ACTIVATION MODULE
PRINTED CIRCUIT BOARD
DEFINITION

CGGVERITAS – MARINE GEOSCIENCE AND TECHNOLOGY DEPARTMENT
MARINE ENGINEERING R&D DEPARTMENT

DOCUMENT CONTROL

Change Record

Date	Author	Version	Change Reference
October 12, 2012	D. PONCEAU	V 1.0	-
April 12, 2013	D. PONCEAU	V 2.0	
April 25, 2013	D. PONCEAU	V 2.1	

Reviewers

Name	Status

Distribution

Copy No.	Name	Location
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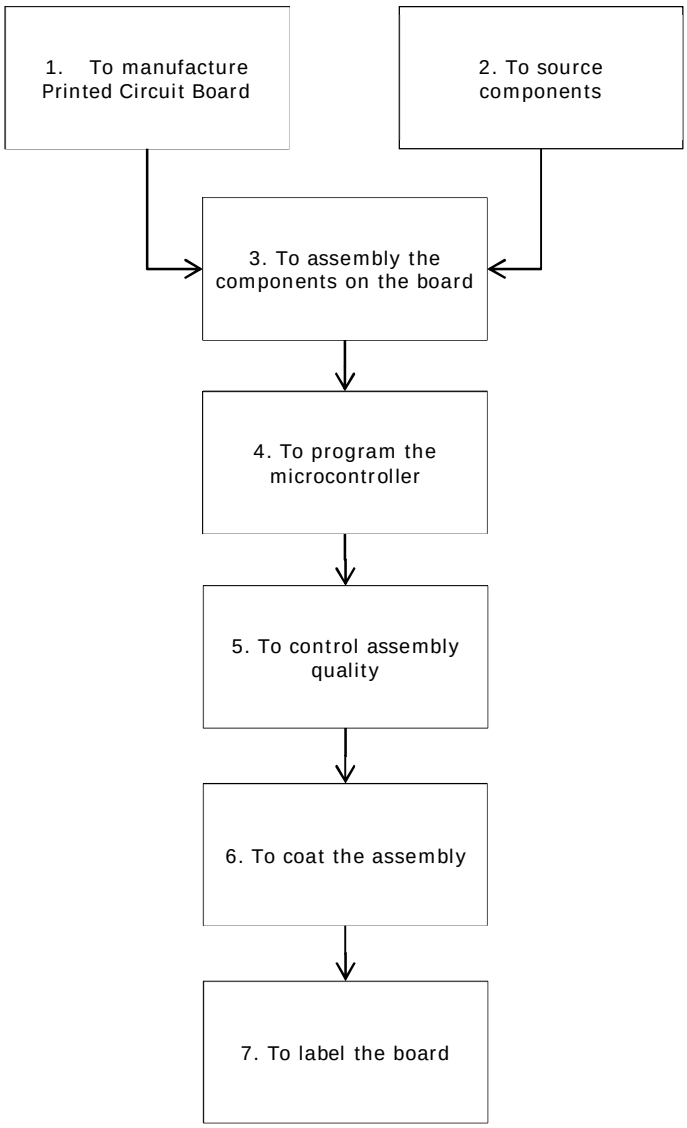
0. SCOPE OF WORK

This document describes the scope of work for the manufacturing of the printed circuit board of the activation module, including the pigtail to the LED.
The scope of this work includes manufacturing of the printed circuit board, sourcing of the components, assembling on the printed circuit board, programming of the microcontroller, testing of the assembled printed circuit board and its labeling. It also includes assembling the LED pigtail.



1. TO MANUFACTURE THE PRINTED CIRCUIT BOARD

This printed circuit board consists in four layers defined by Gerber files and schematics attached to this document. Definition files can be provided to the manufacturer in native format (Altium designer).

2. TO SOURCE COMPONENTS

A bill of materials attached to this document specifies the full list of elements to be sourced for the manufacturing of this printed circuit board and of the LED pigtail. A reference is given for all of them.
If items are missing in this list or if the manufacturer prefers other references, CGGVeritas has to be notified and to validate.

