VCC VCC

R1 100k   R8 100k

RESET   KBI_4

S1   S2

C2 100nF   C12 100nF

GND   GND

VCC

RX   R2 20R   LED1
ANT_2   R3 160R   LED2
ANT_1   R4 160R   LED3

MC13224VR2DKR-ND
U1

ANT1 2.4GHz
C1A 10pF
C1B 10pF

J1
U.FL-R-SMT(01)
GND

VCC

T15 ADC_0 1 ADC0   RF_RX_TX 60   RF_RX_TX
T16 ADC_1 2 ADC1
ADC_2 3 ADC2   TX_ON 52   TX
ADC_3 4 ADC3   RX_ON 59   RX
ADC_4 5 ADC4
ADC_5 6 ADC5   ANT_2 57   ANT_2
ADC_6 7 ADC6   ANT_1 56   ANT_1
ADC7_RTCK 8 ADC7_RTCK

63 ADC1_VREFH   RF_GND 58
C3 100nF R5 ERASE 64 ADC2_VREFH   GND
         100k
GND   R6 ERASE_N 62 ADC1_VREFL   RF_BIAS 55
         100k   61 ADC2_VREFL   PA_POS 54
                                       PA_NEG 53
ERASE U3 A   RF_PLL_FLT 46
       B Y ERASE_N
SN74LVC1G02DCKR
VCC
C5 100nF
GND

TMR3 23 TMR3
TMR2 24 TMR2
T3 TMR1 25 TMR1
T4 TMR0 26 TMR0

VCC
T5 UART2_TX 16 UART2_TX
T6 UART2_RX 15 UART2_RX
T7 UART2_RTS 13 UART2_RTS
T8 UART2_CTS 14 UART2_CTS

R9 R10   UART1_TX 20 UART1_TX
         UART1_RX 19 UART1_RX   MDO07 129
         UART1_RTS 17 UART1_RTS   MDO06 30
1K8 1K8 UART1_CTS 18 UART1_CTS   MDO05 20
Text   MDO04 21
T1 SDA 21 I2C_SDA   MDO03 11
T2 SCL 22 I2C_SCL   MDO02 12
                                   MDO01 02
T14 SPI_SCK 27 SPI_SCK   MDO00 03
T13 SPI_MOSI 28 SPI_MOSI
T12 SPI_MISO 29 SPI_MISO   MCKO 131
T11 SPI_SS 30 SPI_SS   RDY_B 22

SSI_TX 34 SSI_TX   MSEO1_B 13
SSI_RX 33 SSI_RX   MSEO0_B 14
SSI_BITCK 31 SSI_BITCK
SSI_FSYN 32 SSI_FSYN   EVTI_B 132
                                   EVTO_B 23
T9 KBI_7 35 KBI_7
T10 KBI_6 36 KBI_6   TMS 12
KBI_5 37 KBI_5   TCK 11
KBI_4 38 KBI_4   TDI 10
KBI_3 39 KBI_3   TDO 9
KBI_2 40 KBI_2
KBI_1 41 KBI_1
KBI_0 42 KBI_0_HST_WK

49 XTAL_24_OUT   RESETB 51   RESET
Y1 24M   VBATT 45
50 XTAL_24_IN   COIL_BK 43
GND   LREG_BK_FB 44

48 XTAL_32_OUT   DIG_REG 124
                     NVM_REG 133
47 XTAL_32_IN

75 VSS   VSS 93
76 VSS   VSS 94
77 VSS   VSS 95
78 VSS   VSS 96
79 VSS   VSS 97

84 VSS   VSS 104
85 VSS   VSS 105
86 VSS   VSS 106
87 VSS   VSS 115
88 VSS

MC13224V
GND   GND

VCC

VCC
U4
5 VCC   IRQ 6 KBI_5   R7 10K   VCC
C7 100nF SQW 2 CLK_RTC   R11 10K   TMR2
        SDA 7 SDA   Jumper
3 VSS   SCL 8 SCL
M41T62LC6F
GND
I2C address = 1101000Xb

