# mbeDshield: YET ANOTHER MBED

Kazuki Yamamoto(@_K4ZUKI_)

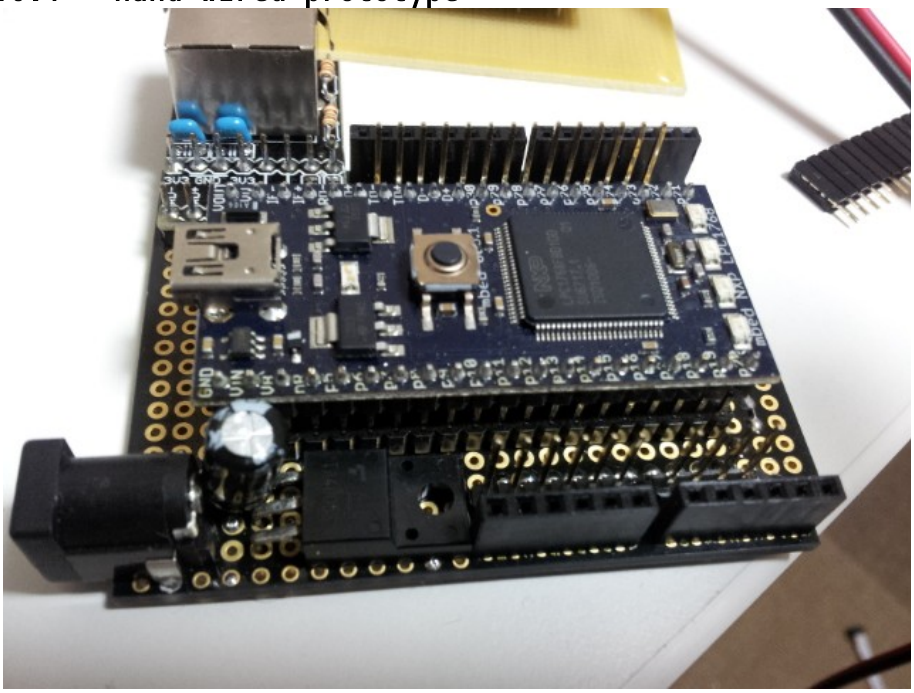
26/Dec/2013 rev1.0
**30/Dec/2014 rev2.0**

THE mbeDshield is YET ANOTHER MBED, which looks like arduino, will make you use ANY arduino "shields" from MBEDs 1768/11U24/**11U35. This document is for current PCB design version 0.5.0 and future design 0.6.0**