3. TO ASSEMBLY THE COMPONENTS ON THE BOARD

All the electronic components have to be placed on the top side of the printed circuit board. Some of them can be traversing and can need to be soldered on the bottom side.
Heavier ones (coil and connectors) will be glued to the top side of the board in order to increase their robustness to vibrations.

4. TO PROGRAM THE MICROCONTROLLER

CGGVeritas will provide test firmware and the tools to program the microcontroller when the assemblies at the end of the assembly process.
The microcontroller will be programmed with this test firmware.

5. TO CONTROL ASSEMBLY QUALITY

Assemblies will be submitted to a two minute long functional testing on a test bench provided by CGGVeritas. This test bench will measure the signals in about 30 test points and compare the recorded signals to simulations.
This testing will automatically generate a result file. Resulting files will be provided to CGGVeritas at the delivery of the assemblies.

6. TO COAT THE ASSEMBLY

A resin coating will be applied to both sides of the board except from the connectors to protect the PCB from its environment.
The heavier components will be glued to the top side of the board. They include the connectors and the inductance.

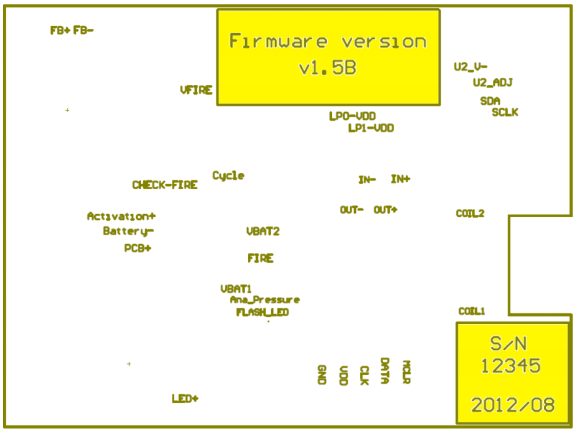
7. TO LABEL THE BOARD

PCB will be identified with a five digit serial number. First identifier of the production will be provided by CGGVeritas.
A weatherproof label (12 mm x 12 mm) on the bottom side of the board would indicate over three lines the serial number of the board and its date of assembly (yyyymmdd). The version of the program loaded in step 4 will be written on this label.
A weatherproof label (25 mm x 10 mm) on the bottom side of the board would indicate over two lines the firmware version.

Firmware version
1.5B

S/N
12345

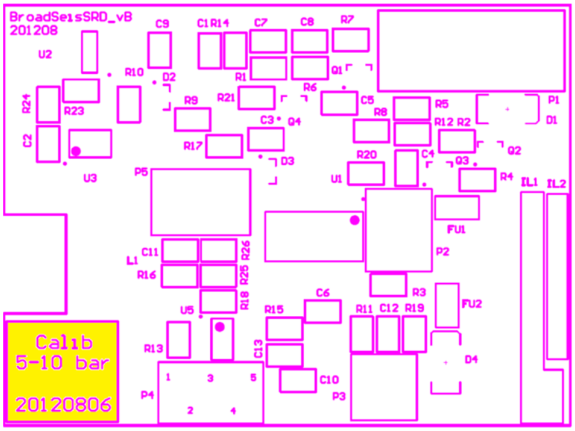
20120806



A weatherproof label (12 mm x 12 mm) on the top side of the board would define over three lines the calibration of the board and its date (yyyymmdd). This label will be left empty.

Calib
5-10 bar

20120806



8. TO ASSEMBLY THE LED PIGTAIL

A 10 cm long two wire pigtail terminated at one side by a LED and at the other side by a watertight connector.
Wires are directly soldered to the pins of the LED then resin coated.
The negative pin of the LED (black wire) is connected to the pin 1 of the connector.
The positive pin of the LED (brown wire) is connected to the pin 2 of the connector.

