External Memory Interface

MicropendousX-LPC182x-GPS-EMI.sch

USB

MicropendousX-LPC182x-GPS-USB.sch

System

MicropendousX-LPC182x-GPS-System.sch

Position_Sensors

MicropendousX-LPC182x-GPS-Position_Sensors.sch

RF

MicropendousX-LPC182x-GPS-RF.sch

LCD

MicropendousX-LPC182x-GPS-LCD.sch

Power Supply

MicropendousX-LPC182x-GPS-Power.sch

Expansion

MicropendousX-LPC182x-GPS-Expansion.sch

Vias

MicropendousX-LPC182x-GPS-Vias.sch

Notes:
- Design targets Revision 'A' of the LPC182x
- Pins with more than one function are labeled
  with their pin name and function(s) used
- VDD controls LPC182x, RF Transceiver, LCD Touchscreen Controller,
  and Motion Sensor so that these can wake up the device
- VDDIO powers microSD, GPS Module, and LCD Display
  along with all LPC182x IO pins so that these can be
  disabled in low-power modes.
- Only WAKEUP pin can wake up device from Deep Sleep and Power-Down Modes
- USB0 can wake up device only from Sleep Mode
- Power Consumption: Normal 10mA+, Sleep 5.5mA+, Other <1mA

<-- Double-click inside a sheet to go to it

Opendous Inc.
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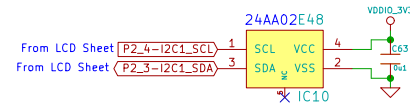Size: A4 | Date: 8 jun 2012 | Rev: 1.0
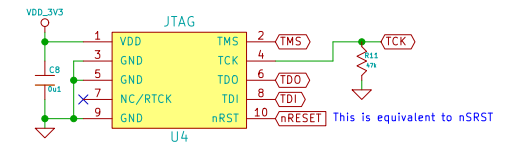KiCad E.D.A. | Id: 1/10

Notes:
- Run core system on always-on VDD_3V3
- Internal Rpu is minimum 45k Ohm, so for boot selection pull-down resistor, 19k is max. usable as $3.3(19/(19+45))=0.98V < Vil=(3.3*.3)=1V$
- E48 EEPROM is used to give every node its own unique EUI-64 address
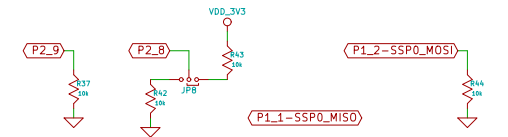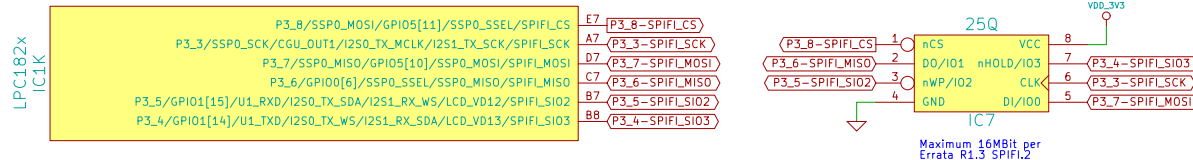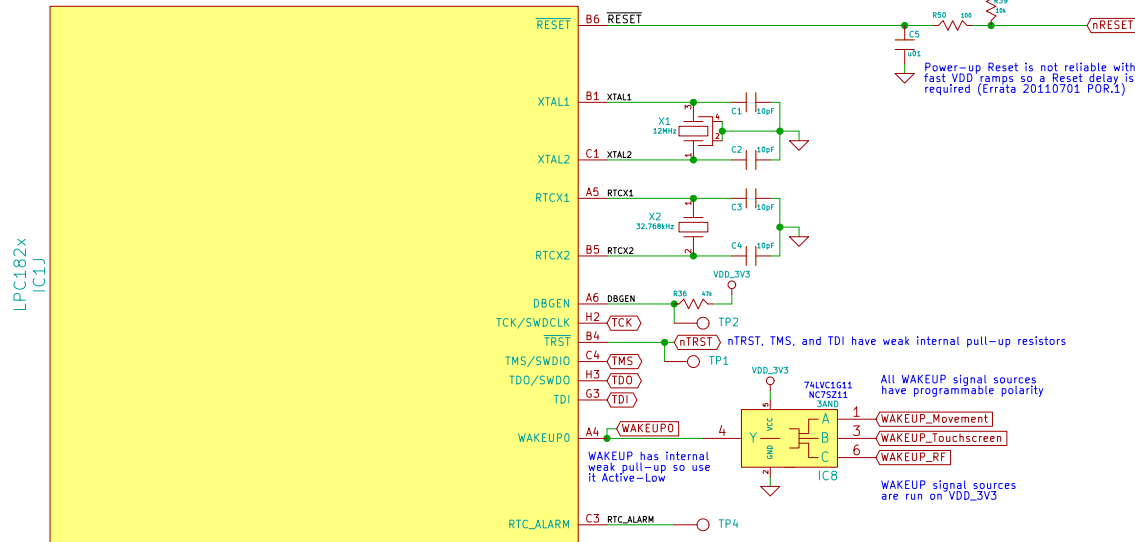
EUI-64 Node Identity

