R7 15k

S1

GND        MCU_RESET

MCU_TX0/PDO    1  MISO  VCC  2  3V3
MCU_SCK        3  SCK   MOSI 4  MCU_RX0/PDI
MCU_RESET      5  RST   GND  6  GND

MCU_VCC

2.4k  R2

U2
MCU_FLASH_CE   1  CE   VDD  8  MCU_VCC
MCU_MISO       2  SO   HOLD 7  MCU_VCC
MCU_VCC        3  WP   SCK  6  MCU_SCK
GND            4  VSS  SI   5  MCU_MOSI

J2
MCU_GPIO_3   1  1  4  4  MCU_GPIO_0
MCU_GPIO_2   2  2  3  3  MCU_GPIO_1

R3   LED0
MCU_LED0         550   GREEN 2.2V
R4   LED1
MCU_LED1         550   GREEN 2.2V
R5   LED2
MCU_LED2         550   GREEN 2.2V  GND
R6   LED3
MCU_LED3         550   GREEN 2.2V

U3
MCU_MOSI       5  SDI   VI    10  WIRELESS_VCC
MCU_MISO       7  SDO  _RESET  2  WIRELESS_RESET
MCU_SCK        6  SCK   WAKE   3  WIRELESS_WAKE
WIRELESS_CS    8 _CS    INT    4  WIRELESS_INT
                            GND 1*3 GND

R1 2.4k

MCU_VCC

JTAG_TMS
JTAG_TDI
JTAG_TDO
JTAG_TCK
MCU_GPIO_0
MCU_GPIO_1
MCU_GPIO_2
MCU_GPIO_3
WIRELESS_INT
WIRELESS_WAKE
WIRELESS_RESET
WIRELESS_CS
MCU_LED3
MCU_LED2
MCU_TX0/PDO
MCU_RX0/PDI

54 55 56 57 58 59 60 61 9 8 7 6 5 4 3 2

PF7_ADC7/TDI
PF6_ADC6/TDO
PF5_ADC5/TMS
PF4_ADC4/TCK
PF3_ADC3
PF2_ADC2
PF1_ADC1
PF0_ADC0
PE7_ICP3/INT7
PE6_T3/INT6
PE5_OC3C/INT5
PE4_OC3B/INT4
PE3_OC3A/AIN1
PE2_XCK0/AIN0
PE1_TXD0/PDO
PE0_RXD0/PDI

AD0  51  PA0_AD0
AD1  50  PA1_AD1
AD2  49  PA2_AD2
AD3  48  PA3_AD3
AD4  47  PA4_AD4
AD5  46  PA5_AD5
AD6  45  PA6_AD6
AD7  44  PA7_AD7
MCU_CS    10  PB0_SS#
MCU_SCK   11  PB1_SCK
MCU_MOSI  12  PB2_MOSI
MCU_MISO  13  PB3_MISO
MCU_FLASH_CE 14 PB4_OC0
MCU_LED1  15  PB5_OC1A
MCU_LED0  16  PB6_OC1B
INIT_B    17  PB7_OC2/OC1C

GND      22*13  GND
_PEN     1
XTAL2    23
XTAL1    24
_RESET   20   MCU_RESET
VCC      21*2  MCU_VCC
AVCC     64
AVREF    62

X1 12MHz

PG4_TOSC2  19  CCLK
PG3_TOSC2  18  CSI_B/FPGA_MISO0
PG2_ALE    43  ALE
PG1_RD#    34  RD
PG0_WR#    33  WR

PC0_A8
PC1_A9
PC2_A10
PC3_A11
PC4_A12
PC5_A13
PC6_A14
PC7_A15
PD0_SCL/INT0
PD1_SDA/INT1
PD2_RXD1/INT2
PD3_TXD1/INT3
PD4_ICP1
PD5_XCK1
PD6_T1
PD7_T2

35 36 37 38 39 40 41 42 25 26 27 28 29 30 31 32

A8
A9
A10
A11
A12
A13
A14
A15
SELECTMAP_D7/SCL
SELECTMAP_D6/SDA
SELECTMAP_D5/MCU_RX1
SELECTMAP_D4/MCU_TX1
SELECTMAP_D3
SELECTMAP_D2/FPGA_MISO3
SELECTMAP_D1/FPGA_MISO2
SELECTMAP_D0/FPGA_MISO1

