

# DESIGN FOR APPLICATION BASED ON Q2403

## POWER SUPPLY 5V

### LOW COST

Level / Version : 003

Date : 09/07/2002

Reference / Référence : WM\_CUS\_GEN\_CTI\_014

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001	12/12/01	OFFICIAL VERSION	B LEBOT
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	Name / Nom	Function / Fonction	Date/ Date	Signature/ Signature
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# 1 INTRODUCTION

## 1.1 Goal of the document

This document with for goal to propose design around the **Q2403** module.

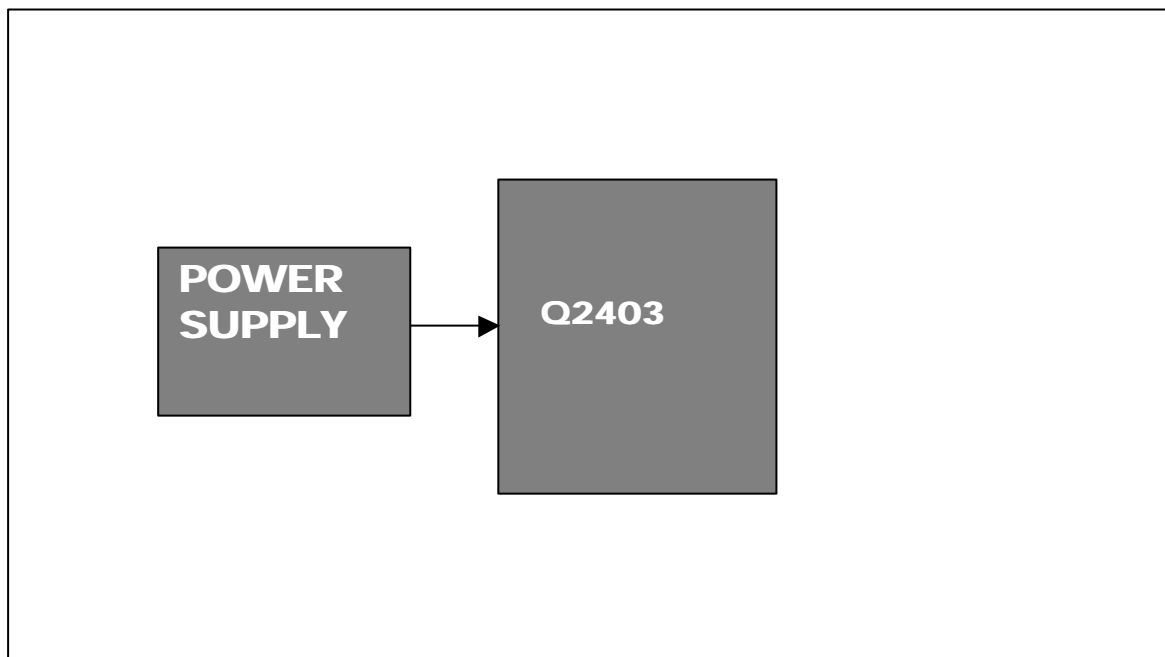
### **NOTES:**

All schematics proposed in this document have passed the electromagnetic compatibility tests in a MODEM WAVECOM in accordance with the following standards :

<b>ETSI EN 300 342-1 edition 1997</b>
<b>EN 55022 Class B (emission)</b>
<b>EN 61000-4-2(CEM)</b>
<b>EN 61000-4-3(ESD).</b>
<b>CLIMATIC TEST OPERATING -20°C;+55°C</b>
<b>CLIMATIC TEST STORAGE -30°C;+85°C</b>

## 2 MODULE INTERFACES

### 2.1 Block diagram



### 2.2 Interface description

- POWER SUPPLY: A standard 5V +/-5%-1A power is strictly required to supply this design..

### 3 POWER SUPPLY

#### 3.1 5V /1A Power supply

Power Supply is one of the key issue in the design of a GSM terminal.  
The purpose is to characterise a reference 5 V power supply to feed Q2403 module .

Advantages of such kind of power supply:

- Small size( based on MIC 5158: LDO Regulator)
- Low POWER DISSIPATION
- Minimal radio perturbation (ripple)

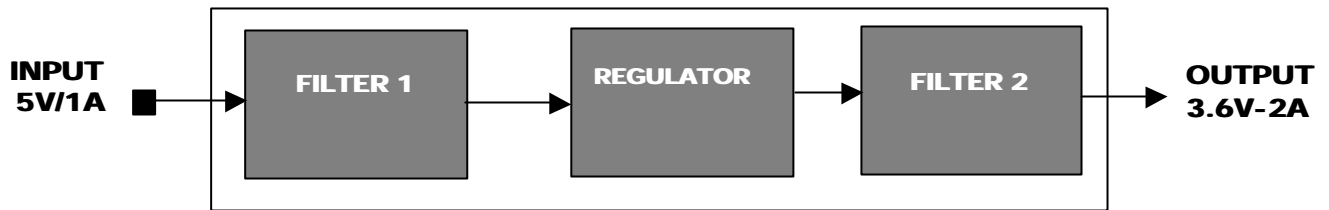
##### 3.1.1 Input features

	MIN	NOM	MAX	UNITES
<b>Input voltage DC</b>	4.75	5	5.25	V
<b>Ripple voltage :F&lt;200Khz</b>			60	mV
<b>Ripple voltage :F&gt;200Khz</b>			15	mV

