

Iridium 9603N Beacon

Page 2:

With grateful thanks to:
Adafruit for the Feather M0 Adalogger
<https://www.adafruit.com/products/2796>
<https://github.com/adafruit/Adafruit-Feather-M0-Adalogger-PCB>
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Page 3:

With grateful thanks to:
Adafruit for the Ultimate GPS FeatherWing
<https://www.adafruit.com/products/3133>
<https://github.com/adafruit/Adafruit-Ultimate-GPS-FeatherWing-PCB>
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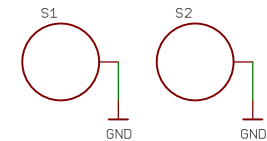
Page 4:

With grateful thanks to:
Sparkfun for the MPL3115A2 Breakout
<https://www.sparkfun.com/products/11084>
https://github.com/sparkfun/MPL3115A2_Breakout/tree/U_H1.1_L1.2.0
The hardware is released under Creative Commons ShareAlike 4.0 International.

Page 5:

LTC3225EDDB SuperCapacitor Charger
Based on Linear Technology DC1220B
and Element14's LTC Library

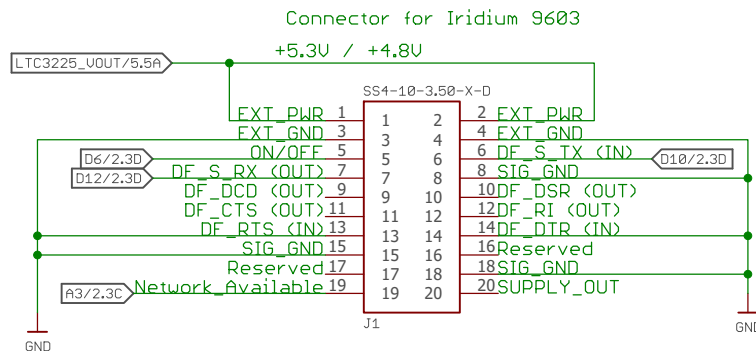
Mounting holes for Iridium 9603
2 x McMaster 95117A411 Press-In Nuts



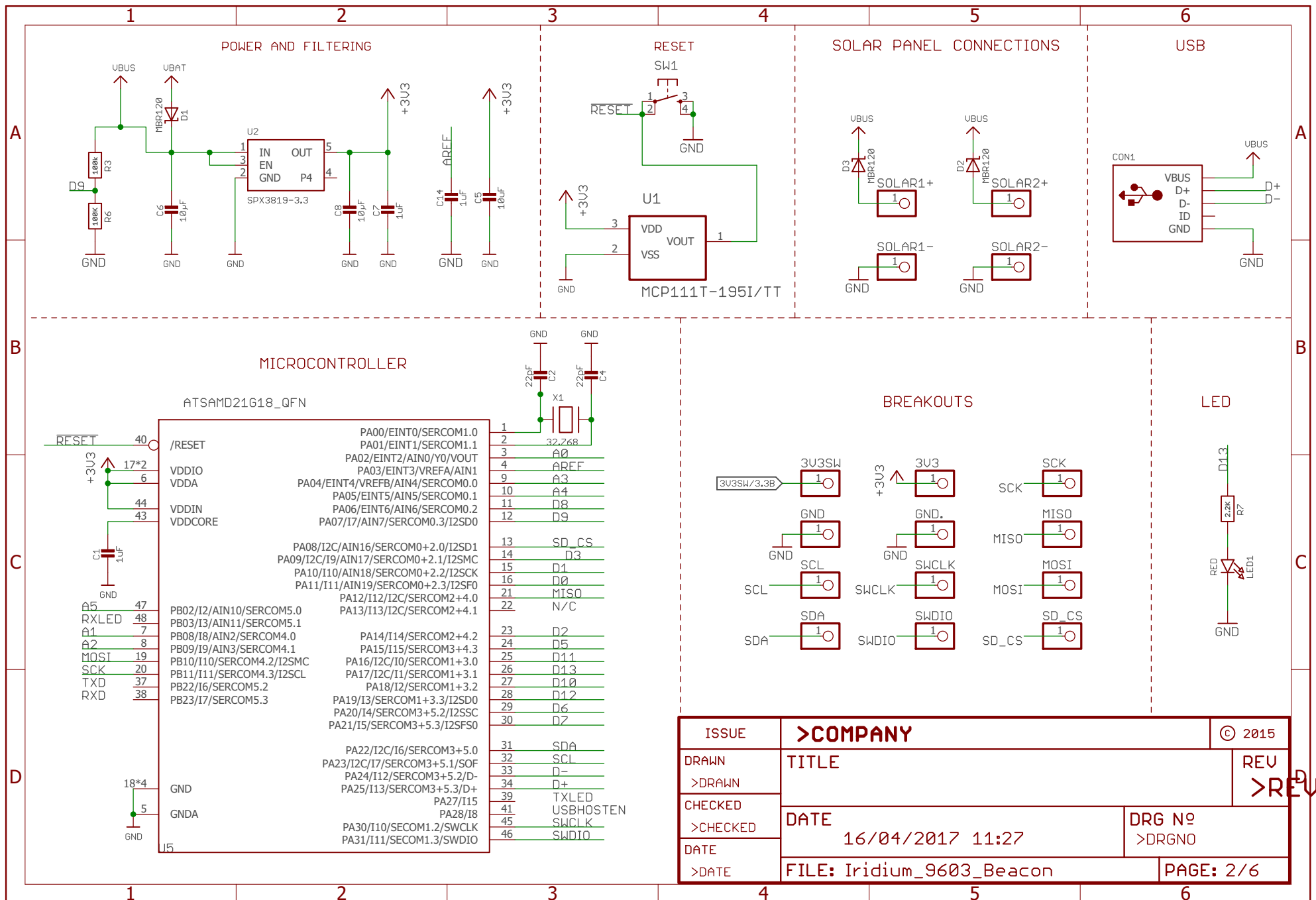
3 x AAA Energiser Ultimate Lithium
in Keystone Electronics 82 clips