## Contents:

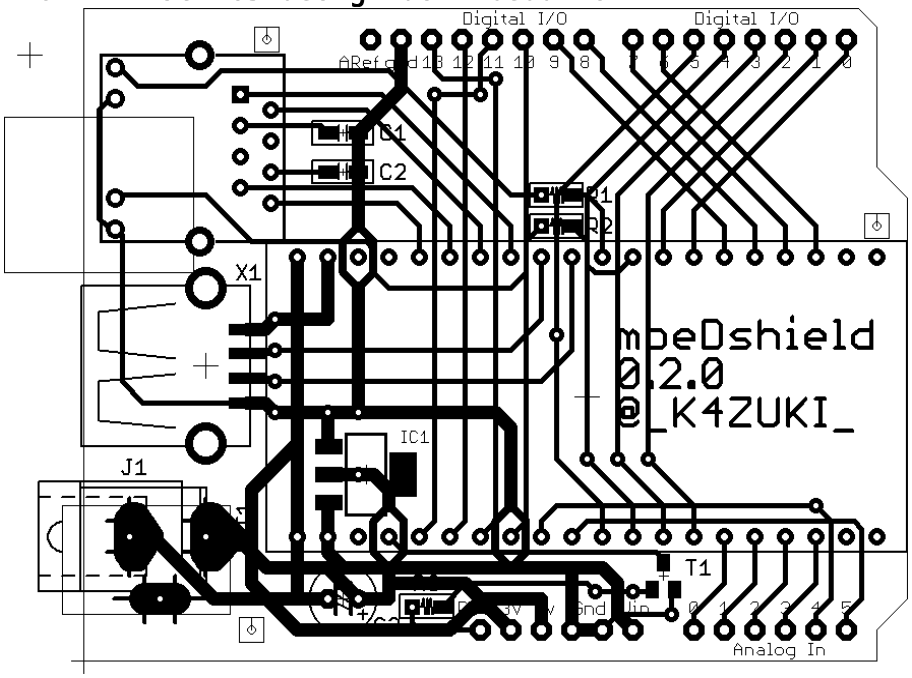
# 1. Version history

## 1.1: v0.0.1 = hand-wired prototype



- Sunhayato's universal shield UB-ARD01
- Switch Science(SSCI)'s SSCI-MBED-ETHER-KIT
- mbed 1768

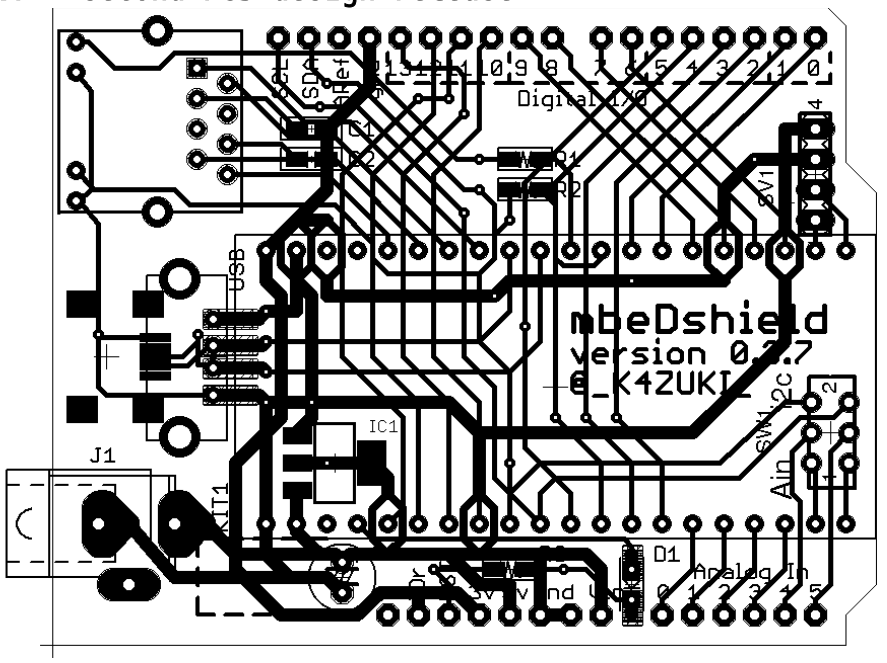
## 1.2: v0.1.0 = first PCB design as "mbeduino"




- the name already exist but didn't ask to Mr. Google
- old arduino pin-out

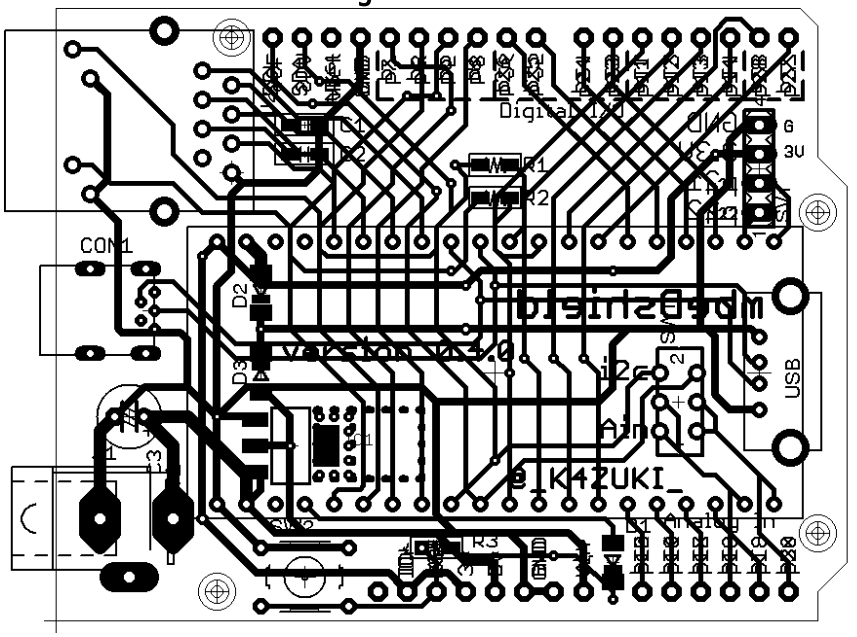
- no reset button
- some mistake on reset signal line
- no M3 screw mounting hole but 0.8mm guide hole instead
- USB host supported