9. APPENDICES

Top layer	Internal upper layer	Internal lower layer
Bottom layer	Top overlay	Bottom overlay
Top solder mask	Bottom solder mask	Top paste

10. LIST OF ELECTRONIC DOCUMENTS ATTACHED

Bill of materials, pdf format
Schematics, pdf format

PCB top layer gerber data, gtl format
PCB mid-layer 1 gerber data, g1 format
PCB mid-layer 2 gerber data, g2 format
PCB bottom layer gerber data, gbl format

PCB top overlay gerber data, gto format
PCB bottom overlay gerber data, gbo format

PCB top solder mask gerber data, gts format
PCB bottom solder mask gerber data, gbs format
PCB top paste mask gerber data, gtp format

PCB drill drawing layer gerber data, gd1 format
PCB drill guide layer gerber data, gg1 format

PCB pick and place file, csv and txt format
PCB test points, csv and txt format

PCB drilling files, drl, drr, ldp and txt format

Microcontroller firmware, hex format

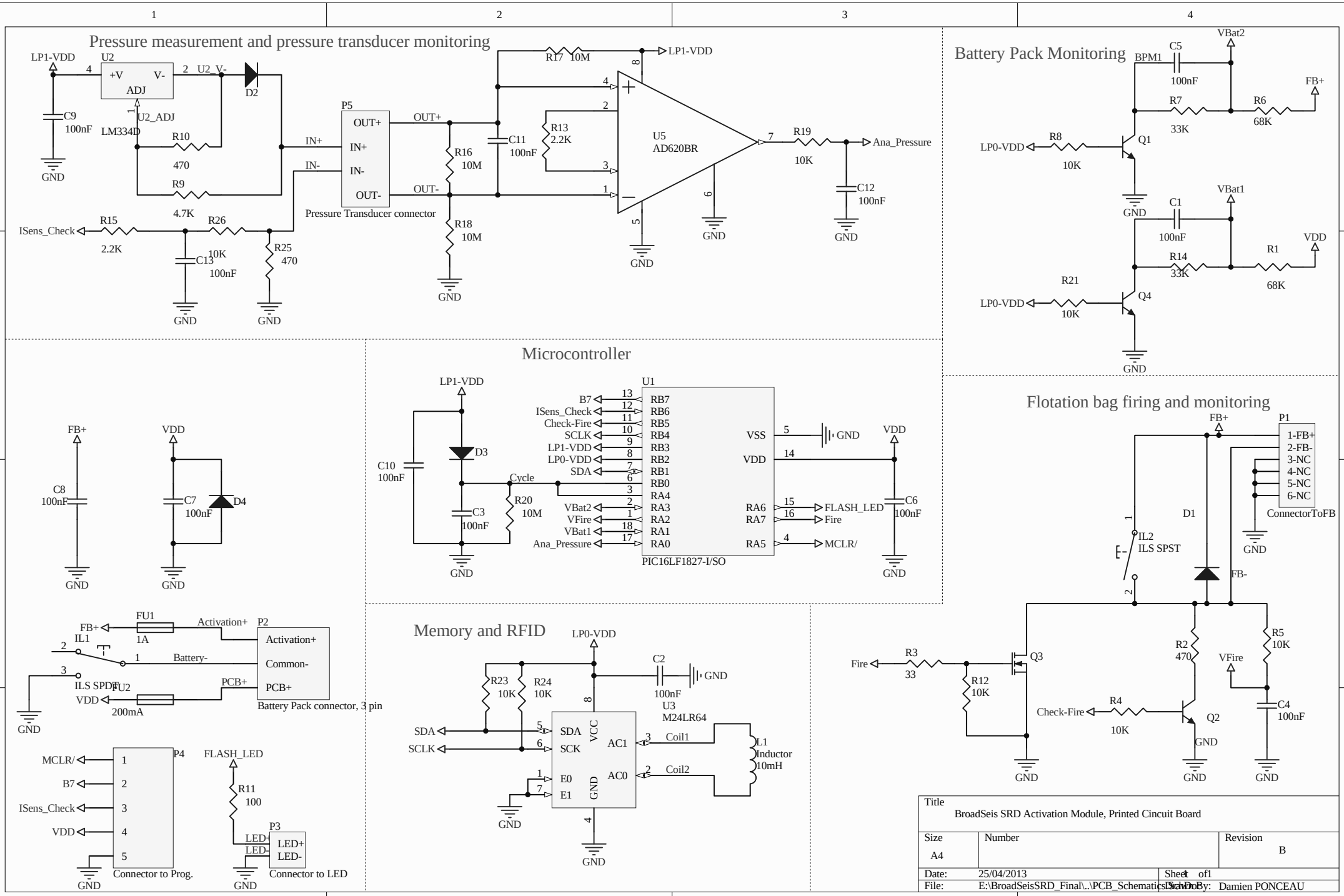
Activation module PCB and LED pigtail; Bill of materials