24AA02E48

From LCD Sheet P2_4-I2C1_SCL — SCL VCC 4
From LCD Sheet P2_3-I2C1_SDA — SDA VSS 2
IC10
VDDIO_3V3
C63
0u1

JTAG

VDD_3V3
JTAG
1 VDD TMS 2 — TMS — TCK
3 GND TCK 4
5 GND TDO 6 — TDO
7 NC/RTCK TDI 8 — TDI
9 GND nRST 10 — nRESET This is equivalent to nSRST
U4
C8 0u1
R11 47k

TDO need not be pulled up since TCK pull-down ensures no random data is ever sent as TDO is only valid when clock is valid.

LPC182x IC1J

B6 RESET — RESET
VDD_3V3
R50 100   R39 10k
C5 0u01
nRESET

Power-up Reset is not reliable with fast VDD ramps so a Reset delay is required (Errata 20110701 POR.1)

B1 XTAL1 — XTAL1
X1 12MHz
C1 10pF
C2 10pF
C1 XTAL2 — XTAL2

A5 RTCX1 — RTCX1
X2 32.768kHz
C3 10pF
C4 10pF
B5 RTCX2 — RTCX2

A6 DBGEN — DBGEN
R36 47k VDD_3V3
H2 TCK — TP2
B4 TRST — nTRST nTRST, TMS, and TDI have weak internal pull-up resistors TP1
C4 TMS — TMS
H3 TDO — TDO
G3 TDI — TDI

A4 WAKEUP0 — WAKEUP0
4 Y A 1 — WAKEUP_Movement
    B 3 — WAKEUP_Touchscreen
    C 6 — WAKEUP_RF
IC8
74LVC1G11 NC7SZ11 3AND
VDD_3V3
All WAKEUP signal sources have programmable polarity
WAKEUP has internal weak pull-up so use it Active-Low
WAKEUP signal sources are run on VDD_3V3

C3 RTC_ALARM — RTC_ALARM — TP4

VDD_3V3
C108 0u1

Boot Mode Selection

P2_9   P2_8   VDD_3V3   P1_2-SSP0_MOSI
R37 10k   R43 10k   JP8   R44 10k
R42 10k   P1_1-SSP0_MISO

Boot Mode		P2_9(A0)	P2_8(A8)	P1_1(A6)	P1_2(A7)
SPIFI	(SPF)	LOW	LOW	HIGH	LOW
USB0	(USB)	LOW	HIGH	HIGH	LOW
USART0		LOW	LOW	LOW	LOW
EMC 8-Bit		LOW	LOW	LOW	HIGH
EMC 16-Bit		LOW	LOW	HIGH	HIGH
EMC 32-Bit		LOW	HIGH	LOW	LOW
USB1		LOW	HIGH	LOW	HIGH
SPI (SSP)		LOW	HIGH	HIGH	HIGH
USART3		HIGH	LOW	LOW	LOW

Note boot pins have weak internal pull-ups of about 50k Ohm to VDDIO
Taken from LPC18x0 Datasheet – Table 5

LPC182x IC1K

P3_8/SSP0_MOSI/GPIO5[11]/SSP0_SSEL/SPIFI_CS E7 — P3_8-SPIFI_CS
P3_3/SSP0_SCK/CGU_OUT1/I2S0_TX_MCLK/I2S1_TX_SCK/SPIFI_SCK A7 — P3_3-SPIFI_SCK
P3_7/SSP0_MISO/GPIO5[10]/SSP0_MOSI/SPIFI_MOSI D7 — P3_7-SPIFI_MOSI
P3_6/GPIO0[6]/SSP0_SSEL/SSP0_MISO/SPIFI_MISO C7 — P3_6-SPIFI_MISO
P3_5/GPIO1[15]/U1_RXD/I2S0_TX_SDA/I2S1_RX_WS/LCD_VD12/SPIFI_SIO2 B7 — P3_5-SPIFI_SIO2
P3_4/GPIO1[14]/U1_TXD/I2S0_TX_WS/I2S1_RX_SDA/LCD_VD13/SPIFI_SIO3 B8 — P3_4-SPIFI_SIO3

25Q
VDD_3V3
P3_8-SPIFI_CS 1 nCS VCC 8
P3_6-SPIFI_MISO 2 DO/IO1 nHOLD/IO3 7 — P3_4-SPIFI_SIO3
P3_5-SPIFI_SIO2 3 nWP/IO2 CLK 6 — P3_3-SPIFI_SCK
4 GND DI/IO0 5 — P3_7-SPIFI_MOSI
IC7