## 1.3: v0.3.7 = second PCB design release



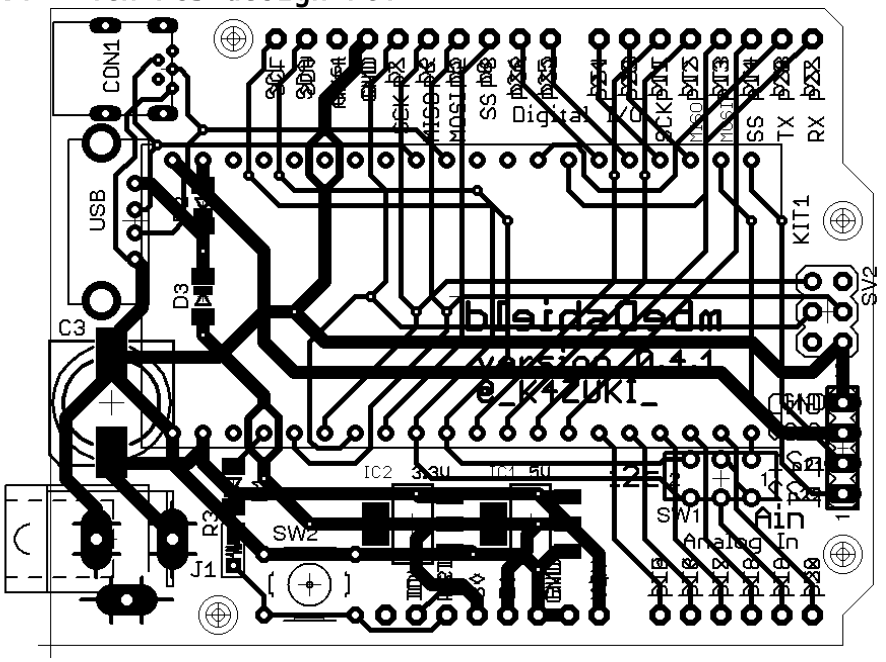

- from this version it is named "mbeDshield", D is large character
- USB host and device supported(mini-B USB on bottom side)
- later arduino pin-out
- A4/A5 pins are multiplexed of analog input or I2C-IO
- no M3 mounting screw hole(FORGOT to add XO)
- no reset switch

## 1.4: v0.4.0 = third PCB design release




- **most of components can be bought from AKIZUKI**
- all components on top side
- design bug on Vin capacitor with normal-height(cheap) one (kit uses low height one!)
- M3 mounting hole implemented *finally*
- silkscreen on Both sides

