
2. Physical Analysis.....	13	4. Added Value Cost.....	61
– Views and dimensions of the inverter		–Assessing the Added Value (AV) Cost	
– Inverter Opening		–Electronic Board Manufacturing Flow	
– Connector and cables of the Inverter		–Electronic Board Process Cadencies	
– Electronic Board – Top Side - Global View		–Electronic Board Equipment Investment & Hourly Rates	
– Electronic Board – Top Side - High Definition Photo		–Details of the Electronic Board AV Cost	
– Electronic Board – Top Side - PCB Markings		–Details of the EMB-2530PA Board AV Cost	
– Electronic Board – Top Side - Main Components Markings		–Complete System Manufacturing Flow	
– Electronic Board – Top Side - Main Components Identification		–Details of the Complete System AV Cost	
– Electronic Board – Top Side - Other Components Markings		–Added Value cost breakdown	
– Electronic Board – Top Side - Other Components Identification			
– Electronic Board – Bottom Side - Global View		5. Estimation of the Manufacturing Price.....	70
– Electronic Board – Bottom Side - High Resolution Photo		–Manufacturing Cost Breakdown	
– Electronic Board – Bottom Side - PCB Markings		–Estimation of the Manufacturing Price	
– Electronic Board – Bottom Side - Main Components Markings		–Functional Breakdown	
– Electronic Board – Bottom Side - Main Components Identification			
– Electronic Board – Bottom Side - Other Components Markings		6. Conclusion.....	81
– Electronic Board – Bottom Side - Other Components Identification			
– EMB-2530PA Board– Top Side - Global View			
– EMB-2530PA Board– Top Side - High Definition Photo			
– EMB-2530PA Board– Top Side - Main Components Identification			

Inverter Opening



PCB Characteristics :