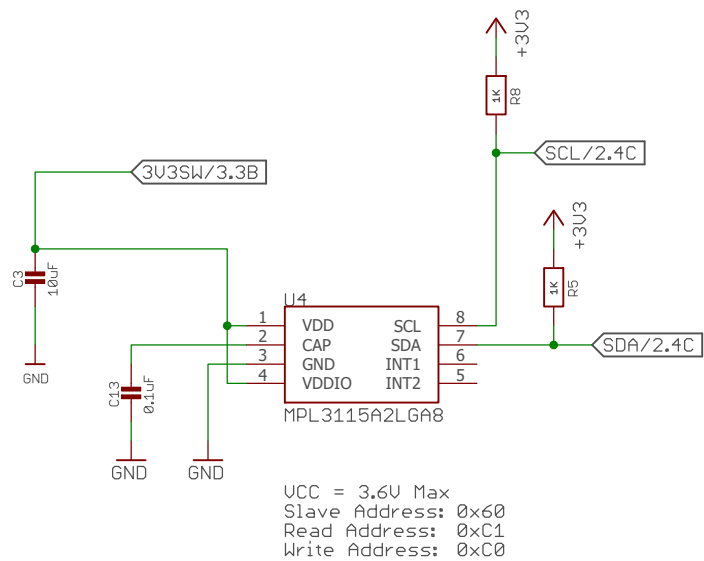


Fiducials



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Sheet: 1/6





A.Weiss

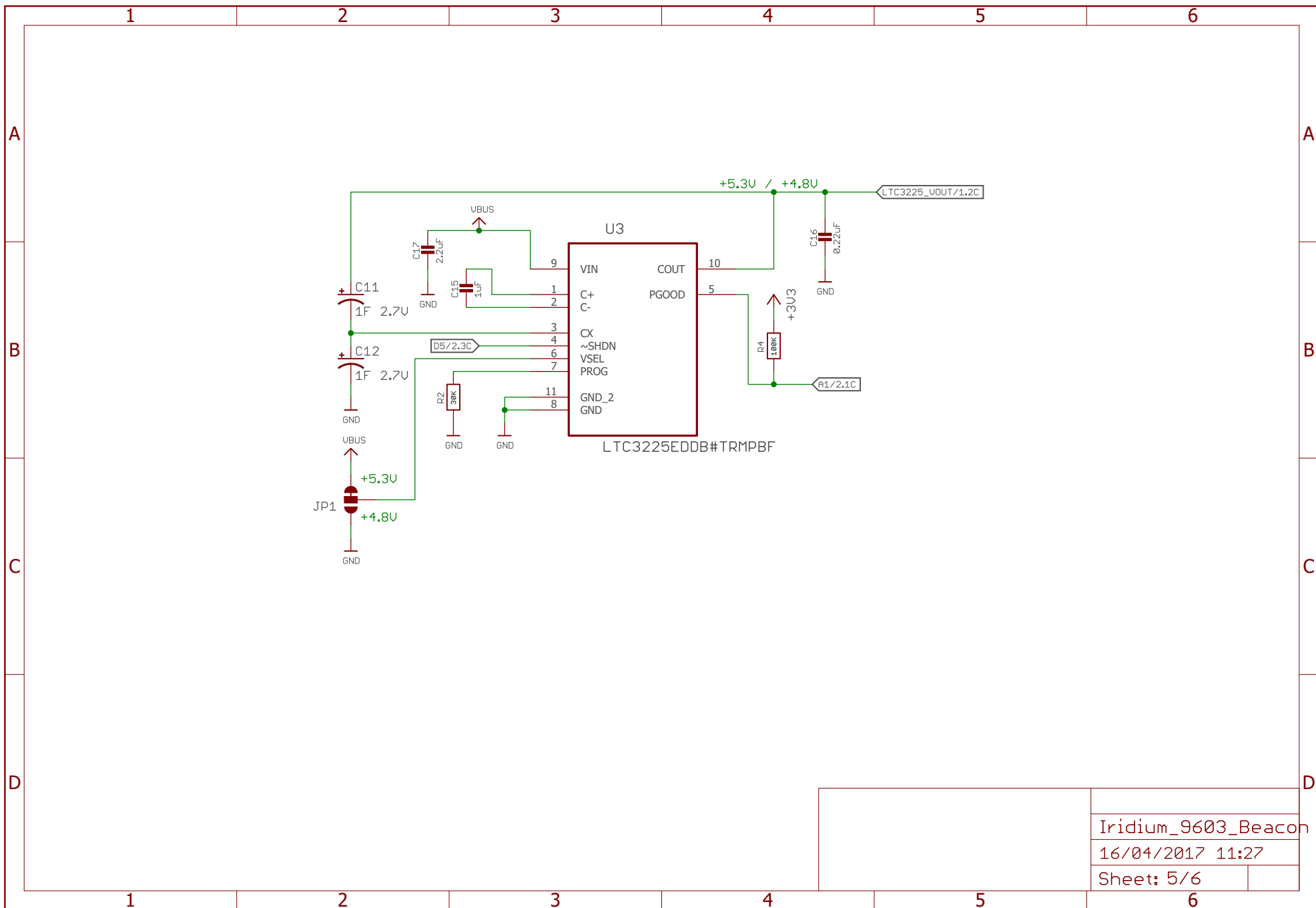
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