##### 3.1.2 output features

	SPECIFICATION				
	MIN	NOM	MAX	RESULT	UNITES
<b>Output current @ PCL5-TX</b>			2	1.6	A
<b>Consumption in OFF</b>				6	mA
<b>Output voltage DC</b>		3.7	3.8	3.68	V
<b>Ripple voltage</b>			300		mV

### 3.2 BLOC DIAGRAM



#### FILTER1 and FILTER 2 :

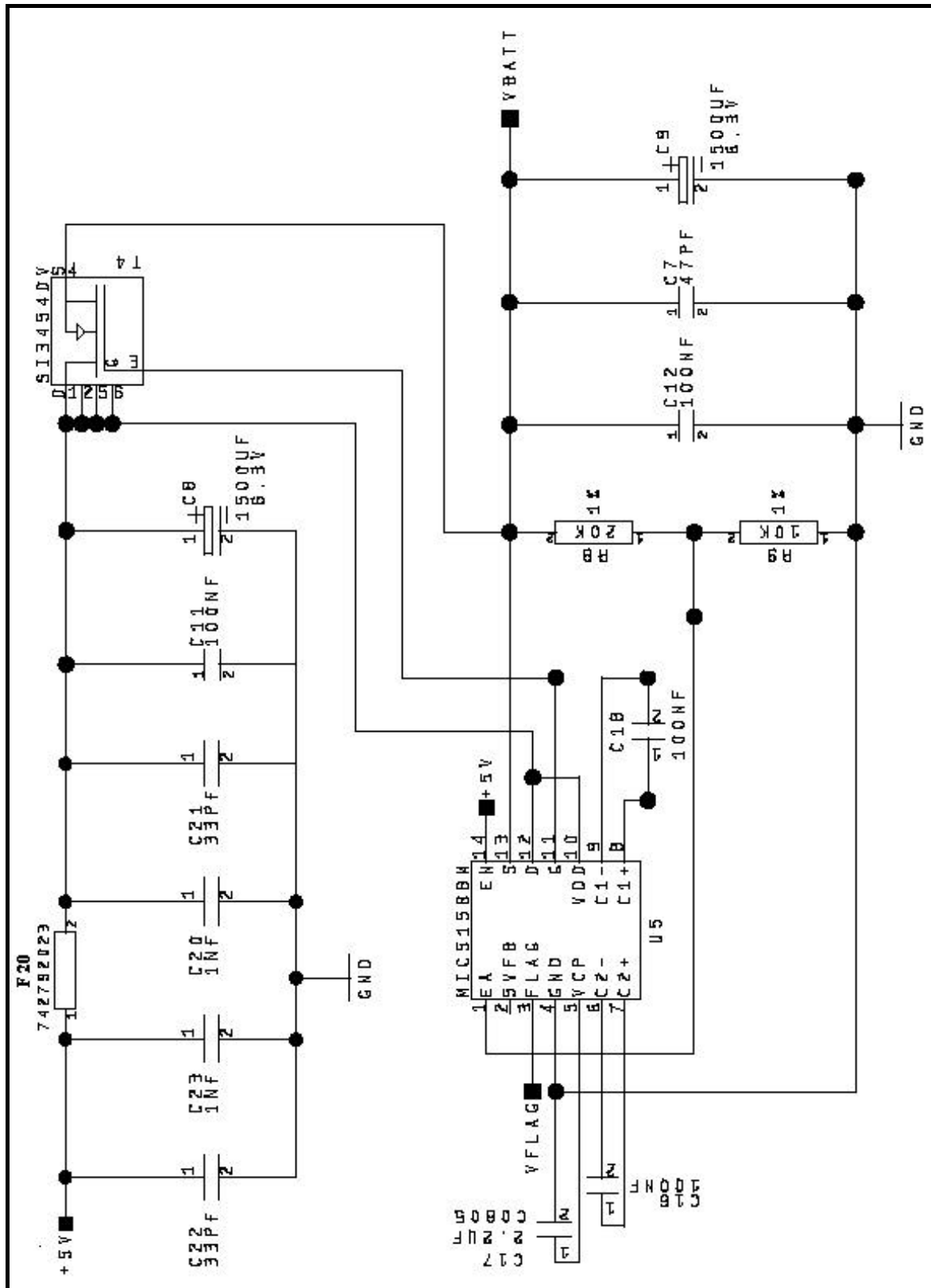
These filter are to minimise noise coming from outside and for needs for significant current in the burst we use large capacitor of 470 $\mu$ F of technology LOW ESR. It's on this part that you can decrease the price.

