LCD Backlight

LCD Outline
JHD12864-G13BSH-OUTLINE
U2
R43 0402/10K/5%
R45 0402/12R/5%
BSS84W Q12
LCD_BACKLIGHT
GND
3V3

FTDI

JP6 FTDI
C29 MASTER_RESET 0402/100n/10V/X5R
R31 0402/0R/5% TX TX_FTDI
R32 0402/0R/5% RX RX_FTDI
DTR
FTDI_PWR
SJ9 Open
3V3
FTDI Power
0603/1u/10V/X5R C38
GND

LiPo Connector

J8
VBATT
GND

5V0 Power

IC8 MCP1825T-3302E/DC
VIN VOUT
SHDN GND PWRGD
3V3
R28 0402/10K/5%
C30 0805/10u/6V3/X5R

Optional Step up regulator
3V3 > 5V0

U1 POWER-POD-EMF
VIN
GND
5V0
AUX
3V3
GND
5V0

3V3 Power

3V3 generated from the PMIC OUTPUT
Shutdown during Sleep

IC10 MCP73831
VIN VBAT
PROG
STAT VSS
VBUS
MCP_STAT
PROG
VBATT
C49 0603/4u7/6V3/Y5V
C33 0805/22u/25V/X5R
R46 0402/2K/5%
C48 0603/4u7/6V3/Y5V
GND

Charge

IC9 TC1015-3V3
IN OUT
GND
EN BP
VBATT_SWITCHED
VBACKUP
C36 0805/22u/25V/X5R
C34 0603/1u/10V/X5R
C50 SMC_B/10u/
BP
GND

Backup power

100mA

Power switch

CUS-12TB
VBATT_SWITCHED
4V2
VBATT
S8
C32 0402/100n/10V/X5R
GND

SRF Reprogram

JP8
GND   3V3
SRF_P2_2/DC   SRF_P2_1/DD
SRF_RESET   SRF_P0_1/MODE_PIN_1
SRF_P0_3/TX   SRF_P0_2/RX

IC3 SRF-V1.2
ANT
3V3
GND
P1_3
P1_6/MOSI
P1_5/SCK
P1_4/SS
P2_3
P2_2/DC
P2_1/DD
P2_0
P0_4/CTS_IN
DUDD/DP
P0_5/DM
P0_3/TX
P0_2/RX
P1_7/MISO
SRF_P1_4/SLEEP

C2 0402/100n/10V/X5R
JP3 ANT
ANT
3V3
GND
GND
SRF_P2_3
SRF_P2_2/DC
SRF_P2_1/DD
SRF_P2_0/AT_COMMAND
SRF_P0_3/TX
SRF_P0_2/RX

SRF Reset TP2
SRF Reset TP3

SJ1 Open MASTER_RESET
SRF_P2_2/DC SRF RESET
SJ2 Open ERASE_CMD
SRF_P2_3 SRF ERASE
SRF_P0_3/TX R5 0402/0R/5% RX
SRF_P0_2/RX R6 0402/0R/5% TX

SRF and programing heder

P2_2 is Remote Reset
need a pin for Erase
need a pin for ATCommand mode

Option to isolate TX and RX

Light Switch

VBACKUP
R47 0402/10K/5%
S1 SKQGAKE010
LIGHT

Batt Voltage Mon

VBATT_SWITCHED R38 R39 VBATT_MON
0402/100K/5% 0402/100K/5%
GND

RGB LED's

Per Data Sheet

Blue Vf3.2 I25 2R
Green Vf3.2 I25 2R
Red Vf2 I50 15R

Pin can sink 9mA

Blue Vf3.2 I4.5 12R
Green Vf3.2 I4.5 12R
Red Vf2 I9 82R

CLV1A-FKB LED2
R15 0402/12R/5% LED2_BLUE
R16 0402/12R/5% LED2_GREEN
R17 0402/82R/5% LED2_RED
3V3

CLV1A-FKB LED1
R18 0402/12R/5% LED1_BLUE
R19 0402/12R/5% LED1_GREEN
R20 0402/82R/5% LED1_RED
3V3

Joystick

SKRHAAE010 S7
BUTTON_UP UP LEFT BUTTON_RIGHT
BUTTON_DOWN DOWN RIGHT BUTTON_LEFT
GND CTR CENT BUTTON_CENTER
VBACKUP
R48 0402/10K/5%
GND