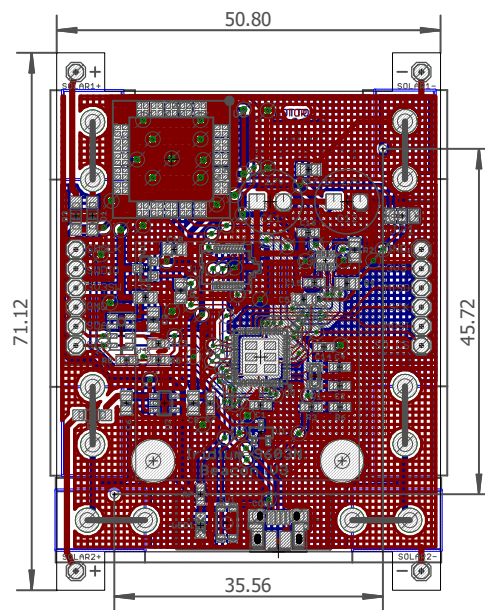
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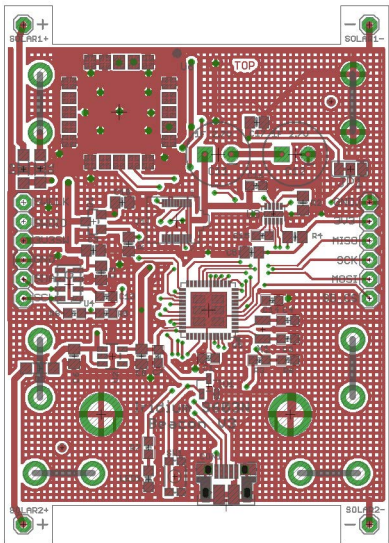
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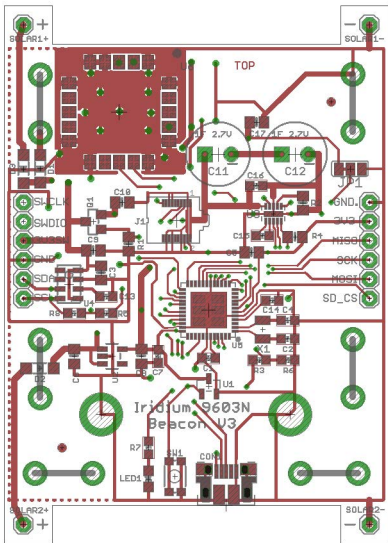