Maximum 16MBit per Errata R1.3 SPIFI.2

RTC_ALARM — RTC_ALARM

Notes:
 – Boot pins have weak internal pull-ups of about 50k Ohm to VDDIO
    so VDDIO_3V3 must be enabled at the same time as VDD_3V3 at startup
 – MODE HIGH enables Burst Mode which is more efficient at lower power
 – HPWR and SUSP have 2M Ohm weak pull-downs
 – regulator outputs 3.3V nominal but lowering the
    voltage to 3.0V will reduce power consumption and
    be within all components' supply margins
 – use low ESL reverse geometry X?R caps closest to device
 – BAT54C reverse leakage is maximum 2uA

VBAT must be < 3.6V

LPC182x
IC1M

Power Management
Li-Ion Charger, Guage, and Dual Buck Regulators

SUSP internal pull-down is too weak
to overcome LPC182x 45k+ pull-up
and requires external pull-down
3.3(5.1/(5.1+45))=0.34V < Vil=0.4V

R14 = 1.74k limits USB
charge current to 500mA

LTC3559
IC6

STC3100
IC2

I2C1 from LCD Sheet

P2_3-I2C1_SDA
P2_4-I2C1_SCL

P2_11-GPIO1_11
From EMI Sheet

74LVC1G125
U5

P6_5-GPIO3_4
From EMI Sheet

P6_4-GPIO3_3
From EMI Sheet

BAT54C
D2

If either VBUS or battery
are present, main VDD
power supply will be enabled.

This buffer is powered by EN1 to
ensure that VDD and VDDIO ramp
up at the same time after reset.
MCU can later tri-state this buffer
to disable VDDIO.

EN1 and EN2 are high impedance inputs that are active-high

LTC3559_EN1
LTC3559_EN2
LTC3559_VCC
LTC3559_CHRG

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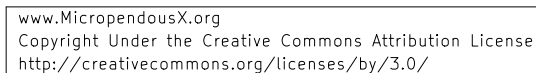http://creativecommons.org/licenses/by/3.0/

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Title: MicropendousX-LPC182x-GPS
Size: A4   Date: 8 jun 2012   Rev: 1.0
KiCad E.D.A.   Id: 9/10

Notes:

IC1A — LPC182x

Pin	Signal
B10	P2_9/GPIO1[10]/CTOUT_3/U3_BAUD/EMC_A0
E8	P2_10/GPIO0[14]/CTOUT_2/U2_TXD/EMC_A1
A9	P2_11/GPIO1[11]/CTOUT_5/U2_RXD/EMC_A2
B9	P2_12/GPIO1[12]/CTOUT_4/U2_UCLK/EMC_A3
A10	P2_13/GPIO1[13]/CTIN_4/U2_DIR/EMC_A4
H1	P1_0/GPIO0[4]/CTIN_3/SSP0_SSEL/EMC_A5
K2	P1_1/GPIO0[8]/CTOUT_7/SSP0_MISO/EMC_A6
K1	P1_2/GPIO0[9]/CTOUT_6/SSP0_MOSI/EMC_A7
	P2_8/CTOUT_0/U3_DIR/GPIO5[7]/EMC_A8
C6	P2_7/GPIO0[7]/CTOUT_1/U3_UCLK/T3_MAT3/EMC_A9
C10	P2_6/U0_DIR/USB0_IND0/GPIO5[6]/CTIN_7/T3_CAP3/EMC_A10
G9	P2_2/U0_UCLK/USB0_IND1/GPIO5[2]/CTOUT_6/T3_CAP2/EMC_A11
F5	P2_1/U0_RXD/USB0_PWR_FAULT/GPIO5[1]/T3_CAP1/EMC_A12
G7	P2_0/U0_TXD/USB0_PWR_EN/GPIO5[0]/T3_CAP0/ENET_MDC/EMC_A13
G10	
G4	P1_7/GPIO1[0]/U1_DSR/CTOUT_13/USB0_PWR_EN/EMC_D0
H5	P1_8/GPIO1[1]/U1_DTR/CTOUT_12/MMC_VOLT0/EMC_D1
J5	P1_9/GPIO1[2]/U1_RTS/CTOUT_11/MMC_DAT0/EMC_D2
H6	P1_10/GPIO1[3]/U1_RI/CTOUT_14/MMC_DAT1/EMC_D3
J7	P1_11/GPIO1[4]/U1_CTS/CTOUT_15/MMC_DAT2/EMC_D4
K7	P1_12/GPIO1[5]/U1_DCD/T0_CAP1/MMC_DAT3/EMC_D5
H8	P1_13/GPIO1[6]/U1_TXD/T0_CAP0/MMC_CD/EMC_D6
J8	P1_14/GPIO1[7]/U1_RXD/T0_MAT2/EMC_D7
K4	P1_6/GPIO1[9]/CTIN_5/MMC_CMD/EMC_WE
J1	P1_3/GPIO0[10]/CTOUT_8/USB0_IND1/SSP1_MISO/MMC_RST/EMC_OE
J4	P1_5/GPIO0[8]/CTOUT_10/USB0_PWR_FAULT/SSP1_SSEL/MMC_POW/EMC_CS0
J2	P1_4/GPIO0[11]/CTOUT_9/USB0_IND0/SSP1_MOSI/MMC_VOLT1/EMC_BLS0
F6	P6_4/GPIO3[3]/CTIN_6/U0_TXD/EMC_CAS
F9	P6_5/GPIO3[4]/CTOUT_6/U0_RXD/EMC_RAS
K3	CLK0/EMC_CLK0/CLKOUT/MMC_CLK/EMC_CLK01/ENET_TX_CLK/ENET_REF_CLK/SSP1_SCK
K6	CLK2/CLKOUT/MMC_CLK/I2S1_RX_SCK/I2S0_TX_MCLK/EMC_CLK23/EMC_CLK3