VCC

VCC
J2
4 VDD   CLK 5 SPI_SCK
C10 100nF C9 4.7uF DO 7 SPI_MISO
                     DI 3 SPI_MOSI
GND   CS 1 SPI_SS
                     A 2   TX
6 VSS   B 4   R16 100k
DM3D-SF
GND   GND

VCC
TX   R14 10K
R14 10K

J3
1 ERASE
2 RESET
3 UART1_CTS
4 UART1_RTS
5 UART1_TX
6 UART1_RX
7 GND
8 VIN
G3
G4
47309-2651_PCB

VIN
L1 744028004
T17 1   2   U2
C4 10uF L VOUT   L2 BLM18BD601SN1D
T18   C6 10uF   VCC
GND   VIN FB   C8 1uF T19
      EN   T20
      GND
TPS61221DCKT
GND   GND   GND
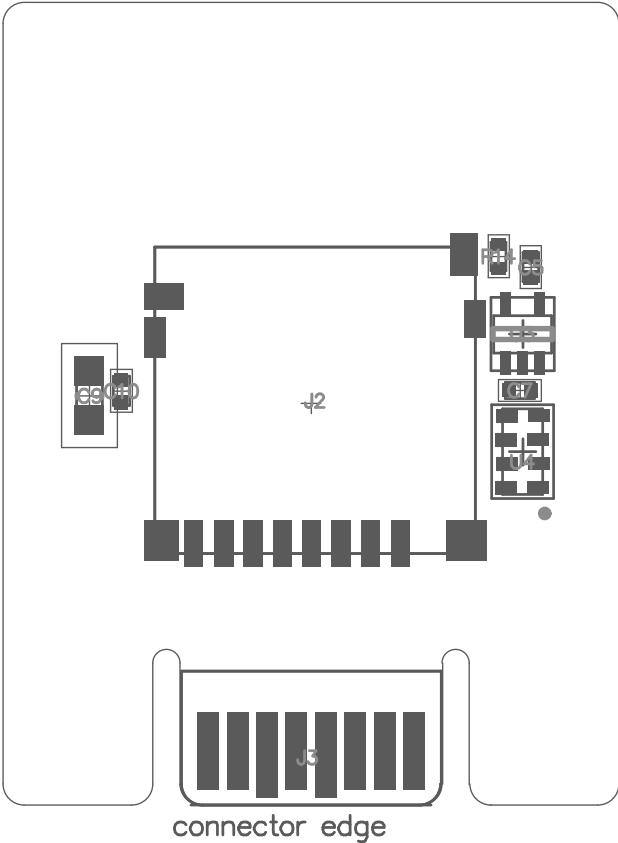
VCC