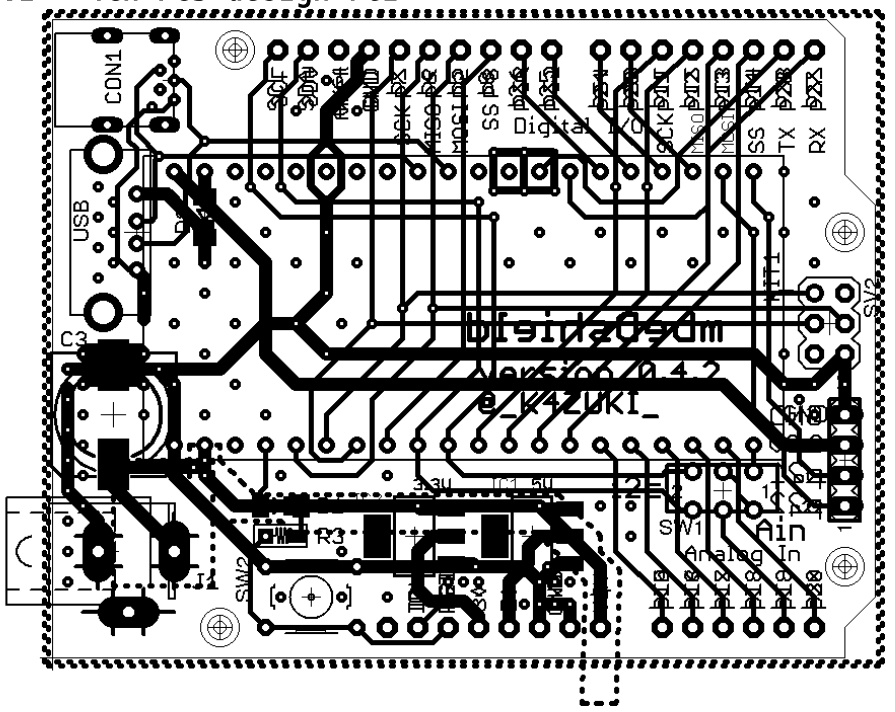
## 1.5: v0.4.1 = 4th PCB design rc1




- **only data exists**
- **no RJ45 socket**
- 1mm(40mil)line ground
- tail 2x3p pin headers for SPI (p5-8 shared)

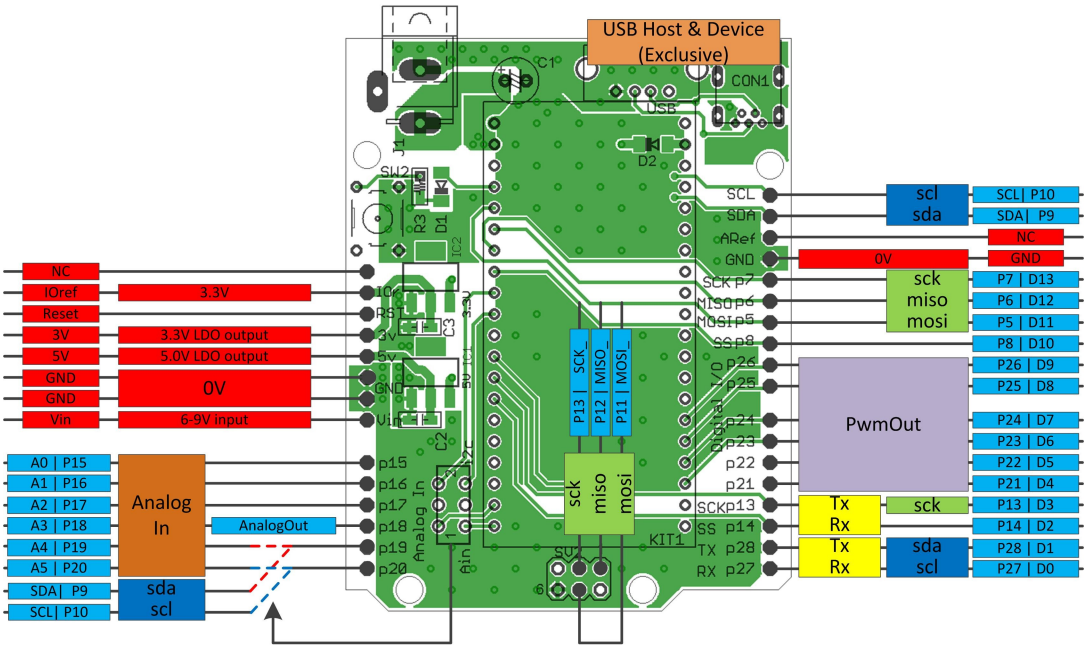
- silkscreen on Both sides
- local LDOs on 3V and 5V lines, 0.5A each
- 7-9V input is necessary