**BANK_1**

AD0, AD1, AD2, AD3, AD4, AD5, AD7, ALE, OSC_32, N$37, N$36, N$35, N$34, A15, A14, A13, A12, A11, A10, A9, A8, RD, WR, SUSPEND

105, 104, 102, 101, 100, 99, 98, 97, 95, 94, 93, 92, 88, 87, 85, 84, 83, 82, 81, 80, 79, 78, 75, 74, 73

IO_L1P_1, IO_L1N_VREF_1, IO_L32P_1, IO_L32N_1, IO_L33P_1, IO_L33N_1, IO_L34P_1, IO_L34N_1, IO_L40P_GCLK11_1, IO_L40N_GCLK10_1, IO_L41P_GCLK9_IRDY1_1, IO_L41N_GCLK8_1, IO_L42P_GCLK7_1, IO_L42N_GCLK6_TRDY1_1, IO_L43P_GCLK5_1, IO_L43N_GCLK4_1, IO_L45P_1, IO_L45N_1, IO_L46P_1, IO_L46N_1, IO_L47P_1, IO_L47N_1, IO_L74P_AWAKE_1, IO_L74N_DOUT_BUSY_1, SUSPEND

**BANK_0**

JTAG_TDO 106 TDO
JTAG_TMS 107 TMS
JTAG_TDI 110 TDI
JTAG_TCK 109 TCK
111 IO_L66N_SCP0_0
112 IO_L66P_SCP1_0
114 IO_L65N_SCP2_0
115 IO_L65P_SCP3_0
116 IO_L64N_SCP4_0
117 IO_L64P_SCP5_0
118 IO_L63N_SCP6_0
119 IO_L63P_SCP7_0
120 IO_L62N_VREF_0
121 IO_L62P_0
123 IO_L37N_GCLK12_0
124 IO_L37P_GCLK13_0
126 IO_L36N_GCLK14_0
127 IO_L36P_GCLK15_0
131 IO_L35N_GCLK16_0
132 IO_L35P_GCLK17_0
133 IO_L34N_GCLK18_0
134 IO_L34P_GCLK19_0
137 IO_L4N_0
138 IO_L4P_0
139 IO_L3N_0
N$31 140 IO_L3P_0
FPGA_LED3 141 IO_L2N_0
FPGA_LED2 142 IO_L2P_0
FPGA_LED1 143 IO_L1N_VREF_0
FPGA_LED0 144 IO_L1P_HSWAPEN_0

**BANK_2**

CMPCS_B_2 72 DONE
DONE_2 71 CCLK
IO_L1P_CCLK_2 70 MODE0
IO_L1N_M0_CMPMISO_2 69
IO_L2P_CMPCLK_2 67
IO_L2N_CMPMOSI_2 66
IO_L3P_D0_DIN_MISO_MISO1_2 65 SELECTMAP_D0/FPGA_MISO1
IO_L3N_MOSI_CSI_B_MISO0_2 64 CSI_B/FPGA_MISO0
IO_L12P_D1_MISO2_2 62 SELECTMAP_D1/FPGA_MISO2
IO_L12N_D2_MISO3_2 61 SELECTMAP_D2/FPGA_MISO3
IO_L13P_M1_2 60 MODE1
IO_L13N_D10_2 59 N$94
IO_L14P_D11_2 58 N$93
IO_L14N_D12_2 57 N$91
IO_L30P_GCLK1_D13_2 56 N$96
IO_L30N_GCLK0_USERCCLK_2 55
IO_L31P_GCLK31_D14_2 51 OSC_50
IO_L31N_GCLK30_D15_2 50 N$12
IO_L48P_D7_2 48 SELECTMAP_D7/SCL
IO_L48N_RDWR_B_VREF_2 47 GND
IO_L49P_D3_2 46 SELECTMAP_D3
IO_L49N_D4_2 45 SELECTMAP_D4/MCU_TX1
IO_L62P_D5_2 44 SELECTMAP_D5/MCU_RX1
IO_L62N_D6_2 43 SELECTMAP_D6/SDA
IO_L64P_D8_2 41 N$98
IO_L64N_D9_2 40 N$941
IO_L65P_INIT_B_2 39 INIT_B
IO_L65N_CSO_B_2 38 CSO_B
PROGRAM_B_2 37 FPGA_RESET