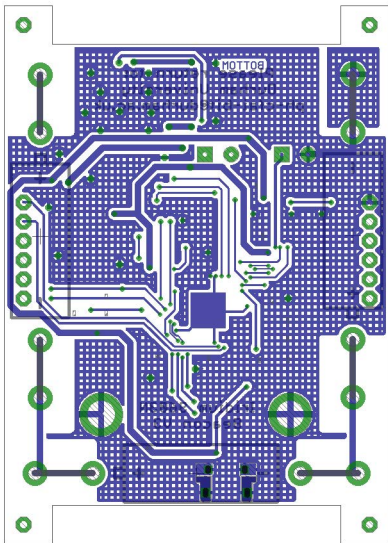
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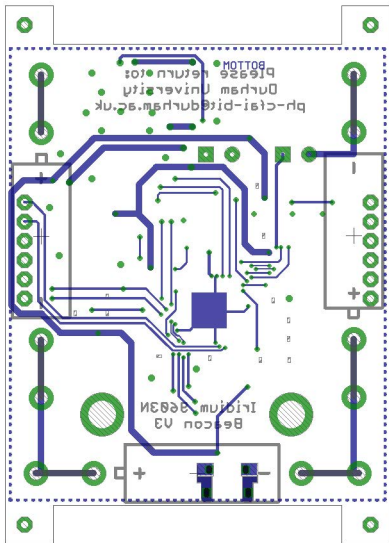
	1	2	3	4	5	6						
A	Iridium 9603 Beacon Change Log											
	U2: Changed C13 to 0603 Added pull-up resistors for SCL and SDA Changed the 3V3 pin adjacent to SCL/SDA to 3V3SW Moved the origin to board bottom-left corner U3: Added connections and protection diodes for two PowerFilm MPT3.6-150 solar panels Replaced GlobalTop FGPM0PA6H GPS with u-blox SAM-M8Q Added split pad to select LTC3225EDDB output voltage. Default is now 5.3V Replaced R2 with 30K to set supercapacitor charge current to 60mA LTC3225EDDB is now powered from VBUS instead of VBAT R3+R6 now monitor VBUS instead of VBAT Added reset supervisor U1											
B												
C												
D					<table><tr><td colspan="2">Iridium_9603_Beacon</td></tr><tr><td colspan="2">16/04/2017 11:27</td></tr><tr><td>Sheet: 6/6</td><td></td></tr></table>		Iridium_9603_Beacon		16/04/2017 11:27		Sheet: 6/6	
Iridium_9603_Beacon												
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Sheet: 6/6												
	1	2	3	4	5	6						