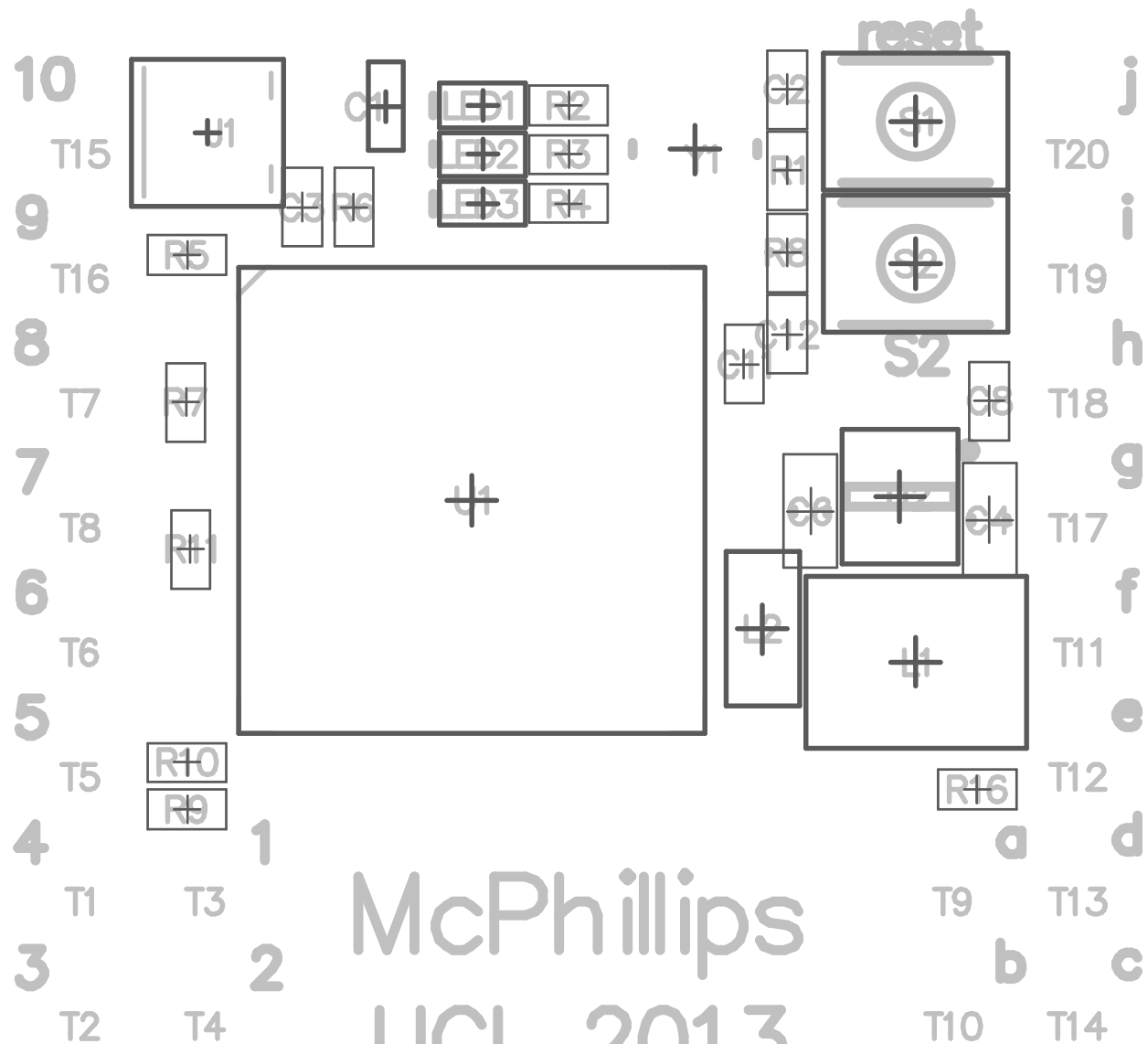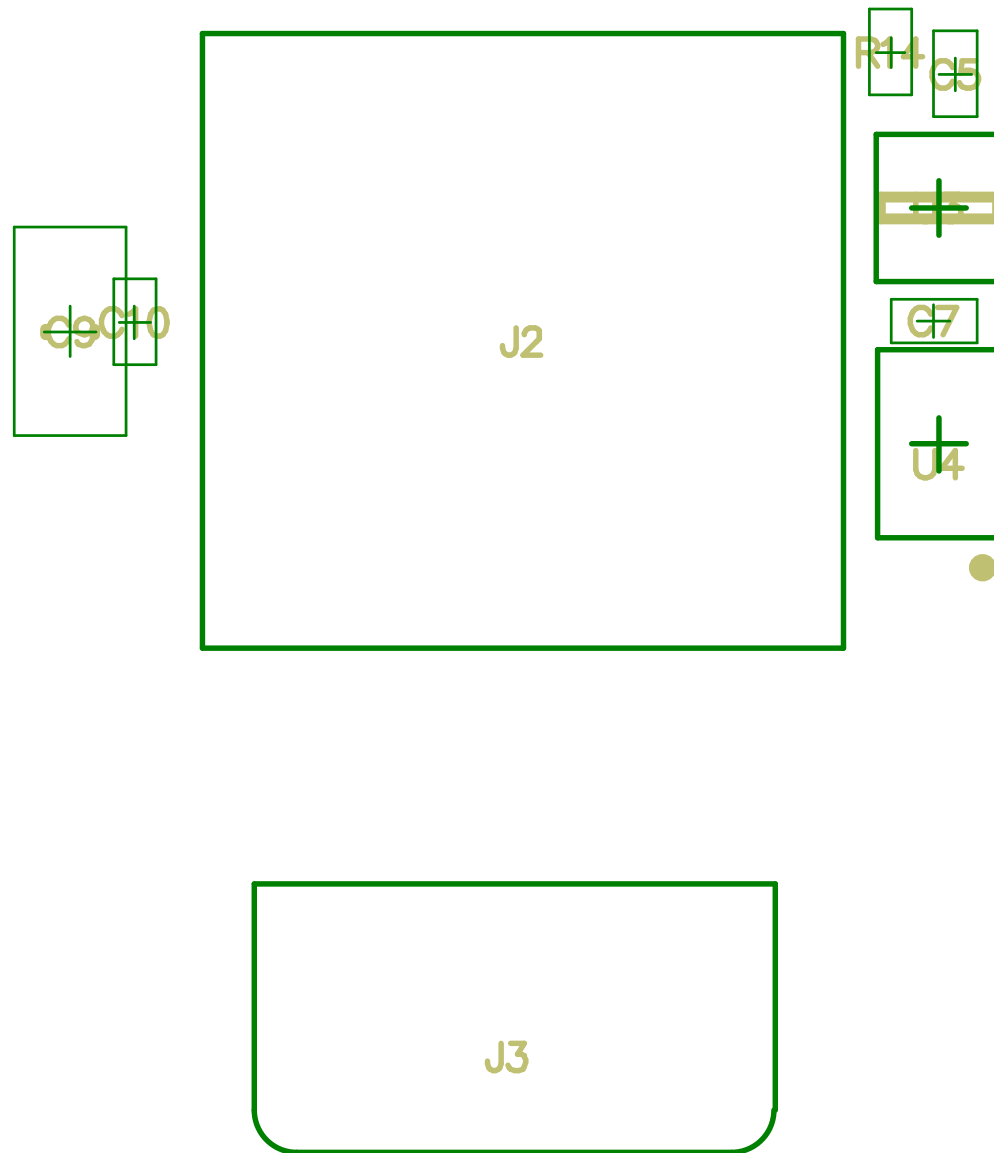C11 100nF
GND