Material: FR4

Total Thickness: 1.6mm

Finishing : ENIG, Lead Free

Layers number: 4

External copper thickness: 18µm

Drilling holes number : 100

Dimensions : 100x100mm

Internal copper thickness: 18µm

Drilling diameter : 0.3mm

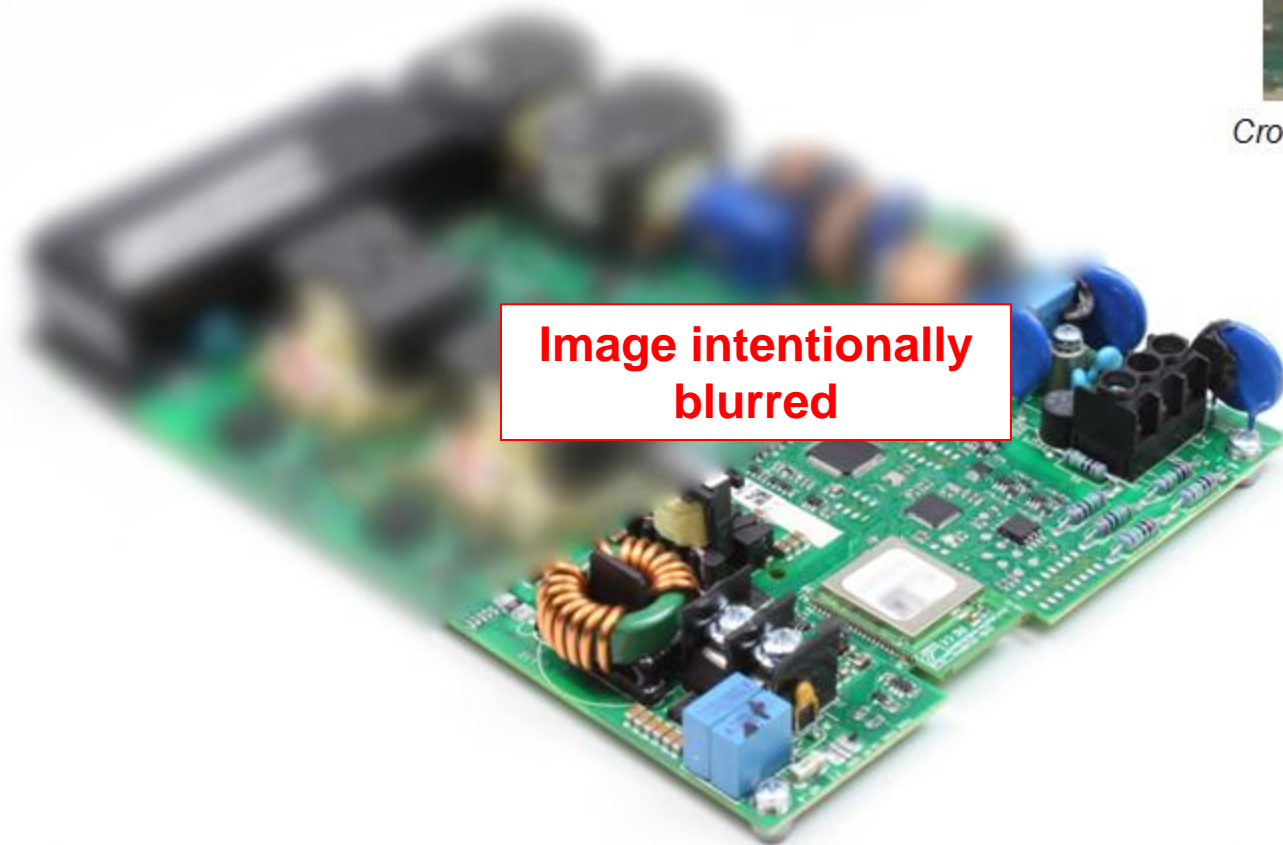
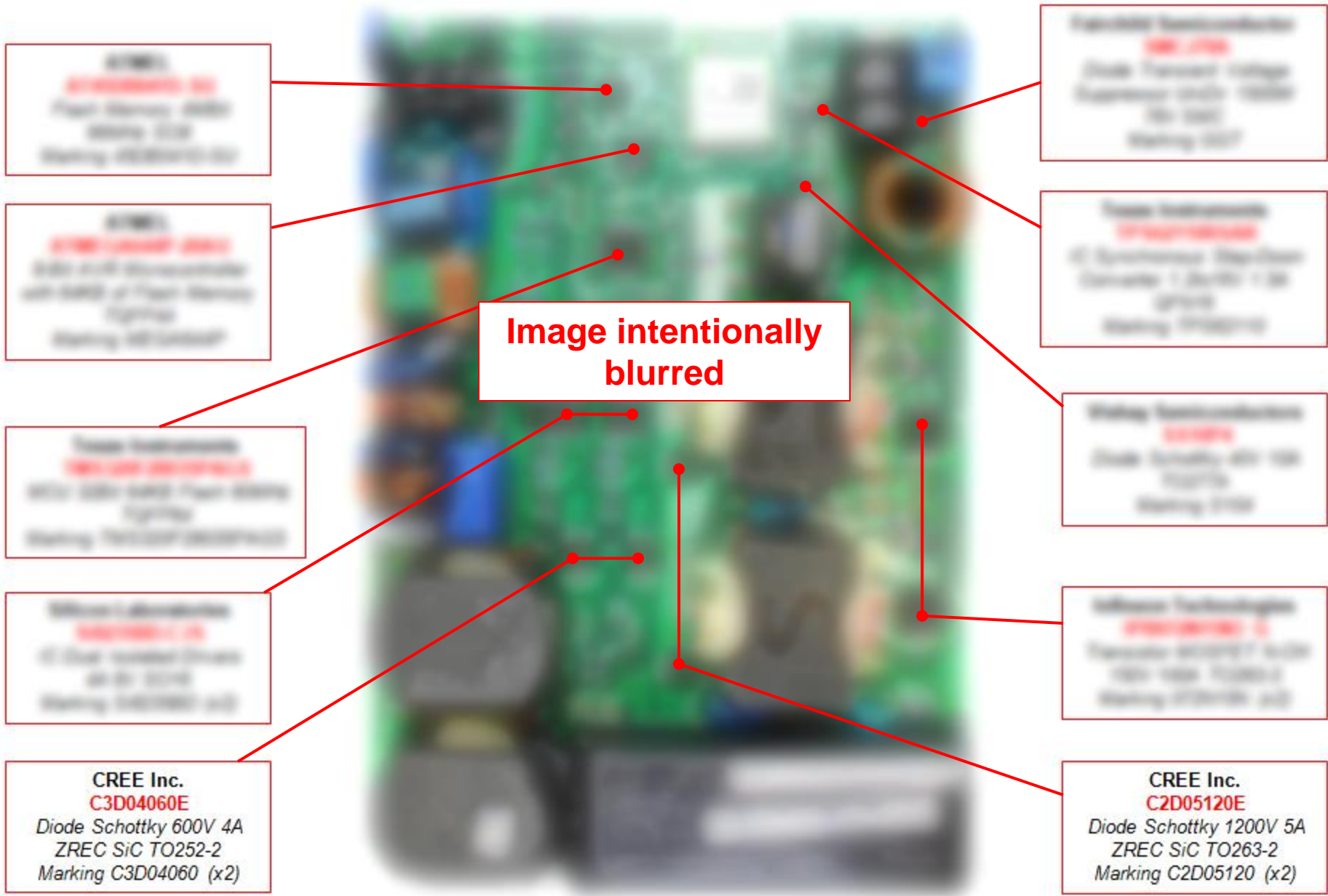