SPI FLASH

Only supports 4kB Sector erase

8,16,32Mbit depending on budget and space needed

IC5 S25FL216K0PMFI011
CS VCC
MISO HOLD
WP SCK
GND MOSI
FLASH_CS
MISO
3V3
3V3
MOSI FLASH_HOLD SCK
SCK FLASH_HOLD
FLASH_CS
MOSI
MISO
3V3
3V3
GND

Supports 512B Page erase
But more expensive

LCD Connector

Connector and support parts
Taken form the Repaper Dev Board

J7
LCD_CS NC
LCD_RST CS1B
LCD_A0 RST
LCD_3V3 A0
LCD_3V3 WR
RD
D0
D1
D2
D3
D4
D5
D6
D7
SCK
MOSI
LCD_3V3 VDD
VSS
LCD_VOUT VOUT
LCD_P3+ P3+
LCD_P1- P1-
LCD_P1+ P1+
LCD_P2+ P2+
LCD_P2- P2-
LCD_V4 V4
LCD_V3 V3
LCD_V2 V2
LCD_V1 V1
LCD_V0 V0
LCD_3V3 PS
NC
SFV30R-2STE1HLF

0603/1u/10V/X5R C39
0603/1u/10V/X5R C40
0603/1u/10V/X5R C41
0603/1u/10V/X5R C42
C86
GND

0603/1u/10V/X5R C43 C44 C45 C46 C47
GND

R44 0402/10K/5%
LCD_POWER
Q11 BSS84W
LCD_3V3
3V3

A B Buttons

S5 SKQGAKE010 BUTTON_B GND
S6 SKQGAKE010 BUTTON_A GND
S9 3x6x2.5
S10 3x6x2.5

Screen Buttons

SCREEN_LEFT GND
SCREEN_RIGHT GND

IR RX

IR_RX
TSOP7523BTT
GND
NC/GND
VS OUT
IR_RX
IR_RX_PWR
R49 0402/10K/5%
Q13 BSS84W
3V3
GND

HMC5883L

IC7 HMC5883LSMD (NP)
VDD SCL MPU_AUX_CL
VDDIO SDA MPU_AUX_DA
S1
C1 SETP
SETC STEP
SETC SETC
GND DRDY HMC_DRDY
VBACKUP
0402/100n/10V/X5R C27
0603/4u7/6V3/Y5V C28
Address 0x1E
Optional, slaved from MPU
GND
STEP C31 0402/0u22/10V/X5R
SETC

MPU-6050 IMU

IC2 MPU-6050
VDD AUX_CL MPU_AUX_CL
INT AUX_DA MPU_AUX_DA
FSYNC SCL SCL0-3
CLKIN SDA SDA0-3
REGOUT AD0
CPOUT VLOGIC VBACKUP
GND
VBACKUP MPU_INT
MPU_REGOUT
MPU_CPOUT
C4 0402/100n/10V/X5R
C6 0402/100n/10V/X5R
0402/2n2/50V/X7R
C37 0805/22u/25V/X5R
C8 0402/10n/4V/X7R
Address 0x68
GND

Buzzer

SG1 PKLCS1212E4001-R1
R25 0402/1/5%
SJ7 Closed
DAC0
Buzzer
C31 0402/0u22/10V/X5R
GND

IR TX LED

Closed SJ14
IR_TX
PWM6
IR_TX_PWM
R40 0402/10K/5%
Q9 2N7002KH
R4 0402/20R/5%
IR_TX VSMB3940X01-GS08
C37 0805/22u/25V/X5R
3V3
GND

Board Outline

open hardware
TiLDA Mk2 Prototype
20/07/2014 00:04
Sheet: 1/1

USB Led's

TXL — R8 — 3V3
TX 0402/1K/5%
0603/LED/RED

RXL — R14 — 3V3
RX 0402/1K/5%
0603/LED/RED

AREF pin select

3V3
AREF
SJ8
AREF — L103 — AVREF
MH2029-300Y
C134 0402/100n/10UV/X5R
C119 0402/100n/10UV/X5R
GND

Reset

MASTER_RESET
SJ6 Open
RESET BUTTON
S4
SKQGAKE010

USB AB Socket

VBUS_VBUS
DHSD_N — DHSD_N
D+ — DHSD_P
D- — UOTGID
GND*7
J1
ZX62-AB-5PA(11)
Z3 C0603M1C-0.BE
Z1 C0603M1C-0.BE
Z2 C0603M1C-0.BE
GND