## 1.6: v0.4.2 = 4th PCB design rc2



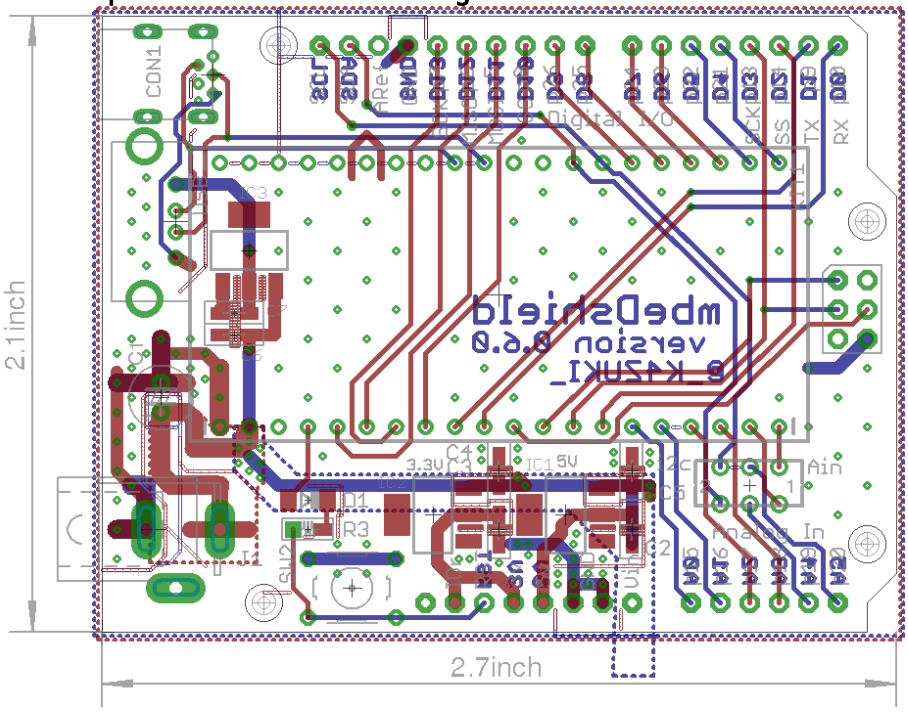

**- only data exists**
- split plane ground and Vin
- local LDOs on 3V and 5V lines, 0.5A each
- USB host is powered from mbed on-board LDO
- SMD Vin capacitor
- tail 2x3p high-height pin headers for SPI
- ask SSCI or AKIZUKI for selling??? - maybe after prototype

## 1.7: v0.5.0 = released 4th PCB design




- sales available from SSCI( https://www.switch-science.com/catalog/1717/ )
- only **1** pcs left(as of 30/Dec/2014) and *discontinued*
- USB host is available only if main USB is connected(1768 only)
- USB device mode only uses data lines(cannot get power from host)
- I2C is only available with 1768(known bug)

## 1.8: v0.6.0 = planned 5th PCB design




- only data exists

- local LDO for USB host
- I2C pin-out change: p27/28 → p9/10
- ask SSCI for selling?