Image intentionally blurred



Cross section of the Main PCB



ELECTRONIC BOARD							2013 - 200K/yr			
PART NUMBER	QTY	DESCRIPTION	Package	Pin Nb	MANUFACTU	SIDE	UNIT PRICE	CURRENCY	UNIT PRICE (in EUR)	TOTAL
	1									
	1									
	2		SMD	2						
	1		SMD	2						
	1		SO8	8						
	1		TQFP44	44						
	1		TH	2						
	1		TH	6						
	1		TH	12						
	2		TH	2						
	1		CAP	2						
	1		TH	2						
	1		TH	2						
	3		TH	2						
	1		TH	2						
	1		SOT23	3						
	2		SOT23	3						
	11		SOT323	3						
	3		SOD323	2						
	2		TH	2						
	2		TO263	3						
	2		TO252	3						
	18		0803	2						
	4		0805	2						
	75		1206	2						
	1		TH	4						
	1		TH	2						
	1		TH	8						
	2		SMD	7						
	1		TH	2						
	1		TH	2						
	2		TH	2						
	1		TH	2						
	1	Transistor MOSFET N-Ch 200V 2.2A MLP8L Marking FDMC2610	MLP8L	8						
	4	Transistor PNP 20V 1,5A SOT23 Marking 718	SOT23	3						
	1	Inductor 0803	0803	2						