ALTIUM

McPhillips
UCL 2013

Layer Stack Up Detail for: Prime.PcbDoc

Layer Name	Gerber Document	Copper Thickness	Dielectric Height	Dielectric Material	Dielectric Constant	Dielectric Type
Top Solder Mask	(.GTS)		0.025mm	Solder Resist	4.00	
Top Layer	(.GTL)	0.035mm				
			0.1mm	PCL370HR FR4	4.17	PrePreg
InternalPlane1	(.GP1)	0.035mm				
			0.41mm	PCL370HR FR4	4.17	Core
InternalPlane2	(.GP2)	0.035mm				
			0.1mm	PCL370HR FR4	4.17	PrePreg
Bottom Layer	(.GBL)	0.035mm				
Bottom Solder Mask	(.GBS)		0.025mm	Solder Resist	4.00	

Layer Stack Up Detail for: Prime.PcbDoc

Layer Name	Gerber Document	Copper Thickness	Dielectric Height	Dielectric Material	Dielectric Constant	Dielectric Type
Top Solder Mask	(.GTS)		0.025mm	Solder Resist	4.00	
Top Layer	(.GTL)	0.035mm				
			0.1mm	PCL370HR FR4	4.17	PrePreg
InternalPlane1	(.GP1)	0.035mm				
			0.41mm	PCL370HR FR4	4.17	Core
InternalPlane2	(.GP2)	0.035mm				
			0.1mm	PCL370HR FR4	4.17	PrePreg
Bottom Layer	(.GBL)	0.035mm				
Bottom Solder Mask	(.GBS)		0.025mm	Solder Resist	4.00	