## 2. Components

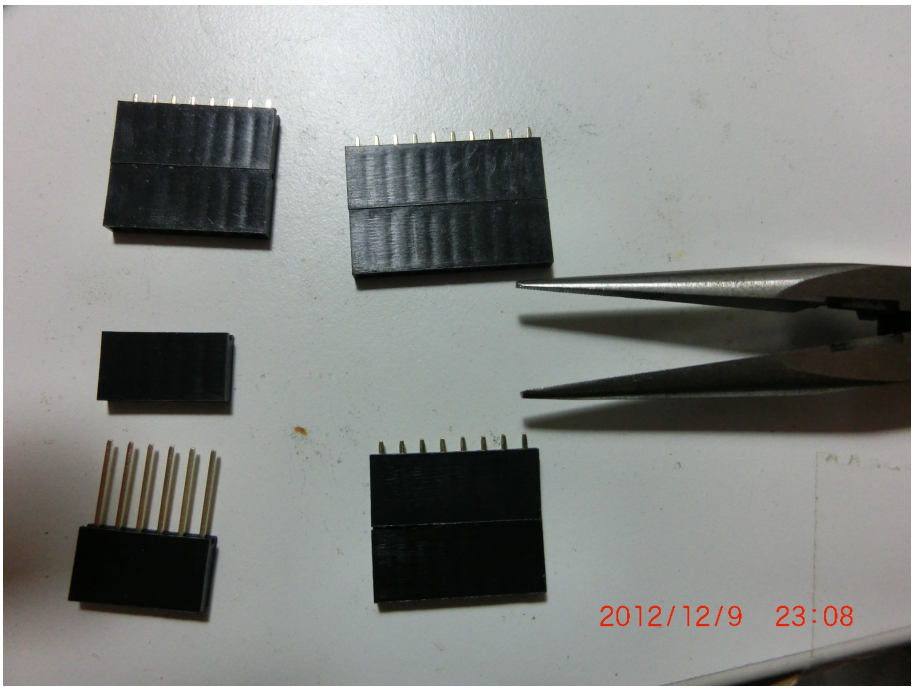
| No. | Description | AKIZUKI number | 0.1.0 | 0.3.7 | 0.4.0 | 0.4.1 | 0.4.2 | 0.5.0 | 0.6.0 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2x 20p pin socket | C-3138 | v | v | v | v | v | v | v |
| 2 | 4x 8p pin socket | C-4046 | v | v | v | v | v | v | v |
| 3 | 2x 6p pin socket | C-4045 | v | v | v | v | v | v | v |
| 4 | 2x 10p additional pin socket | C-7199 | | v | v | v | v | v | v |
| 5 | 2x 6p additional pin socket | (C-4045) | v | | | | | | |
| 6 | smd USB-A | | v | | | | | | |
| 7 | TH USB-A | C-160 | | v | v | v | v | v | v |
| 8 | smd USB mini-B | C-5843 | v | | | | | | |
| 9 | TH USB mini-B | C-2235 | | v | v | v | v | v | v |
| 10 | DC jack | C-6568 | v | v | v | v | v | v | v |
| 11 | 5V SMD LDO | I-2503 | v | v | v | v | v | v | v |
| 12 | 3.3V SMD LDO | I-2502 | | | | v | v | v | v |
| 13 | SMD 0.1uF 2012 | P-355 | v | v | v | v | v | v | v |
| 14 | SMD 100ohm | R-6101 | v | v | v | v | v | v | v |
| 15 | SMD Schottky diode | I-2073 | v | v | v | v | v | v | v |
| 16 | I2C/Analog switch | P-2627 | | v | v | v | v | v | v |
| 17 | TH Vin 100uF/16V | P-5002 | v | v | v | | | v | v |
| 18 | RJ45 Ethernet connector from SSCI | | v | v | | | | | |
| 19 | RJ45 Ethernet connector from AKIZUKI | P-4809 | | | v | | | | |
| 20 | reset switch | P-3647 | | | v | v | v | v | v |
| 21 | SMD Vin 330uF/25V | P-6978 | | | | v | v | | |
| 22 | 2x3p high-height pin header | | | | | v | v | v | v |

## 3. Soldering of the Kit

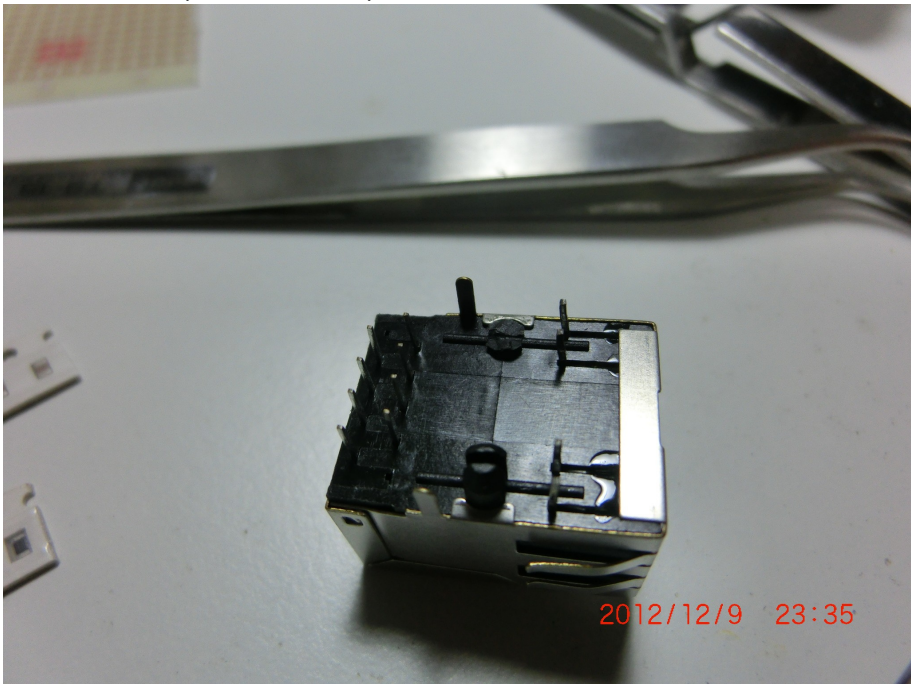
From lower height components:

a. SMD parts C,R,D,LDO
b. mbed socket
c. Vin capacitor
d. USB sockets A and mini-B
e. Vin capacitor
f. DC jack

g. board connectors
g1. unplug pins from one of each pair
g2. stack with other one
g3. solder stacked socket




h. Ethernet RJ45 socket(not for 0.5.0)

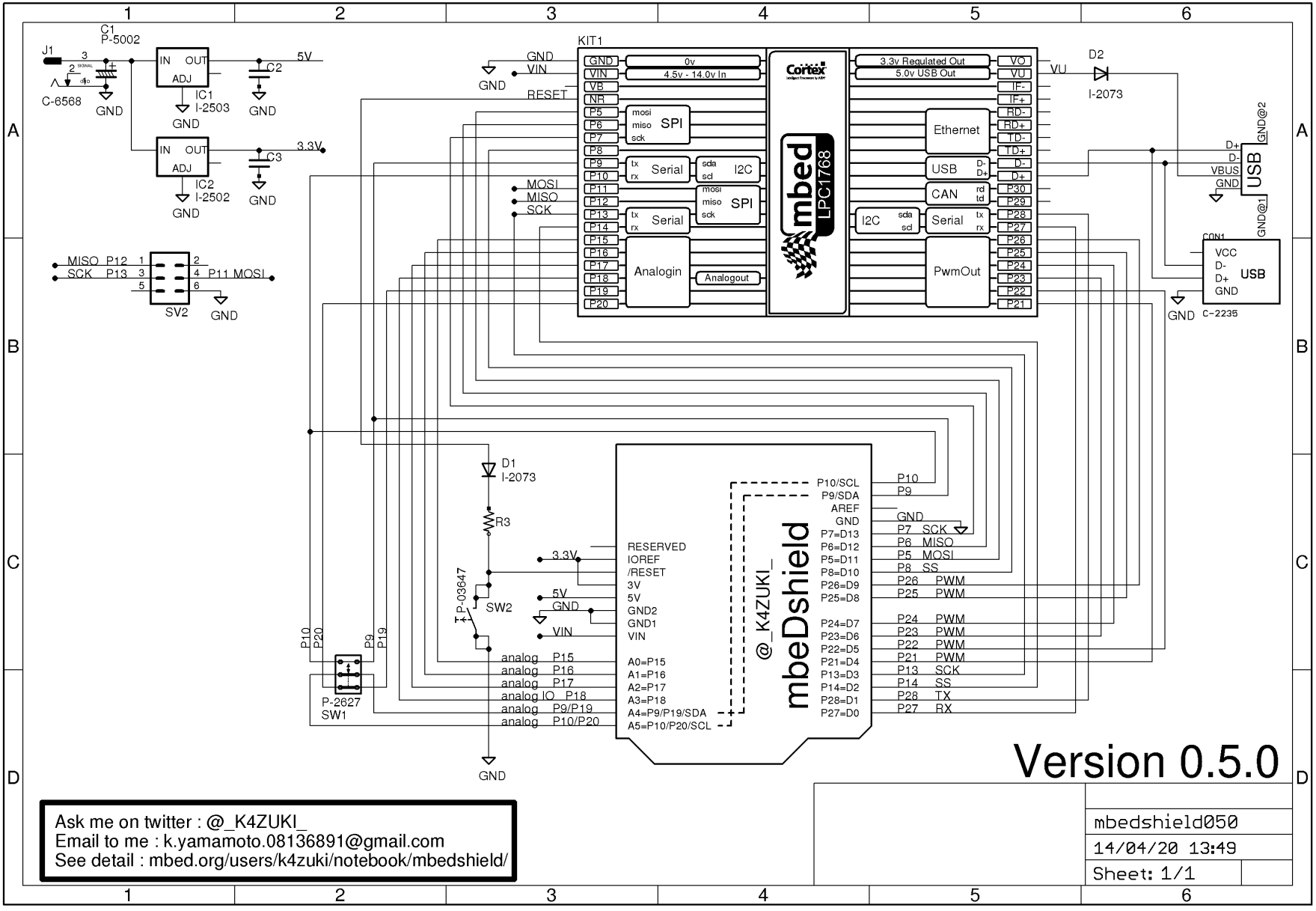


## *4.Software*

You can use any existing softwares for mbed. From writer's experience:
- onboard Ethernet + NTP client (mbed1768 + PCB <0.4.0)
- onchip USB host + Bluetooth dongle connected to Wiimote(Wii Rimokon)
  (mbed1768 + PCB <0.4.0)
- 2.8 inch touch LCD shield from Seeed Studio(0.5.0)
- VFD clock shield from SSCI/@hayasita
- Touch Shield(MPR121 used) from sparkfun
- SPI memory LCD from AKIZUKI(need to make your own shield)
-- **breakout board will be available from MARUTSU(2015~)**
- I2C graphic LCD from AKIZUKI(need to make your own shield)
- I2C 16x2 character LCD from AKIZUKI(need to make your own shield)
- Aquestalk Pico from AKIZUKI(need to make your own shield)
- eVY1 shield from SSCI

UNDER CONFIRMATIONS:
- Ethernet shield R3 from SSCI/Arduino team
- USB host shield from sparkfun
- Xbee shield from sparkfun
- Gameduino from SSCI

## *5. Schematics of v0.5.0*


C1
P-5002