SOLAR1+
+

SOLAR1-
-

U6

SWCLK
SWDIO
3V3SW
GND
SDA
SCL

SWCLK
SWDIO
3V3SW
GND
SDA
SCL

R8

C6

U2

C8

C7

C1

U5

X1

R3

C2

R6

Iridium 9603N
Beacon U3

R7

SW1
LED1

CON1

SOLAR2+
+

SOLAR2-
-

JP1

GND.
3V3
MISO
SCK
MOSI
SD_CS

1F 2.7V
C11
C12

U3

C5

C14

C4

C18

J1

R1

1

2

C15

C16

C17

C18

C19

C20

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C22

C23

C24

C25

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C27

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Please return to:
Durham University
ph-ctai-pit@durham.ac.uk



Beacon V3
Iridium 9603N

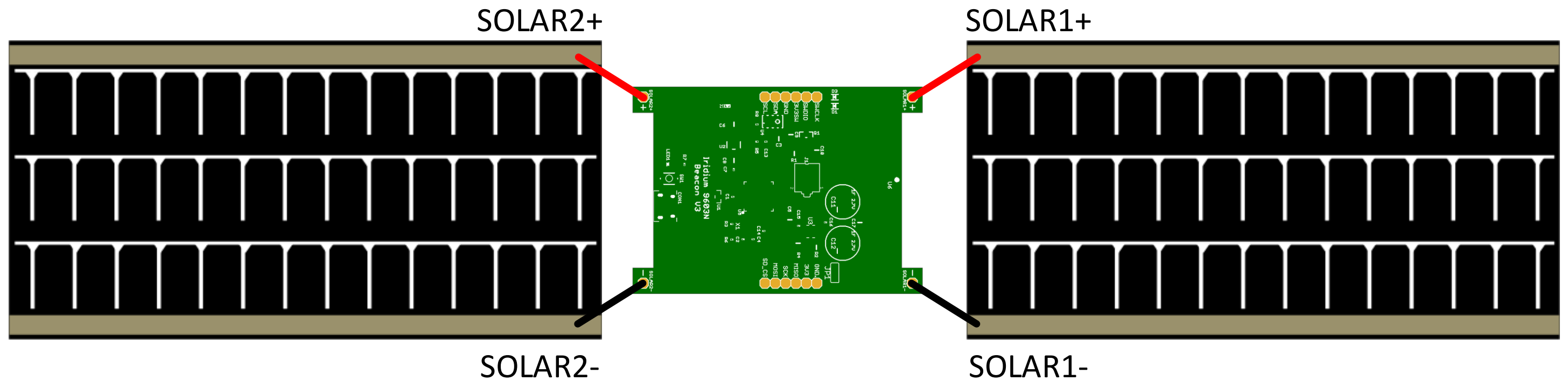


Part	X	Y	Angle	Package	Value	Manufacturer	Manufacturer Part No	Farnell Part No	Mouser Part No	Description
FD1	7.62	12.7	0							Fiducial
FD2	43.18	58.42	0							Fiducial
C1	26.99	24.51	180	0603	1uF	Walsin	0603X105K100CT	2496916		MultiLayer Ceramic Capacitor; 1uF; 10V; 0603; X5R
C2	37.47	27.05	0	0603	12pF	Walsin	0603N120J500CT	2496884		MultiLayer Ceramic Capacitor; 12pF; 50V; 0603
C3	12.76	35.81	270	0805	10uF	Walsin	0805F106Z100CT	2496998		MultiLayer Ceramic Capacitor; 10uF; 10V; 0805
C4	37.47	29.53	0	0603	12pF	Walsin	0603N120J500CT	2496884		MultiLayer Ceramic Capacitor; 12pF; 50V; 0603
C5	32.7	38.48	180	0805	10uF	Walsin	0805F106Z100CT	2496998		MultiLayer Ceramic Capacitor; 10uF; 10V; 0805
C6	9.21	24.77	270	0805	10uF	Walsin	0805F106Z100CT	2496998		MultiLayer Ceramic Capacitor; 10uF; 10V; 0805
C7	20.32	24.77	270	0603	1uF	Walsin	0603X105K100CT	2496916		MultiLayer Ceramic Capacitor; 1uF; 10V; 0603; X5R
C8	18.1	24.77	270	0805	10uF	Walsin	0805F106Z100CT	2496998		MultiLayer Ceramic Capacitor; 10uF; 10V; 0805
C9	11.75	38.73	0	0805	0.1uF	Walsin	0805B104K500CT	2496944		MultiLayer Ceramic Capacitor; 0.1uF; 50V; 0805; X7R
C10	15.56	45.09	0	0805	10uF	Walsin	0805F106Z100CT	2496998		MultiLayer Ceramic Capacitor; 10uF; 10V; 0805
C13	13.46	32.64	0	0603	0.1uF	Walsin	0603B104K500CT	2496834		MultiLayer Ceramic Capacitor; 0.1uF; 50V; 0603; X7R
C14	35.37	32.19	0	0603	1uF	Walsin	0603X105K100CT	2496916		MultiLayer Ceramic Capacitor; 1uF; 10V; 0603; X5R
C15	34.1	40.7	0	0603	1uF	Walsin	0603X105K100CT	2496916		MultiLayer Ceramic Capacitor; 1uF; 10V; 0603; X5R
C16	33.27	47.31	0	0603	0.22uF	Multicomp	MC0603F224Z160CT	1759019		MultiLayer Ceramic Capacitor; 0.22uF; 16V; 0603
C17	33.37	55.66	0	0805	2.2uF	Multicomp	MCTT21X225K100CT	1759477		MultiLayer Ceramic Capacitor; 2.2uF; 10V; 0805; X5R