JTAG 10Pin

3V3
R21 R22 R23 R24
0402/100K/1%
JP2
JTAG_TMS
JTAG_TCK
JTAG_TDO
JTAG_TDI
JTAG_RESET
R7 MASTER_RESET
0402/0R/5%
GND
JTAG M50-3500542

Ethernet Header

3V3
JP7
ERXD1 1 2 ETXD1
ERX_ER 3 4 ERX_DV
EMDC 5 6 ERXD0
EMDIO 7 8 ETXD0
NRST 9 10 ETX_EN
EEXTINT 11 12 ETX_CLK
PC11 13 14 5V0
15 16
GND ETH GND

JTAG 4Pin

Removed to due space
MASTER_RESET
JTAG_TMS
JTAG_TCK
GND

Decoupling

3V3
L101 MH2029-300Y
L102 MH2029-300Y
VDDANA
VDDOUTIMI
C101 SMC_B/10u/
C118 0402/10U/10U/X5R
VDDIN
C106 0402/100n/10U/X5R
C105 0402/100n/10U/X5R
C104 0402/100n/10U/X5R
C107 0402/100n/10U/X5R
C108 0402/100n/10U/X5R
C109 0402/100n/10U/X5R
C102 SMC_B/10u/
C110 0402/100n/10U/X5R
C103 SMC_B/10u/
C111 SMC_B/10u/
C112 0402/100n/10U/X5R
C113 0402/100n/10U/X5R
C114 0402/100n/10U/X5R
C115 0402/100n/10U/X5R
C116 0402/100n/10U/X5R
C117 0402/100n/10U/X5R
VDDIO VDDIO VDDIO VDDOUT
GND

SAM3X8E
IC1
ATSAM3X8EA-AU

12Mhz 13pF 30ppm (7pf caps)
0402/7p/ C121
X1
R108 0402/0R/5%(NP)
0402/7p/ C122
0402/15p/ C123
32.768Khz
X2
0402/15p/ C124

DHSD_N — R105 DFSD_N 0402/39R/1%
DHSD_P — R106 DFSD_P 0402/39R/1%
0603/6K8/1% R107
C125 0402/15p/

TST
XOUT 35 XOUT
XIN 36 XIN
XOUT32 49 XOUT32
XIN32 48 XIN32
DHSDM 38
DFSDM 37
DHSDP 40
DFSDP
VBG

VBUS
JTAGSEL
FWUP
SHDN
NRSTB
NRST
ADVREF
VDDIN
VDDIO1
VDDIO2
VDDIO3
VDDIO4
VDDANA
VDDBU
VDDPLL
VDDOUTIMI
VDDOUT
VDDCORE1
VDDCORE2
VDDCORE3
VDDCORE4
VDDCORE5
GNDANA
GNDPLL
GNDBU
GNDOUTIMI
GND1
GND2
GND3
GND4

PA0 CANTX0 23
PA1 CANRX0 24
PA2 SRF_P1_4/SLEEP 85
PA3 SRF_P2_0/AT_COMMAND
PA4 AD5 83
PA5 EEXTINT 25
PA6 AD4 82
MPU_INT 26
PA8 RX 27
PA9 TX 28
PA10 RXD2 3
PA11 TXD2 4
PA12 RXD1 5
PA13 TXD1 6
PA14 BUTTON_CENTER
PA15 AD0 78
PA16 SDA1 70
PA17 SCL1 71
PA18 IR_RX 72
PA19 LIGHT 72
TXL 107
AD3 81
AD2 80
AD1 79
MISO 108
MOSI 109
SCK 110
FLASH_CS 111
SD_CS 112

SPI0_NPCS0 (ETH)
SPI0_NPCS1 (SD)

PD10 32 — HMC_DRDY — PD10
PD9 21 — PWM12
PD8 20 — PWM11
PD6 19 — SCREEN_LEFT
PD5 18 — RXD0 RXD0
PD4 17 — TXD0 TXD0
PD3 16 — BUTTON_LEFT
PD2 15 — BUTTON_UP
PD1 14 — BUTTON_DOWN
PD0 13 — BUTTON_RIGHT