J1
C-6568
GND
IC1
I-2503
IN OUT
ADJ
C2
5V
IC2
I-2502
C3
3.3V
MISO P12
SCK P13
P11 MOSI
SV2
KIT1
GND
VIN
RESET
MOSI
MISO
SCK
0v
4.5v - 14.0v In
3.3v Regulated Out
5.0v USB Out
VU
D2
I-2073
SPI
Serial
I2C
Analogin
Analogout
Ethernet
USB
CAN
PwmOut
mbed
LPC1768
Cortex
USB
VCC
D-
D+
C-2235
CON1
D1
R3
SW2
P-03647
P-2627
SW1
RESERVED
IOREF
/RESET
3V
5V
GND2
GND1
VIN
A0=P15
A1=P16
A2=P17
A3=P18
A4=P9/P19/SDA
A5=P10/P20/SCL
@_K4ZUKI_
mbeDshield
P10/SCL
P9/SDA
AREF
P7=D13
P6=D12
P5=D11
P8=D10
P26=D9
P25=D8
P24=D7
P23=D6
P22=D5
P21=D4
P13=D3
P14=D2
P28=D1
P27=D0
P7 SCK
P6 MISO
P5 MOSI
P8 SS
P26 PWM
P25 PWM
P24 PWM
P23 PWM
P22 PWM
P21 PWM
P13 SCK
P14 SS
P28 TX
P27 RX
analog P15
analog P16
analog P17
analog IO P18
analog P9/P19
analog P10/P20
Version 0.5.0
Ask me on twitter : @_K4ZUKI_
Email to me : k.yamamoto.08136891@gmail.com
See detail : mbed.org/users/k4zuki/notebook/mbedshield/
mbedshield050
14/04/20 13:49
Sheet: 1/1

# *6. Revision history*

Revision 1.0: released at C85(2013)
- documented up to 0.4.2

Revision 2.0: released at C87(2014)
- modification/correction/replace from Revision 1.0
- documented up to 0.6.0

---

mbeDshield: YET ANOTHER MBED

Kazuki Yamamoto
@_K4ZUKI_

Revision 2.0

---