**BANK_3**

IO_L83N_VREF_3, IO_L83P_3, IO_L52N_3, IO_L52P_3, IO_L51N_3, IO_L51P_3, IO_L50N_3, IO_L50P_3, IO_L49N_3, IO_L49P_3, IO_L44N_GCLK20_3, IO_L44P_GCLK21_3, IO_L43N_GCLK22_IRDY2_3, IO_L43P_GCLK23_3, IO_L42N_GCLK24_3, IO_L42P_GCLK25_TRDY2_3, IO_L41N_GCLK26_3, IO_L41P_GCLK27_3, IO_L37N_3, IO_L37P_3, IO_L36N_3, IO_L36P_3, IO_L2N_3, IO_L2P_3, IO_L1N_VREF_3, IO_L1P_3

1, 2, 5, 6, 8, 9, 10, 11, 12, 14, 15, 16, 17, 21, 22, 24, 27, 29, 30, 32, 33, 34, 35

FPGA_GPIO_0, FPGA_GPIO_1, FPGA_GPIO_2, FPGA_GPIO_3, FPGA_GPIO_4, FPGA_GPIO_5, FPGA_GPIO_6, FPGA_GPIO_7, FPGA_GPIO_8, FPGA_GPIO_9, FPGA_GPIO_11, FPGA_GPIO_12, FPGA_GPIO_13, FPGA_GPIO_14, FPGA_GPIO_15, FPGA_GPIO_16, FPGA_GPIO_17, FPGA_GPIO_18

**Power**

GND, VCCAUX, VCCINT, VCCO_0, VCCO_1, VCCO_2, VCCO_3

GND, FPGA_VCCINT, FPGA_VCCAUX

**Decoupling caps**

vccint
FPGA_VCCINT — C1 4,7uF, C5 4,7uF, C9 0,47uF, C13 — GND

vccaux
FPGA_VCCAUX — C2 4,7uF, C6 4,7uF, C10 4,7uF, C14 4,7uF, C17 4,7uF, C20 4,7uF, C23 .47uF, C24 — GND

vcco0 / vcco1
FPGA_VCCAUX — C3 4,7uF, C7 .47uF, C11 4,7uF, C15 .47uF, C18 .47uF, C21 — GND
FPGA_VCCAUX (FPGA_VCCAUX)

vcco2 / vcco3
FPGA_VCCAUX — C4 4,7uF, C8 .47uF, C12 4,7uF, C16 .47uF, C19 .47uF, C22 — GND
FPGA_VCCAUX (FPGA_VCCAUX)

**U5**

R14 2,4k  FPGA_VCCAUX
1 CE — VDD 8 FPGA_VCCAUX
CSO_B
SELECTMAP_D0/FPGA_MISO1 3 SO — HOLD 7 SELECTMAP_D2/FPGA_MISO3
SELECTMAP_D1/FPGA_MISO2 WP — SCK 6 CCLK
GND 4 VSS — SI 5 CSI_B/FPGA_MISO0

**S2**
FPGA_VCCAUX
R15 15k
GND — S2 — FPGA_RESET

R12 2,4k  FPGA_VCCAUX
MODE0 1 1X — 1Y 4 GND
MODE1 2 2X — 2Y 3 GND
R13 2,4k  FPGA_VCCAUX

**J3**
FPGA_VCCAUX 1 — 1
GND 3 — 2

**J4**
FPGA_VCCINT 1 — 1
GND 3 — 2

**J5**
FPGA_GPIO_1 1 — 1 10 — FPGA_GPIO_0
FPGA_GPIO_3 2 — 2 9 — FPGA_GPIO_2
FPGA_GPIO_5 3 — 3 8 — FPGA_GPIO_4
FPGA_GPIO_7 4 — 4 7 — FPGA_GPIO_6
FPGA_GPIO_9 5 — 5 6 — FPGA_GPIO_8