IC1E — LPC182x

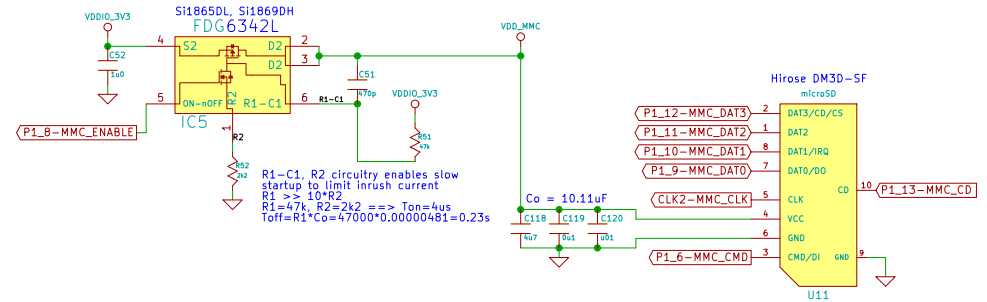| Pin	Signal
H4	PF_4/SSP1_SCK/GP_CLKIN/TRACECLK/I2S0_RX_SCK/LCD_CLKIN/I2S0_TX_MCLK
A8	P3_0/I2S0_RX_MCLK/I2S0_TX_MCLK/SSP0_SCK/I2S0_RX_SCK/I2S0_TX_SCK
G6	P3_2/CAN0_TD/USB1_IND0/GPIO5[9]/LCD_VD14/I2S0_RX_SDA/I2S0_TX_SDA
F7	P3_1/CAN0_RD/USB1_IND1/GPIO5[8]/LCD_VD15/I2S0_RX_WS/I2S0_TX_WS
H7	xP6_0/I2S0_RX_MCLK/I2S0_RX_SCK
J9	xP6_2/GPIO3[1]/EMC_CKEOUT1/U0_DIR/T2_CAP1/I2S0_RX_SDA
G5	xP6_1/GPIO3[0]/EMC_DYCS1/U0_UCLK/T2_CAP0/I2S0_RX_WS

Net labels / annotations:

- P2_9 — Used in System Sheet
- P2_10-GPIO0_14 — Used in RF Sheet
- P2_11-GPIO1_11 — Used in Power Supply Sheet
- P2_12-GPIO1_12 — Used in RF Sheet
- P2_13-GPIO1_13 — Used in RF Sheet
- P1_0-SSP0_SSEL — Used in RF Sheet
- P1_1-SSP0_MISO — Used in RF and System Sheets
- P1_2-SSP0_MOSI — Used in RF and System Sheets
- P2_8 — Used in System Sheet
- TP3 P2_7-ISP P2_7 has weak internal pull-up to disable ISP
- P2_6-GPIO5_6 — Used in Position Sensors Sheet
- P2_2-GPIO5_2 — Used in Position Sensors Sheet
- P2_1-U0_RXD — Used in Position Sensors Sheet
- P2_0-U0_TXD — Used in Position Sensors Sheet
- P1_8-MMC_ENABLE
- P1_9-MMC_DAT0
- P1_10-MMC_DAT1
- P1_11-MMC_DAT2
- P1_12-MMC_DAT3
- P1_13-MMC_CD
- P1_6-MMC_CMD
- P1_5-GPIO0_8 — Used in Position Sensors Sheet
- P1_4-GPIO0_11 — Used in Position Sensors Sheet
- P6_4-GPIO3_3 — Used in Power Supply Sheet
- P6_5-GPIO3_4 — Used in Power Supply Sheet
- CLK2-MMC_CLK
- P3_0-SSP0_SCK — Used in RF Sheet
- P3_1-GPIO5_8 — Used in Position Sensors Sheet

IC5 — FDG6342L (Si1865DL, Si1869DH)