Image intentionally blurred

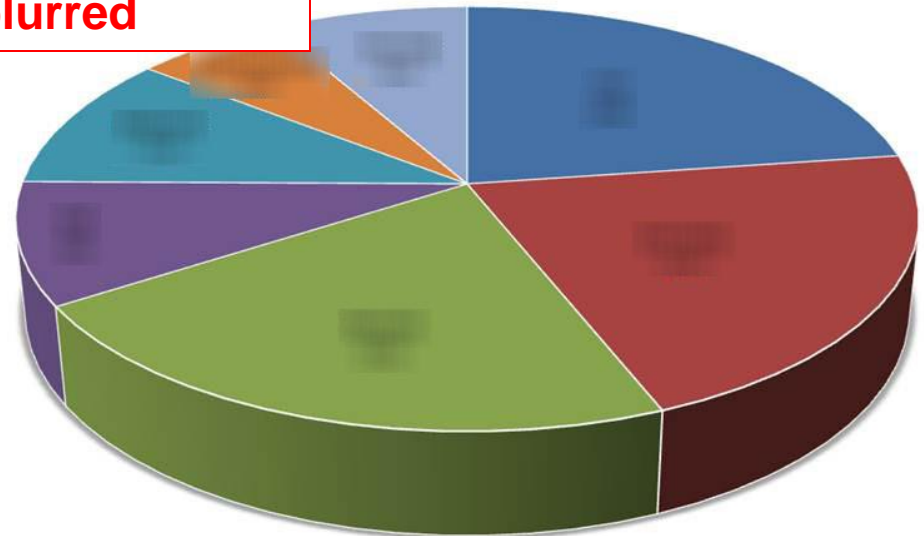
Material cost breakdown

Designation	Costs (€)	Costs (\$)	(%)
ICs			%
Discretes			%
Passives			%
PCB			%
Magnetic			%
Interconnect			%
Housing			%
TOTAL	€	\$	100%

The Electronic and Electrical components represent % of the total material cost of \$.

Material Cost Breakdown

Image intentionally blurred



Power-One - Aurora Micro inverter - Electronic Board (Italy)

- + Screenprinting (side 1)
- + Chipchooter (Side 1)
- + Pick and place SMT (Side 1)
- + Reflow (side1)
- + Automated Optical Inspection (side 1)
- + Storage(1)
- + Screenprinting (side 2)
- + Chipshooter (Side 2)
- + Pick and place SMT (Side 2)
- + Reflow (side 2)
- + Automated Optical Inspection (side 2)
- + Storage(2.1)
- + Manual Report Protective Carrier
- + Storage(2.2)
- + Manual report TH Cps
- + Storage(2.3)
- + Wave soldering
- + Storage(2.4)
- + Manual Withdrawal Protective Carrier
- + Storage(3)
- + In circuit test
- + Storage(4)
- + Rework
- + Storage(5)
- + Depaneling
- + Storage(6)
- + Functional test
- + Storage(7)
- + Resin Report
- + Storage(8)
- + Board conditioning



From the Screen Printing step to the Optical Test : these manufacturing steps are carried out in serial (the slowest equipment causes an additional immobilization of the other equipment).

Same operations are done on the 2d side.

A Protective Carrier/Pallet is mounted on the panel to protect the SMD component from the Wave Soldering.

Manual Placement of Through Hole Components (TH) and Connectors.

Wave Soldering and withdrawal of the protective carrier.

In circuit test (possible rework)

Depaneling

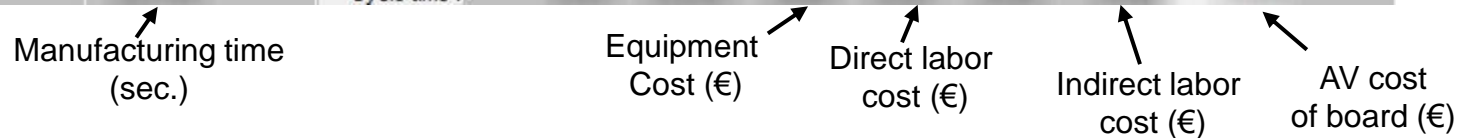
Functional Test

A resin is deposited on both side of the Board

Conditioning

Operation	Equip Time	Labour Time	Net Operation Time	Brut Operation Time	Cumulative Yield	Equip Cost	Labour Cost	Entity Cost	Full Labour Cost by Op	Operation Total Cost	Currency
Storage											
Panel loading/unloading											
Manual report of Protective Carrier											
Storage											
Panel loading/unloading											
Manual Report TH Cps											
Storage											
Panel loading/unloading											
Wave soldering - Setup											
Wave soldering											
Storage											
Panel loading/unloading											
Manual Withdrawal of Protective Carri											
Storage											
In circuit test - Setup											
Loading/Unloading											
In circuit test											
Storage											
Loading/Unloading											
Rework											
Storage											
Panel loading/unloading											
Depaneling											
Storage											
Loading/Unloading											
Functional test - Setup											
Functional test											
Storage											
Loading/Unloading											
Resin - Setup											
Resin Report											
Storage											
Board conditioning											