connector edge

Symbol	Hit Count	Tool Size	Plated	Hole Type
○	78	0.2mm (7.874mil)	PTH	Round
▽	20	1.2mm (47.244mil)	PTH	Round
✩	2	2.1mm (82.677mil)	NPTH	Round
	100 Total			

connector edge

Layer Stack Up Detail for: Prime.PcbDoc

Layer Name	Gerber Document	Copper Thickness	Dielectric Height	Dielectric Material	Dielectric Constant	Dielectric Type
Top Solder Mask	(.GTS)		0.025mm	Solder Resist	4.00	
Top Layer	(.GTL)	0.035mm				
			0.1mm	PCL370HR FR4	4.17	PrePreg
InternalPlane1	(.GP1)	0.035mm				
			0.41mm	PCL370HR FR4	4.17	Core
InternalPlane2	(.GP2)	0.035mm				
			0.1mm	PCL370HR FR4	4.17	PrePreg
Bottom Layer	(.GBL)	0.035mm				
Bottom Solder Mask	(.GBS)		0.025mm	Solder Resist	4.00	

ANT1

reset

10   T1
T15
9   C5 R6   LED1 R2
T16   LED2 R3
8   R5   LED3 R4
T7   R7
7   R11
T8
6
T6
5
T5   R10
4   R9   1
T1   T3

3
T2   T4

C2
C3
R1
R8
C12
C11

j
T20
i
T19
h
S2
T18
g
C6 C4 T17
f
C3 b T11
e
T12
a d
T9 T13
R16

b   c
T10 T14

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R14 C5

C7

J2

C9 C10

U4

J3

Comment	Description	Designator	Footprint	LibRef	Quantity	Supplier 1	Supplier Part Number 1	Supplier Order Qty 1	Supplier Stock 1	Supplier Subtotal 1	Supplier Unit Price 1
2.4GHz	RF, 2.4GHz	ANT1	2450AT43A100	CMP-00013-A.1	1	Digi-Key	712-1009-6-ND	1	17434	0.92	0.92
10pF	10pF, 50V, C0G/ NP0, ±5%	C1	CAPC1005L - Twin 90	CC0402JRNPO9BN100_twin_90	1	Digi-Key	311-1014-6-ND	1	1E+06	0.07	0.07
100nF	CAP 100nF 16V ±5% 0402 (1005 Metric) Thickness 0.6mm SMD	C2, C3, C5, C7, C10, C11, C12	CAPC0402(1005)60_L	CMP-1034-02068-1	7	Digi-Key	445-8095-6-ND	7	21075	0.91	0.13
10uF	CAP 10uF 6.3V ±10% 0603 (1608 Metric) Thickness 1mm SMD	C4, C6	CAPC0603(1608)100_L	CMP-1035-02796-1	2	Digi-Key	445-7492-6-ND	2	167216	0.64	0.32
1uF	CAP 1uF 6.3V ±10% 0402 (1005 Metric) Thickness 0.6mm SMD	C8	CAPC0402(1005)60_L	CMP-1034-02113-1	1	Digi-Key	709-1060-6-ND	1	14853	0.23	0.23
4.7uF	CAP 4.7uF 6.3V ±10% 0603 (1608 Metric) Thickness 1mm SMD	C9	CAPC0603(1608)100_M	CMP-1035-02780-1	1	Digi-Key	399-3482-6-ND	1	479438	0.09	0.09
U.FL-R-SMT(01)	RECEPTACLE, SMT, U.FL	J1	U.FL-R-SMT	CMP-00006-A.1	1	Digi-Key	H916-1DKR-ND	1	177597	1.31	1.31
DM3D-SF	Connector, Micro SD, Push Pull with card detection	J2	Hirose_DM3D-SF	CMP-00007-A.1	1	Digi-Key	HR1941DKR-ND	1	24281	1.61	1.61