VDDIO_3V3 C52 1u0
S2, D2, ON-nOFF, R1-C1
C51 47p
VDDIO_3V3 R51 47k
R2
P1_8-MMC_ENABLE
VDD_MMC

R1-C1, R2 circuitry enables slow
startup to limit inrush current
R1 >> 10*R2
R1=47k, R2=2k2 ==> Ton=4us
Toff=R1*Co=47000*0.00000481=0.23s

Co = 10.11uF
C118 4u7 C119 0u1 C120 u01

U11 — Hirose DM3D-SF (microSD)

Pin	Signal	Net
2	DAT3/CD/CS	P1_12-MMC_DAT3
1	DAT2	P1_11-MMC_DAT2
8	DAT1/IRQ	P1_10-MMC_DAT1
7	DAT0/DO	P1_9-MMC_DAT0
10	CD	P1_13-MMC_CD
5	CLK	CLK2-MMC_CLK
4	VCC	
6	GND	
3	CMD/DI	P1_6-MMC_CMD
9	GND	

USB Device Mode

LPC182x IC1

USB0_DP	E1
USB0_DM	E2
USB0_VBUS	E3
USB0_ID	F1
USB1_DP	E9
USB1_DM	E10

USB0_DP
USB0_DM
VBUS

VBUS pin will remain high for several seconds after USB disconnect
USB0_ID has an internal pull-up resistor to indicate B Device

To Host
USB-microAB

3	DP	
2	DN	
1	VBUS	
4	GND	
5	SHIELD	
6	ID	

U1

CR2
CR1
GNDPWR

VBUS
f1
Fuse

L11 FBY
GND_microAB
GNDPWR

VDD_3V3

R8
101

CR3
GNDPWR

FBX L10
High DCR
GNDPWR

Notes:
- USB VBUS Fuse F1 limits inrush current with
  its 0.5 ohm typical resistance
- FBX ferrite bead is high DCR 0805
- FBY ferrite beads are high current 0805
- Choose PTC fuse with 750mA Ihold for temperature compensation
- pull-up on USB ID pin indicates B device

DELETE
R1
R2

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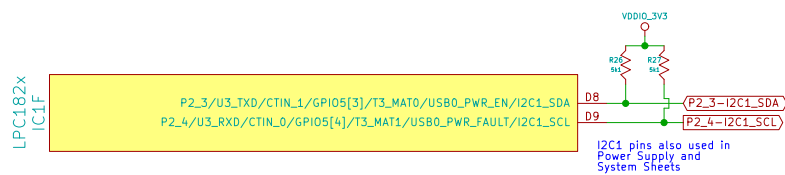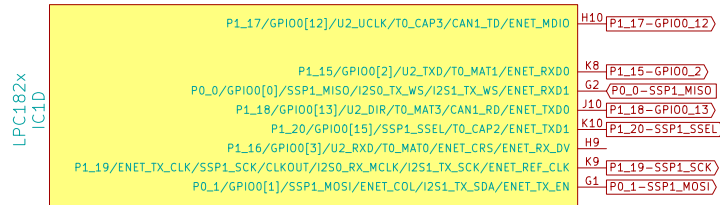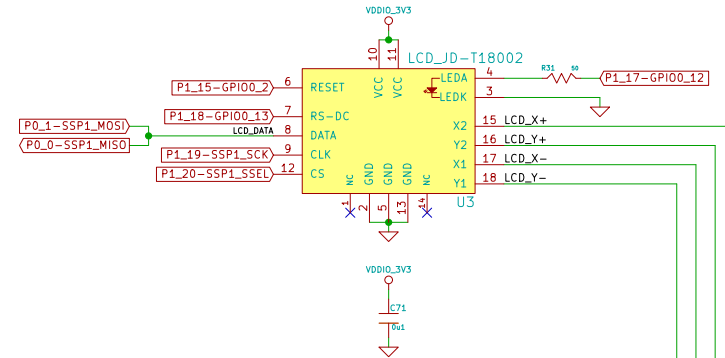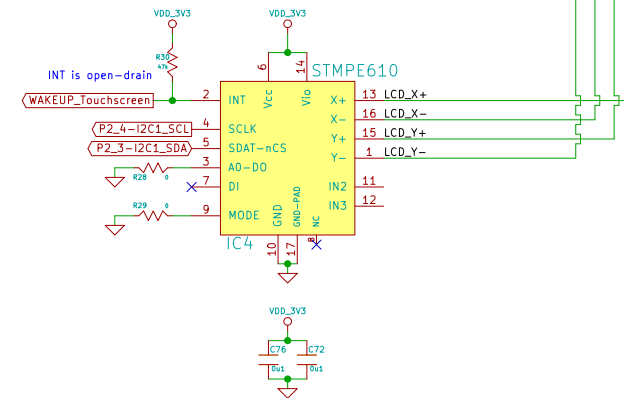| Size: A4	**Date: 8 jun 2012**	**Rev: 1.0**
KiCad E.D.A.		Id: 7/10