CGG — D.PONCEAU

PCB version C (2013/04) — 2013/04/25

Bill of materials version T

Identifier		Manufacturer	Reference	Packaging	Supplier	Reference	Qty
Printed board							
C1 to C13	MLCC Capacitor Y5V, 25 V, 100 nF	MULTICOMP	MCCA000179	CMS 0805	FARNELL	1759167	13
D1, D4	High speed diode 1.0A 200V CMS	MULTICOMP	RS1D	SMA/DO-214AC	FARNELL	4085027	1
D2, D3	High speed diode CMS	MULTICOMP	BAS16	SOT23	FARNELL	1621825	1
FU1	1 A fuse	MULTICOMP	MC12CF 001	CMS 1206	FARNELL	1841024	1
FU2	0.2 A fuse	MULTICOMP	MC12CF.200	CMS 1206	FARNELL	1841019	1
IL1	SPDT REED Inverter Switch 10-20 AT, radial	HAMLIN	MDRR-DT 15-20 F	Radial	NEWARK	24C6463	1
IL2	SPST REED NO Switch 10-30 AT, surface mount.	COTO TECHNOLOGY	CT10-1530-G1	SMT-G1	FARNELL	1081696	1
L1	4.7 µH inductor, 4 A	WUERTH ELEKTRONIK	744772047	5 mm pitch	FARNELL	1635795	1
Q1, Q2, Q4	NPN General purpose transistor	MULTICOMP	BC847B	SOT-23	FARNELL	1574343	3
Q3	HEXFET Power MOSFET	International Rectifier	IRLML0030TRPbF	SOT-23	FARNELL	1791366	1
R1, R6	Resistor, 68 kΩ, 5 %, 0.125 W, -55 to 125°C	PANASONIC	0.125W 0805 5% 68K	CMS 0805	FARNELL	2057730	2
R2, R10, R25	Resistor, 470 Ω, 5 %, 0.125 W, -55 to 125°C	PANASONIC	0.125W 0805 5% 470R	CMS 0805	FARNELL	2057693	3
R3	Resistor, 33 Ω, 5 %, 0.125 W, -55 to 125°C	PANASONIC	0.125W 0805 5% 33R	CMS 0805	FARNELL	2057675	1
R4, R5, R8, R12	Resistor, 10 kΩ, 5 %, 0.125 W, -55 to 125°C	PANASONIC	0.125W 0805 5% 10K	CMS 0805		2057719	9
R19, R21, R23, R24, R26					FARNELL		
R7, R14	Resistor, 33 kΩ, 5 %, 0.125 W, -55 to 125°C	PANASONIC	0.125W 0805 5% 33K	CMS 0805	FARNELL	2057726	2
R9	Resistor, 4.7 kΩ, 5 %, 0.125 W, -55 to 125°C	PANASONIC	0.125W 0805 5% 4K7	CMS 0805	FARNELL	2057714	1
R11	Resistor, 100 Ω, 5 %, 0.125 W, -55 to 125°C	PANASONIC	0.125W 0805 5% 100R	CMS 0805	FARNELL	2057681	1
R13, R15	Resistor, 2.2 kΩ, 5 %, 0.125 W, -55 to 125°C	PANASONIC	0.125W 0805 5% 2K2	CMS 0805	FARNELL	2057708	2
R16 to R18, R20	Resistor, 10 MΩ, 5 %, 0.1 W, -55 to 125°C	PANASONIC	0.125W 0805 5% 10M	CMS 0805	FARNELL	2057741	4
U1	Flash Microcontroller Unit with nanoWatt XLP	Microchip	PIC16LF1827	18 pin SOIC	RS	698-8975	1
U2	Current source	ST Microelectronics	LM334DT	8 pin SOIC	FARNELL	1750201	1
U3	64 kbit EEPROM	ST Microelectronics	M24LR64-R MN6	SO8N	FARNELL	1794173	1
U5	Instrumentation amplifier	Analog Devices	AD8227ARZ	8 pin SOIC	FARNELL	1827395	1
P4	Header, 2.54 mm pitch, 5 ways, SMT, gold plating	Molex	87898-0524	2.54 mm x 5	MOUSER	538-87898-0524	1
P1	DF3 header, 2 mm pitch, 6 ways, SMT, gold plating	HIROSE	DF3DZ-6P-2V(51)	2 mm x 6			1
P2	IP 67, crimp style shrouded header, 3 pins	JST	B03B-JWPF-SK-R	2 mm x 3	FARNELL	1324126	1
P3	IP 67, crimp style shrouded header, 2 pins	JST	B02B-JWPF-SK-R	2 mm x 2	FARNELL	1324125	1
P5	IP 67, crimp style shrouded header, 4 pins	JST	B04B-JWPF-SK-R	2 mm x 4	FARNELL	1324127	1
LED pigtail							
LED wire +	AWG 26 insulated wire, 10 cm long, brown	-	-	-	FARNELL	1742517	1
LED wire -	AWG 26 insulated wire, 10 cm long, black	-	-	-	FARNELL	1764904	1
P6	IP 67, crimp style connector, 2 pins	JST	02R-JWPF-VSLE-S	2 mm x 2	FARNELL	3849806	1
Contact for P6	JWPF connector, tab contact	JST	SWPR-001T-025	-	FARNELL	3849790	2
LED	Red 5 mm LED	AVAGO Technologies	HLMP-EG24-PS000	5 mm T-1	FARNELL	1003415	1
							Total