PC30 103 RXL
PC29 102 PWM10
PC28 139 PWM3
PC27 138 PC27
PC26 137 PWM4
PC25 136 PWM5
PC24 135 PWM6
PC23 134 PWM7
PC22 133 PWM8
PC21 132 PWM9
PC20 131 LED2_RED
PC19 101 LED2_GREEN
PC18 100 LED2_BLUE
PC17 99 SCREEN_RIGHT
PC16 98 BUTTON_B
PC15 97 BUTTON_A
PC14 96 FLASH_HOLD
PC13 95 IR_RX_PWR
PC12 94 PC12
PC11 93 PC11
PC10 117 PC10
PC9 67 LED1_BLUE
PC8 66 LCD_POWER
PC7 65 LED1_GREEN
PC6 64 LCD_A0
PC5 63 LED1_RED
PC4 116 SD_CARD_DECTECT
PC3 60 PC3
PC2 59 LCD_RST
PC1 58 LCD_BACKLIGHT
PC0 130 ERASE_S

EPD
RXD0
TXD0
Not on Due
Not on Due
PMIC
PMIC
Not on Due
Not on Due
EPD
EPD
EPD
EPD
EPD
EPD

PB0 ... PB31
ETX_CLK 113
ETX_EN 114
ETXD0 115
ETXD1 118
ERX_DV 119
ERXD0 120
ERXD1 121
ERX_ER 122
EMDC 123
EMDIO 127
UOTGUBOF 128
UOTGID 129
SCL0-3 86
SDA0-3 87
ISP_RESET_IO 140
MCP_STAT
LCD_CS
DAC0
DAC1
PWM13
SS3
PWM2
PWM1
JTAG_TCK
JTAG_TDI
JTAG_TDO
JTAG_TMS

USB power filter
Do not need fuse as PMIC handles that
VBUS — VBUS
C126 0402/10n/10UV/Y5V
C127 SMC_B/10u/
C135 SMC_B/10u/
R102 0402/10K/5%

Reset pin Select
NRSTB
C120 0402/10n/10v/Y5V
MASTER_RESET
SJ5 RESET SELECT
NRST

SD CARD SOCKET
No Place/Optional
J5
SD_CS P2 — CS
MOSI P3 — DI
3V3 P4 — VCC
SCK P5 — SCK
GND P6 — GND
MISO P7 — DO
P1 — RSV
SD_CARD_DECTECT G1
GND SHIELD
GND SHIELD
GND SHIELD
1050270001 (NP)

Conductive Thread Pads
TP1 GND
TP17 D19
TP18 D18
TP19 3V3

I2C Pull-Up's
SDA0-3 R33 0402/1K5/5%
SCL0-3 R34 0402/1K5/5%

CAN and DAC
JP4
DAC0
DAC1
JP5
CANRX0
CANTX0
CAN

Arduino Shield Headers
SPI/ISP header
Reset to be wired to a pin by default
via FET for voltage protection
We can use as isp header for
reprogramming SiNE or TiLDA MK1
Solder jumper saw back to normal reset

ISP_RESET_IO
R42 0402/10K/5%
Q10 2N7002KW
SJ3 ISP_RES

MISO SCK MOSI ISP_RESET

ARDUINO
RX D0
TX D1
PWM2 D2
PWM3 D3
PWM4 D4
PWM5 D5
PWM6 D6
PWM7 D7
PWM9 D8
D9
PWM10 D10
PWM11 D11
PWM12 D12
PWM13 D13
GND
AREF
SDA1 SDA
SCL1 SCL
A5 AD5
A4 AD4
A3 AD3
A2 AD2
A1 AD1
A0 AD0
VIN VIN
GND GND
5V0 5V0
3V 3V3
RESET MASTER_RESET
IOREF
RESERVED

Erase Jumper not Button
R41 0402/10K/5%
BSS84W Q8
ERASE_CMD
VBACKUP
JP1
ERASE

TiLDA Mk2 Prototype
20/07/2014 00:04
Sheet: 1/1

v0.1

Revsion Notes

v0.2
  Add IR_RX power fet
  Removed EPD and support parts
  Removed S2 and S3, Screen left and rght, added TP's
  Removed PMIC and support parts
  Swapped A and B labels on buttons
  Add LCD and support parts
  Add TC1015 for VBackup power
  Add MCP73831 for charge
  Remove Dataflash IC