Notes
- Enable the Touchscreen controller to wake up the processor
- Run STMPE610 on always-on VDD to enable Touchscreen wakeup
- Run LCD on VDDIO since it does not need to always be on and has leakage currents
- P1_7-GPIO0_12 is a High Drive Strength Pin that can source 32mA to the LCD Backlight LED

LCD and Resistive Touchscreen

IC1D LPC182x

Pin	Signal	Net
H10	P1_17/GPIO0[12]/U2_UCLK/T0_CAP3/CAN1_TD/ENET_MDIO	P1_17-GPIO0_12
K8	P1_15/GPIO0[2]/U2_TXD/T0_MAT1/ENET_RXD0	P1_15-GPIO0_2
G2	P0_0/GPIO0[0]/SSP1_MISO/I2S0_TX_WS/I2S1_TX_WS/ENET_RXD1	P0_0-SSP1_MISO
J10	P1_18/GPIO0[13]/U2_DIR/T0_MAT3/CAN1_RD/ENET_TXD0	P1_18-GPIO0_13
K10	P1_20/GPIO0[15]/SSP1_SSEL/T0_CAP2/ENET_TXD1	P1_20-SSP1_SSEL
H9	P1_16/GPIO0[3]/U2_RXD/T0_MAT0/ENET_CRS/ENET_RX_DV	
K9	P1_19/ENET_TX_CLK/SSP1_SCK/CLKOUT/I2S0_RX_MCLK/I2S1_TX_SCK/ENET_REF_CLK	P1_19-SSP1_SCK
G1	P0_1/GPIO0[1]/SSP1_MOSI/ENET_COL/I2S1_TX_SDA/ENET_TX_EN	P0_1-SSP1_MOSI

LCD_JD-T18002 U3

VDDIO_3V3

Pin	Signal	Net
6	RESET	P1_15-GPIO0_2
10	VCC	
11	VCC	
4	LEDA	R31
3	LEDK	P1_17-GPIO0_12
7	RS-DC	P1_18-GPIO0_13
8	DATA	LCD_DATA / P0_1-SSP1_MOSI
9	CLK	P1_19-SSP1_SCK
12	CS	P1_20-SSP1_SSEL
15	X2	LCD_X+
16	Y2	LCD_Y+
17	X1	LCD_X-
18	Y1	LCD_Y-

GND GND GND
NC NC
X1 X2 X3 X4

C71 0u1 VDDIO_3V3

P0_0-SSP1_MISO

Resistive Touchscreen Controller

VDD_3V3

R30 47k

INT is open-drain

WAKEUP_Touchscreen

STMPE610 IC4

Pin	Signal	Net
2	INT	
6	Vcc	
14	Vio	
13	X+	LCD_X+
16	X-	LCD_X-
15	Y+	LCD_Y+
1	Y-	LCD_Y-
4	SCLK	P2_4-I2C1_SCL
5	SDAT-nCS	P2_3-I2C1_SDA
3	A0-DO	R28
7	DI	
9	MODE	R29
11	IN2	
12	IN3	
10	GND	
17	GND-PAD	
	NC	

VDD_3V3
C76 0u1   C72 0u1

IC1F LPC182x

Pin	Signal	Net
D8	P2_3/U3_TXD/CTIN_1/GPIO5[3]/T3_MAT0/USB0_PWR_EN/I2C1_SDA	P2_3-I2C1_SDA
D9	P2_4/U3_RXD/CTIN_0/GPIO5[4]/T3_MAT1/USB0_PWR_FAULT/I2C1_SCL	P2_4-I2C1_SCL