**J7**
JTAG_TMS P$6 TMS
JTAG_TDI P$5 TDI
JTAG_TDO P$4 TDO
JTAG_TCK P$3 TCK
GND P$2 GND
3V3 P$1 REF

**J6**
FPGA_GPIO_18 1 — 1 10 — FPGA_GPIO_19
FPGA_GPIO_16 2 — 2 9 — FPGA_GPIO_17
FPGA_GPIO_14 3 — 3 8 — FPGA_GPIO_15
FPGA_GPIO_12 4 — 4 7 — FPGA_GPIO_13
FPGA_GPIO_10 5 — 5 6 — FPGA_GPIO_11

**X2**
FPGA_VCCAUX 1 EN — VS+ 4 FPGA_VCCAUX
GND 2 GND — OUTPUT 3 OSC_50
50MHz

**X3**
FPGA_VCCAUX 1 EN — VS+ 4 FPGA_VCCAUX
GND 2 GND — OUTPUT 3 OSC_32
32MHz

**LEDs**
FPGA_LED0 — R8 750 — LED4 — RED 1.8V 2mA
FPGA_LED1 — R9 750 — LED5 — RED — GND
FPGA_LED2 — R10 750 — LED6 — RED
FPGA_LED3 — R11 750 — LED7 — RED

$$Rmax = Vmax / Imax$$
$$= 80mV / Imax$$

**U7**

| | | | |
|---|---|---|---|
| 1 | SENSE1+ | VDD | 10 | 3V3
| 2 | SENSE1- | SMCLK | 9 | SELECTMAP_D7/SCL
| 3 | SENSE2+ | SMDATA | 8 | SELECTMAP_D6/SDA
| 4 | SENSE2- | ALERT# | 7 |
| 5*5 | GND | ADDR_SEL | 6 |

Imax=100mA  R19  .8  FPGA_VCCAUX  1V2
Imax=100mA  R17  .8  3V3
FPGA_VCCINT
GND
R21  300  GND

**U8**

| | | | |
|---|---|---|---|
| 1 | SENSE1+ | VDD | 10 | 3V3
| 2 | SENSE1- | SMCLK | 9 | SELECTMAP_D7/SCL
| 3 | SENSE2+ | SMDATA | 8 | SELECTMAP_D6/SDA
| 4 | SENSE2- | ALERT# | 7 |
| 5*5 | GND | ADDR_SEL | 6 |

Imax=100mA  R22  .8  3V3
MCU_VCC
GND
GND  R24  1.5k
R25  1.5k
R23  2000  GND

**U6**

| | | | |
|---|---|---|---|
| 1 | SENSE1+ | VDD | 10 | 3V3
| 2 | SENSE1- | SMCLK | 9 | SELECTMAP_D7/SCL
| 3 | SENSE2+ | SMDATA | 8 | SELECTMAP_D6/SDA
| 4 | SENSE2- | ALERT# | 7 |
| 5*5 | GND | ADDR_SEL | 6 |

USB_VCC
Imax=500mA  R18  0.16
Imax=100mA  R16  0.8  5V
3V3
WIRELESS_VCC
GND
R20  100  GND

5V

ORANGE 2V
ORANGE 2V
R28 1.5k
R27 1.5k
RX
TX

12MHZ
N$26
RX

22 21 10 11 9

GND
GND

C25 10n
C26 4.7u
100n
C27

USB_VCC_RAW

U9

CBUS0 CBUS1 CBUS2 CBUS3 CBUS4

J8
VCC 1
D- 2
D+ 3
GND 5
SHIELD

L1

USB_VCC

5V 1 VCCIO TXD 30 MCU_RX0/PDI
19 VCC RXD 2 MCU_TX0/PDO
15 USBDM RTS# 32 N$17
14 USBDP CTS# 8 N$18
18 RESET# DTR# 31 N$19
N$6 27 OSCI DSR# 6 N$20
N$5 28 OSCO DCD# 7 N$21
N$4 16 3V3OUT RI# 3 N$22

SHIELD1

USB_SHIELD

100n
C28

AGND GND TEST
24 4*13 26

GND

GND GND GND

GND
C30 10u

vreg

U10

3V3

L2 3.3uH
R28 6k8

4 SW1 VIN 5 5V
1 VFB1 SW2 6
L3 3.3uH
2 RUN1 VFB2 8
9 GND RUN2 7 3V3
MODE 3 5V

R31 1k5
1V2

22u C29
1k5 R29
5V
GND

R30 1k5
22u C31

GND

GND

R32 RED PWR
270

GND