Pressure measurement and pressure transducer monitoring
LP1-VDD
U2
+V
V-
ADJ
U2_V-
U2_ADJ
LM334D
D2
C9
100nF
R10
470
R9
4.7K
GND
P5
OUT+
IN+
IN-
OUT-
Pressure Transducer connector
R17 10M
R13
2.2K
C11
100nF
R16
10M
R18
10M
U5
AD620BR
R19
10K
Ana_Pressure
C12
100nF
ISens_Check
R15
2.2K
R26
10K
C13
100nF
R25
470
Battery Pack Monitoring
VBat2
BPM1
C5
100nF
FB+
R7
33K
R6
68K
R8
10K
LP0-VDD
Q1
VBat1
C1
100nF
VDD
R14
33K
R1
68K
R21
10K
Q4
Microcontroller
U1
B7
ISens_Check
Check-Fire
SCLK
LP1-VDD
LP0-VDD
SDA
VBat2
VFire
VBat1
Ana_Pressure
RB7
RB6
RB5
RB4
RB3
RB2
RB1
RB0
RA4
RA3
RA2
RA1
RA0
VSS
VDD
RA6
RA7
RA5
FLASH_LED
Fire
MCLR/
PIC16LF1827-I/SO
C10
100nF
D3
Cycle
C3
100nF
R20
10M
C6
100nF
FB+
VDD
C8
100nF
C7
100nF
D4
Flotation bag firing and monitoring
P1
1-FB+
2-FB-
3-NC
4-NC
5-NC
6-NC
ConnectorToFB
D1
IL2
ILS SPST
FB-
R3
33
R12
10K
Q3
R2
470
R5
10K
VFire
R4
10K
Check-Fire
Q2
C4