744028004	SMD Shielded Tiny Power Inductor WE-TPC, L = 4.70 µH	L1	WE-TPC-2811-T	CMP-0227-00060-1	1	Digi-Key	732-1003-6-ND	1	3840	2.04	2.04
BLM18BD601SN1D	EMI Filter Bead 600ohms 100MHz 200mA Monolithic 0603 SMD	L2	SMD-0603	CMP-00018-A.1	1	Digi-Key	490-1023-6-ND	1	63955	0.07	0.07
SML-P12BC7TT86	Blue Picoled 1.0mm x 0.6mm	LED1	SMD LED (0402)	CMP-00003-A.1	1	Digi-Key	511-1615-6-ND	1	154824	0.43	0.43
SML-P12PTT86	Green Picoled 1.0mm x 0.6mm	LED2	SMD LED (0402)	CMP-00002-A.1	1	Digi-Key	511-1592-6-ND	1	27845	0.39	0.39
SML-P12YTT86	Yellow Picoled 1.0mm x 0.6mm	LED3	SMD LED (0402)	CMP-00004-A.1	1	Digi-Key	511-1595-6-ND	1	6861	0.41	0.41
100k	100K 0.063W 5% 0402 (1005 Metric) SMD	R1, R5, R6, R8, R16	RESC0402(1005)_L	CMP-1011-00122-1	5	Digi-Key	541-100KJDKR-ND	5	173456		
20R	20R 0.063W 1% 0402 (1005 Metric) SMD	R2	RESC0402(1005)_L	CMP-1011-00316-1	1	Digi-Key	541-20.0LDKR-ND	1	80845		
160R	160R 0.063W 1% 0402 (1005 Metric) SMD	R3, R4	RESC0402(1005)_L	CMP-1011-00418-1	2	Digi-Key	541-160LDKR-ND	2	27713		
10K	10K 0.063W 1% 0402 (1005 Metric) SMD	R7, R14	RESC0402(1005)_L	CMP-1011-00623-1	2	Digi-Key	541-10.0KLDKR-ND	2	113561		
1K8	1K8 0.063W 1% 0402 (1005 Metric) SMD	R9, R10	RESC0402(1005)_L	CMP-1011-00537-1	2	Digi-Key	311-1.80KLRDKR-ND	2	97830	0.14	0.07
Jumper	Jumper 0402 (1005 Metric)	R11	RESC0402(1005)_L	CMP-1011-00001-1	1	Digi-Key	541-0.0JDKR-ND	1	822388		
B3U-1000P	Ultra-small TACTILE SWITCH SMD	S1, S2	B3U-1000P	CMP-00010-A.1	2	Digi-Key	SW1020DKR-ND	2	43417	1.8	0.9
MC13224V	Advanced ZigBee™- Compliant Platform-in-Package (PiP) for the 2.4 GHz IEEE® 802.15.4 Standard with nanoWatt XLP Technology	U1	1901-01	CMP-00008-A.1	1	Digi-Key	MC13224VR2DKR-ND	1	3559	7.21	7.21
TPS61221DCKT	LOW INPUT VOLTAGE STEP-UP CONVERTER IN 6 PIN SC-70 PACKAGE	U2	DCK	CMP-00014-A.1	1	Digi-Key	296-24171-6-ND	1	7511	1.32	1.32
SN74LVC1G02DCKR	SINGLE 2-INPUT POSITIVE NOR-GATE	U3	DCK-5	CMP-00019-A.1	1	Digi-Key	296-11598-6-ND	1	29822	0.35	0.35
M41T62LC6F	Serial real-time clocks (RTCs) with alarm - Embedded crystal LCC8	U4	ST_LCC8	CMP-00276-A.1	1	Digi-Key	497-11275-6-ND	1	1966	3.58	3.58
24M	CRYSTAL, TSX-3225, 24MHZ, 10PPM, 9PF	Y1	TSX-3225	CMP-000	1	Digi-K	SER36	1	0	0.46	0.46