CON1	29.34	8.07	0		Micro_USB	Amphenol_FCI	10103594	2293752		Amphenol FCI 10103594 Micro USB Type B
D1	4.73	49.56	90	SOD-123	MBR120	ON SEMICONDUCTOR	MBR120VLSFT1G	1431044		Schottky Rectifier; 20V; 1A; SOD-123
D2	4.7	23.18	180	SOD-123	MBR120	ON SEMICONDUCTOR	MBR120VLSFT1G	1431044		Schottky Rectifier; 20V; 1A; SOD-123
D3	2.54	49.53	90	SOD-123	MBR120	ON SEMICONDUCTOR	MBR120VLSFT1G	1431044		Schottky Rectifier; 20V; 1A; SOD-123
J1	22.78	42.71	0		SS4-10-3.50	Samtec	SS4-10-3.50-L-D-K-TR	2085336		Samtec SS4-10-3.50-L-D-K-TR
LED1	19.05	8.57	180	2.0x1.25	RED	Multicomp	703-0107	2112119		LED; Red; 20mA; 2.2V; 2.0x1.25mm
Q1	11.75	42.55	90	SOT23	DMG3415U-7	Diodes Inc.	DMG3415U-7	1843688		MOSFET; P Channel; SOT23-WIDE
R1	16.45	39.62	90	0805	100k	Multicomp	MC01W08051100K	9332405		Chip Resistor; Thick Film; 100k; 150V; 0805; 100mW
R2	39.43	45.02	90	0805	30k	Panasonic	ERJ6GEYJ303V	2323834		Chip Resistor; Thick Film; 30k; 150V; 0805; 125 mW
R3	33.69	24.26	0	0603	100k	Yageo	RC0603FR-13100KL	2309107		Chip Resistor; Thick Film; 100k; 50V; 0603; 100mW
R4	38.42	40.58	0	0805	100k	Multicomp	MC01W08051100K	9332405		Chip Resistor; Thick Film; 100k; 150V; 0805; 100mW
R5	13.46	30.45	0	0603	1K	Multicomp	MCWR06X1001FTL	2447272		Chip Resistor; Thick Film; 1k; 50V; 0603; 100mW
R6	37.5	24.26	0	0603	100k	Yageo	RC0603FR-13100KL	2309107		Chip Resistor; Thick Film; 100k; 50V; 0603; 100mW
R7	19.05	12.7	270	0603	2.2K	Panasonic	ERJ3GEYJ222V	2059610		Chip Resistor; Thick Film; 2.2k; 75V; 0603; 100mW
R8	9.27	30.45	180	0603	1K	Multicomp	MCWR06X1001FTL	2447272		Chip Resistor; Thick Film; 1k; 50V; 0603; 100mW
SW1	22.54	8.89	270	4.6x2.8	Tactile Switch	Multicomp	MCIPTG23K-V	1605470		Tactile Switch; 4.6x2.8mm; 50mA; 12V
U1	27.05	20.83	0	SOT23-3	MCP111T-195I/TT	Microchip	MCP111T-195I/TT		579-MCP111T-195I/TT	Reset Supervisor; SOT23-3; 1.95V; Open Drain; Active Low
U2	14.29	24.77	270	SOT23-5	SPX3819-3.3	Exar	SPX3819M5-L-3-3/TR		701-SPX3819M5-L-33TR	LDO Voltage Regulator; 500mA; SOT-23-5
U3	35.56	43.62	90	DFN-10	LTC3225EDDB	Linear Technology	LTC3225EDDB#TRMPBF	1715231		Supercapacitor Charger
U4	8.54	34.29	180	LGA8	MPL3115A2	NXP	MPL3115A2	2009084		Pressure Sensor
U5	26.99	30.86	90	TQFN48	ATSAMD21G18A	Atmel	ATSAMD21G18A-MF	2460544		ATSAMD21G18A-MF; QFN48
U6	15.18	57.02	270		SAM-M8Q	u-blox	SAM-M8Q			https://www.u-blox.com/en/product/sam-m8q-module
X1	34.16	28.32	270	3.2x1.5	32.768	Epson	Q13FC13500004	1278036		Crystal; 32.768kHz; 12.5pF; 3.2 x 1.5mm