100nF
FU1
1A
Activation+
P2
Common-
PCB+
Battery-
IL1
ILS SPDT
FU2
200mA
Battery Pack connector, 3 pin
Memory and RFID
LP0-VDD
R23
10K
R24
10K
C2
100nF
U3
M24LR64
SDA
SCK
VCC
AC1
AC0
E0
E1
GND
Coil1
Coil2
L1
Inductor
10mH
P4
MCLR/
B7
ISens_Check
VDD
Connector to Prog.
FLASH_LED
R11
100
P3
LED+
LED-
Connector to LED
Title
BroadSeis SRD Activation Module, Printed Cincuit Board
Size
A4
Number
Revision
B
Date:
25/04/2013
Sheet 1 of 1
File:
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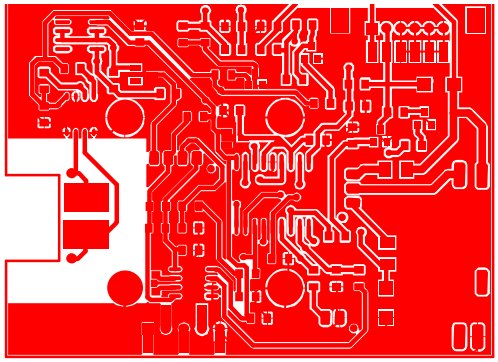
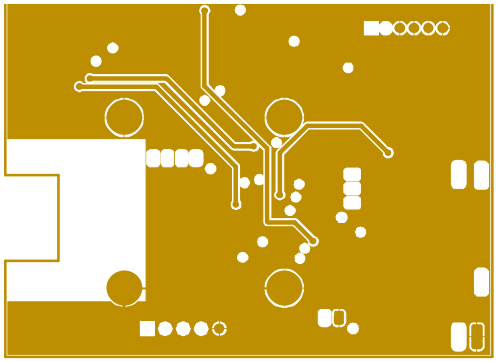
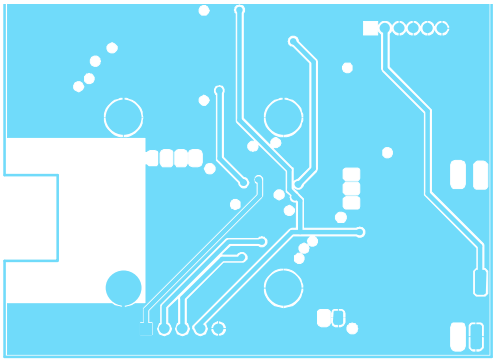
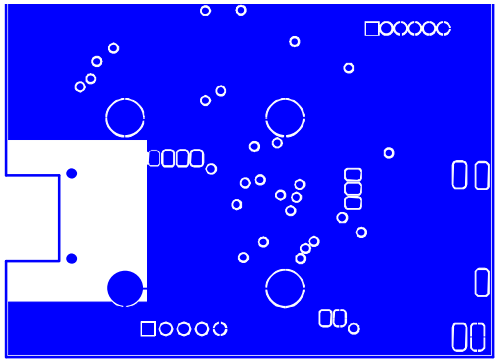
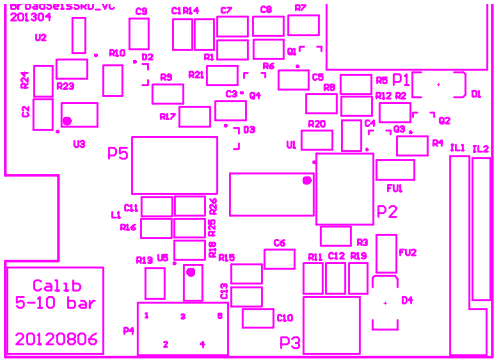
Drawn By:
Damien PONCEAU










Calib
5-10 bar
20120806
P1
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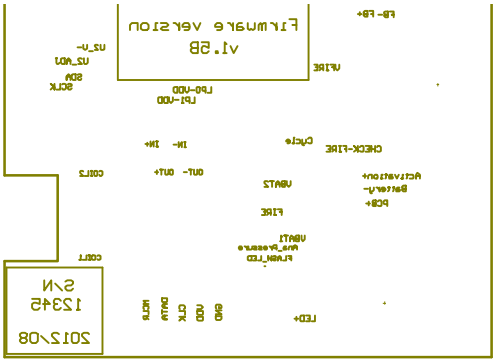
Firmware version
v1.5B
SN
12345
2012/08