Image intentionally blurred



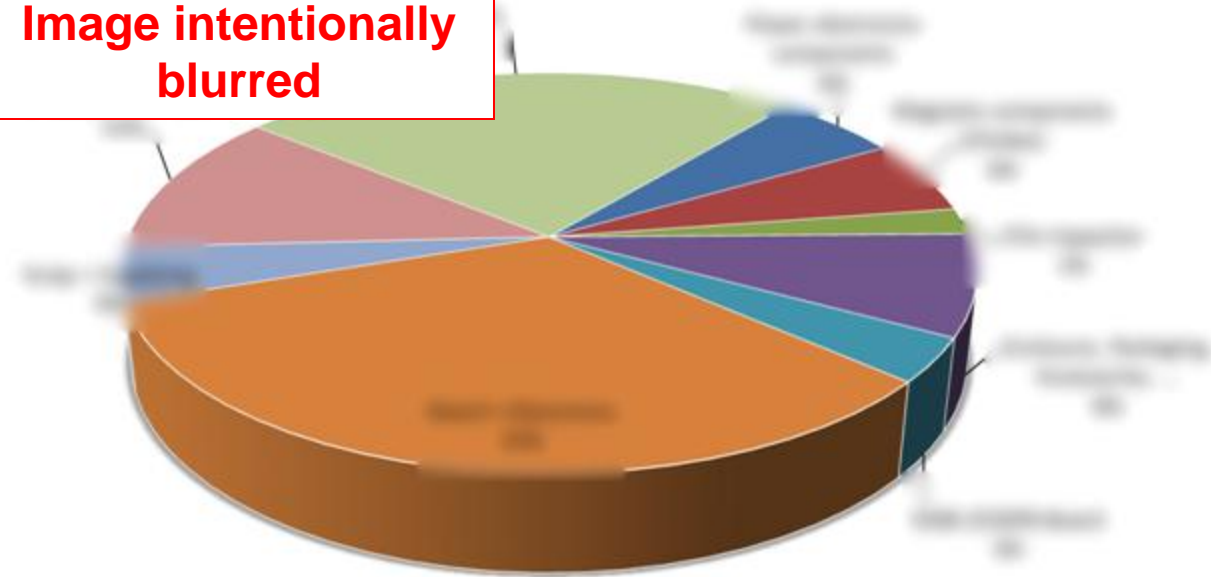
Cycle time :

Designation	Costs (€)	Costs (\$)	(%)
Power electronics components			
Magnetic components (Chokes)			
Film Capacitor			
Enclosure, Packaging, Accessories, ...			
Board + Electronics			
Scrap + Supplying			
Production + Test			
Power-One Overhead			
TOTAL			
	€/Watt	\$/Watt	

The Manufacturing Price is estimated to be € (\$).

Power-One Aurora Micro-0,25-I Inverter Cost Breakdown

Image intentionally blurred



- The Reverse costing analysis represents the best cost/price evaluation given the publically available data, completed with industry expert estimates.
- These results are open for discussion. We can re-evaluate this system with your information. Please contact us:



Headquarters :

Address :

21 rue La Noue Bras de Fer
F-44200 Nantes
FRANCE

Tel +33 (0)240 180 916

Fax +33 (0)253 551 059

info@systemplus.fr



EUROPE Sales Office
Ms Lizzie LEVENEZ
Frankfurt am Main
Tel: +49 (0) 151 23 54 41 82
Email : llevenez@systemplus.fr

Distributor:

 *Global Information, Inc.*
世界の市場調査資料 総合サイト
Tel: +81 044 952 0102 (Japan)
Website: www.gii.co.jp