Part	Value	Manufacturer	Manufacturer Part No	Farnell Part No	Mouser Part No	McMaster Part No	Description
Non-surface mount components:							
BAT1	AAA-Clip_Pair	Keystone Electronics	82	908721			Keystone Electronics 82 AAA Battery Clip (Pair)
BAT2	AAA-Clip_Pair	Keystone Electronics	82	908721			Keystone Electronics 82 AAA Battery Clip (Pair)
BAT3	AAA-Clip_Pair	Keystone Electronics	82	908721			Keystone Electronics 82 AAA Battery Clip (Pair)
C11	1F 2.7V	Bussmann	HV0810-2R7105-R	2148482			Supercapacitor; 1F; 2.7V; +30%, -10%; 3.5mm Pitch
C12	1F 2.7V	Bussmann	HV0810-2R7105-R	2148482			Supercapacitor; 1F; 2.7V; +30%, -10%; 3.5mm Pitch
S1	Press-In Nut	McMaster-Carr	95117A411			95117A411	Press-In Nut; 2-56
S2	Press-In Nut	McMaster-Carr	95117A411			95117A411	Press-In Nut; 2-56
Mounting hardware for Iridium 9603N and antenna PCB:							
SPACERS_x4						94669A100	4.5mm OD x 6mm Spacers for Iridium Module and Antenna PCB
SCREWS_x2						92185A092	2-56 x 0.75" Screws for Iridium Module and Antenna PCB
Components for antenna PCB:							
ANT1	IP.1621.25.4.A.02	Taoglas	IP.1621.25.4.A.02		960-IP1621254A02		25mm Iridium Patch Antenna
X1	uFL	Hirose	U.FL-R-SMT(01)	3908021			HIROSE U.FL-R-SMT(01); U.FL Coaxial; Straight Jack; 50 ohm
CABLE		Molex	73412-0508	1340201			Molex uFL Plug/Plug 50mm 73412-0508
For solar operation:							
Don't install BAT1-BAT3 battery clips							
Replace C11 and C12 with 10F capacitors. Install these flat against the underside of the PCB, carefully bending the legs to fit.							
C11 & C12	10F 2.7V	Bussmann	HV1030-2R7106-R	2148486			Supercapacitor; 10F; 2.7V; +30%, -10%; 5.0mm Pitch
Connect two PowerFilm MPT3.6-150 solar panels to the SOLAR+/- terminals. Be careful with the panel polarity.							

Iridium 9603N Beacon V3

Connected to:
2 x PowerFilm Solar MPT3.6-150



Note Panel Orientation!