#### REGULATOR :

A LDO regulator is used.

LDO regulator added to a PMOS output minimise dissipation.

### 3.3 schematic





### 3.4 Components triple sourcing

#### **filtrage 1**

F20 : INDUCTOR FERRITE -742792023

<b>F20</b>	First source	Second source	Third source
SUPPLIER	WE	MURATA	WURTZ
DEVICE	WEEMI	BLM21300SN1	
PACK	742792023		74279206

#### **Regulation**

C8: CAPACITOR-ELECTROLYTIQUE 6.3V 1500µF or 1000µF TANTALE 6.3V

<b>C8</b>	First source	Second source
SUPPLIER	SANYO 1500µF	VISHAY 1000µF
DEVICE	6CV1500AX	594D108X06R3R2D
PACK	C103X103	RCASE
ADVANTAGE	PRICE CHEAPER	
DISADVANTAGE	CASE HIGHER	PRICE EXPENSIVE CASE HIGHER

T5 :TRANSISTOR-MOSFET- N CHANNEL

<b>T5</b>	First source	Second source	Third source
SUPPLIER	VISHAY	INTERNATI RECTIFIER	FAIRCHILD
DEVICE	SI3454DV	IRLMS1503	FDC655AN
PACK	SOT23-6		

U1 :LDO CONTROLEUR-ADJUSTABLE

<b>U1</b>	First source
SUPPLIER	MICREL
DEVICE	MI5158BN
PACK	SOIC14

#### **Filtrage2**

C9: CAPACITOR-ELECTROLYTIQUE 6.3V 1500µF or 1000µF TANTALE 6.3V

<b>C9</b>	First source	Second source
SUPPLIER	SANYO 1500µF	VISHAY 1000µF
DEVICE	6CV1500AX	594D108X06R3R2D
PACK	C103X103	RCASE
ADVANTAGE	PRICE CHEAPER	PRICE EXPENSIVE
DISADVANTAGE	CASE HIGHER	CASE HIGHER

### 3.5 Bill of material

C7	CAPACITOR	COG	33PF		50V	C0603			C0603
C8	CAPACITOR	C103X103	1500UF		6.3V		ELECTROLYTIC	SANYO	
C9	CAPACITOR	C103X103	1500UF		6.3V		ELECTROLYTIC	SANYO	
C11	CAPACITOR	X7R	100NF		16V	C0603			C0603
C12	CAPACITOR	X7R	100NF		16V	C0603			C0603
C16	CAPACITOR	X7R	100NF		16V	C0603			C0603
C17	CAPACITOR	Y5V	2.2UF		16V	C0805			C0805
C18	CAPACITOR	X7R	100NF		16V	C0603			C0603
C20	CAPACITOR	X7R	1NF		50V	C0603			C0603
C21	CAPACITOR	COG	33PF		50V	C0603			C0603
C22	CAPACITOR	COG	33PF		50V	C0603			C0603
C23	CAPACITOR	X7R	1NF		50V	C0603			C0603
F20	INDUCTOR	FERRITE				WE0805	742792023	WE	WEEMI
R9	RESISTOR		10K	1%	1/16W	R0603			R0603
R8	RESISTOR		20K	1%	1/16W	R0603			R0603
T4	MOSFET	N CHANNEL				SOT23-6		VISHAY	SI3454DV
U5	LDO CONTROLLER		ADJ			SOIC14	MIC5158BM	MICREL	MIC5158BM

### 3.6 Layout restriction

- See application notes of MIC 5158 MICREL :
  - dissipation under MOS
  - MOS near the MIC5158
- **VBATT :**
  - The track between battery and module connectors has to be 2mm large.
  - It is recommended to get the track not to close from the audio circuit.

## 4 MMI layout restrictions

To avoid any EMI/RFI problem, do not place any electrical function around the antenna connection on module or too close to the antenna.

Especially for Low frequency devices: DC/DC converter, microprocessors, memories..

RF lines or cables shall be as short as possible to minimize losses and must have a characteristic impedance of 50 Ohms until  $F \geq 2$  GHz.

A micro strip line, as above, or a strip line can be used.

### 4.1 Power supply connection

Since the maximum peak current is around 2 A, to avoid voltage loss between the external power supply and the module power supply, WAVECOM strongly recommends a large width for the layout of this signal.

A total impedance line  $\leq 10 \text{ m}\Omega$  @ 217 Hz shall be routed, including through holes.

### 4.2 Ground connection

The ground connection on module is assumed by mechanical fixing points, and not 60pts connector. All of these 4 points shall be connected together to assume the module ground. An extra ground plane is recommended on application board just behind module.