VDDIO_3V3
R26 5k1   R27 5k1

I2C1 pins also used in Power Supply and System Sheets

LCD_DATA — LCD_DATA
LCD_X+ — LCD_X+
LCD_X- — LCD_X-
LCD_Y+ — LCD_Y+
LCD_Y- — LCD_Y-

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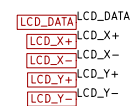Sheet: /LCD/
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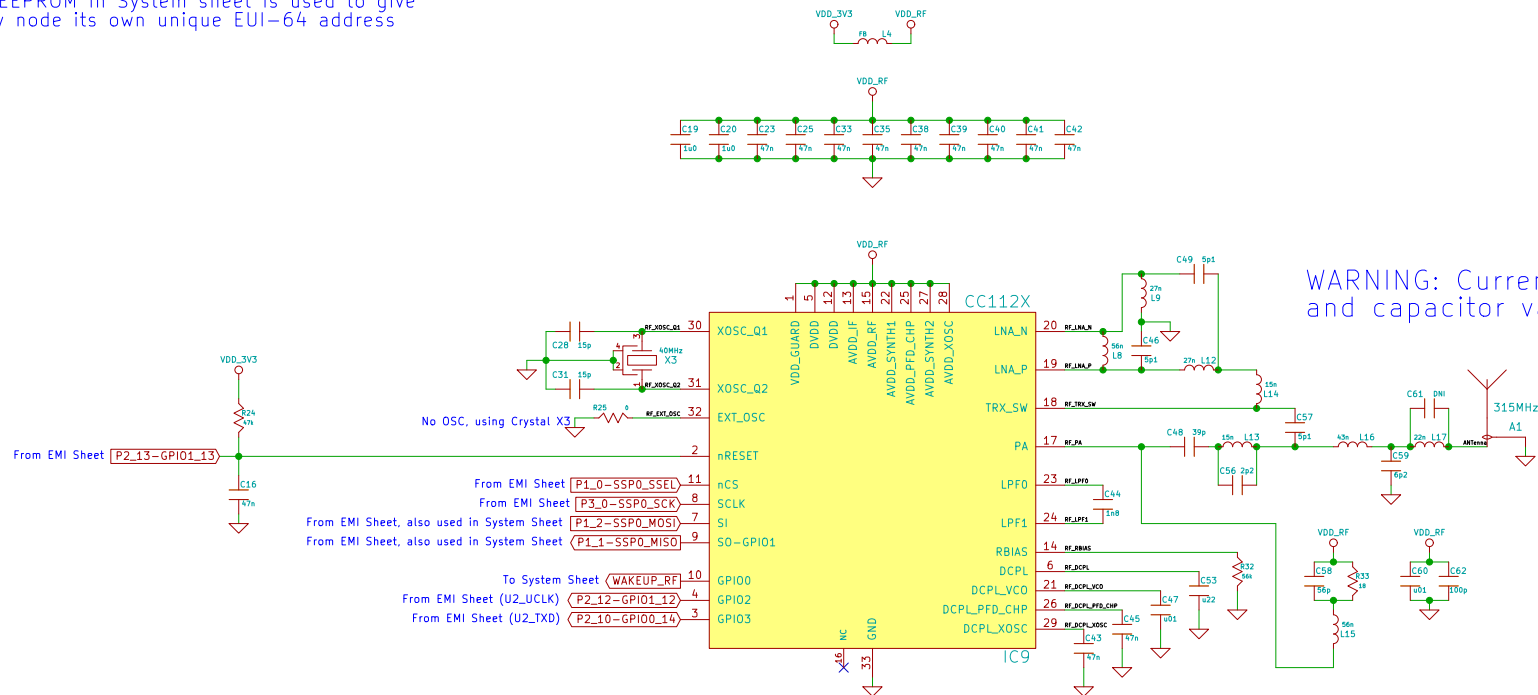Size: A4   Date: 8 jun 2012   Rev: 1.0
KiCad E.D.A.   Id: 4/10

Notes:
— Target 315MHz RF Band (Short Data Packets, No Streaming, Limited Power) for Sensor Nodes
— Use to transfer Identification and Control signals between nodes
— Refer to Linx Application Note AN-00125 for FCC15.231 A-D Overview
— CC1125 DS 1.12: 315/40=7.9, 40*8=320, (320-315)=5>1MHz TX, similar for XOSC/2 for RX
— Use always-on VDD for power to enable Wake-On-Radio function
— MISO and MOSI are used in System sheet to define boot order
— MISO (P1_1) has a 50k pull-up
— MOSI (P1_2) has a 10k pull-down
— All capacitors should be X7R or C0G/NPO
— For CC1120, use a 32MHz X3
— E48 EEPROM in System sheet is used to give
   every node its own unique EUI-64 address

WARNING: Current RF filter inductor
and capacitor values are for 420MHz

CC112X

IC9

315MHz
A1

From EMI Sheet P2_13-GPIO1_13

No OSC, using Crystal X3

From EMI Sheet P1_0-SSP0_SSEL
From EMI Sheet P3_0-SSP0_SCK
From EMI Sheet, also used in System Sheet P1_2-SSP0_MOSI
From EMI Sheet, also used in System Sheet P1_1-SSP0_MISO
To System Sheet WAKEUP_RF
From EMI Sheet (U2_UCLK) P2_12-GPIO1_12
From EMI Sheet (U2_TXD) P2_10-GPIO0_14

30 XOSC_Q1
31 XOSC_Q2
32 EXT_OSC
2   nRESET
11 nCS
8   SCLK
7   SI
9   SO-GPIO1
10 GPIO0
4   GPIO2
3   GPIO3

LNA_N 20 RF_LNA_N
LNA_P 19 RF_LNA_P
TRX_SW 18 RF_TRX_SW
PA 17 RF_PA
LPF0 23 RF_LPF0
LPF1 24 RF_LPF1
RBIAS 14 RF_RBIAS
DCPL 6 RF_DCPL
DCPL_VCO 21 RF_DCPL_VCO
DCPL_PFD_CHP 26 RF_DCPL_PFD_CHP
DCPL_XOSC 29 RF_DCPL_XOSC
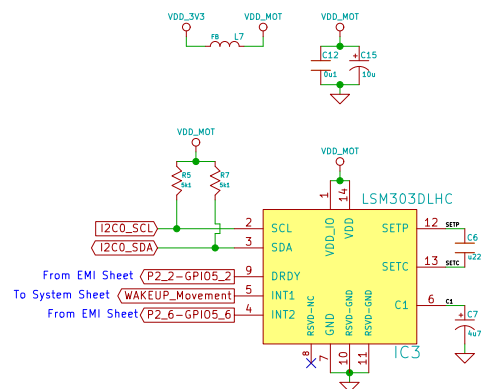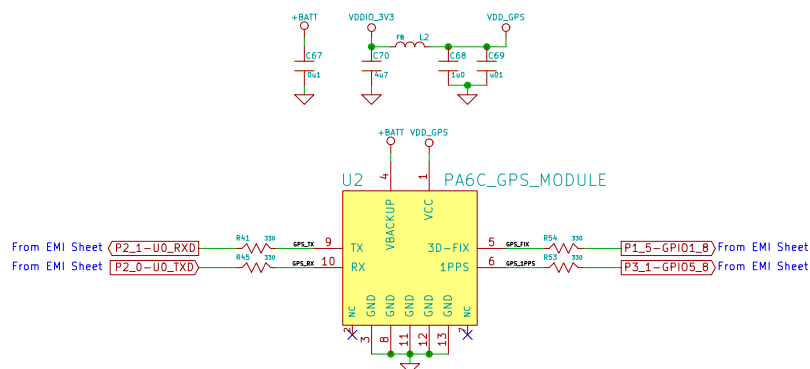
Notes:
 – separate the LSM303 from all other electronics
 – do not place a GND plane underneath the LSM303
 – keep inductors and ferrites very far from the LSM303
 – avoid ferrous materials like nickel near the LSM303
 – X?R ceramic capacitor materials are ferrous, use C0G/NP0 or tantalum
 – set LSM303 INT1 interrupt to Active-Low wakeup the LPC182x
 – LSM303 is powered by always-on VDD_3V3 to
   enable the LSM303 to wake up the LPC182x when in motion
 – PA6C is powered by VDDIO_3V3 so that it can be turned
   off when the device is not in motion
 – PA6C VBACKUP is 2V to 4.3V so direct Li-Ion power is OK
 – The 1PPS signal is connected to an interruptable GPIO
   pin so that it can be used as a global timebase for RF

Motion and Orientation Sensor

LPC182x
IC1G

I2C0_SCL   D6 I2C0_SCL
I2C0_SDA   E6 I2C0_SDA

VDD_3V3   VDD_MOT   VDD_MOT
FB L7
C12 C15
0u1 10u

VDD_MOT   VDD_MOT
R5 R7
8k1 8k1

LSM303DLHC

1 VDD   14
I2C0_SCL   2 SCL   SETP 12 SETP
I2C0_SDA   3 SDA   SETC 13 SETC
                                          C6
                                          u22
From EMI Sheet P2_2-GPIO5_2 9 DRDY
To System Sheet WAKEUP_Movement 5 INT1   C1 6 C1
From EMI Sheet P2_6-GPIO5_6 4 INT2   C7
                                                   4u7
VDD_IO VDD SETP SETC C1
RSVD-NC GND RSVD-GND RSVD-GND
8 7   10 11
IC3

GPS

+BATT   VDDIO_3V3   VDD_GPS
C67   FB L2   C68 C69
0u1   C70   1u0 u01
        4u7

U2   PA6C_GPS_MODULE
+BATT VDD_GPS
4   1
VBACKUP VCC

From EMI Sheet P2_1-U0_RXD R41 330 GPS_TX 9 TX   3D-FIX 5 GPS_FIX R54 330 P1_5-GPIO1_8 From EMI Sheet
From EMI Sheet P2_0-U0_TXD R45 330 GPS_RX 10 RX   1PPS   6 GPS_1PPS R53 330 P3_1-GPIO5_8 From EMI Sheet

NC GND GND GND GND NC
2 3 8 11 12 13 7

Notes:
- there isn't enough room on the PCB for a full expansion header
- these 3 analog pins and some GPIO are exposed as unmasked vias

LPC182x
IC1H

P2_5/CTIN_2/USB1_VBUS/GPIO5[5]/T3_MAT2/USB0_IND0/ADCTRIG1   D10   ADCTRIG1
ADC0_0/ADC1_0/DAC   A2   ADC0_0
ADC0_1/ADC1_1   A1
ADC0_2/ADC1_2   B3
ADC0_3/ADC1_3   A3   ADC0_3

Opendous Inc.
File: MicropendousX-LPC182x-GPS-Expansion.sch
Sheet: /Expansion/
Title: MicropendousX-LPC182x-GPS
Size: A4 | Date: 8 jun 2012 | Rev: 1.0
KiCad E.D.A. | Id: 10/10