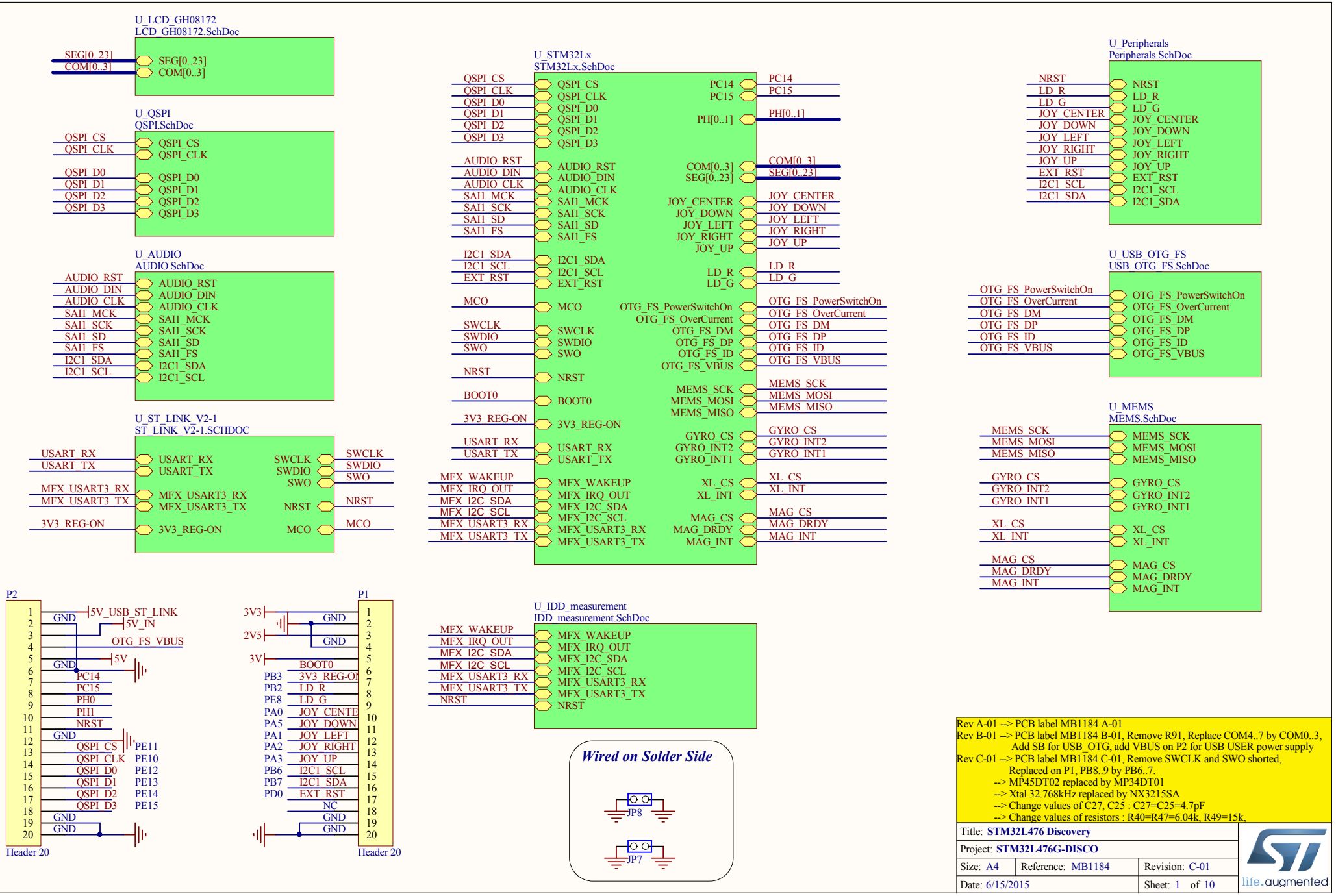
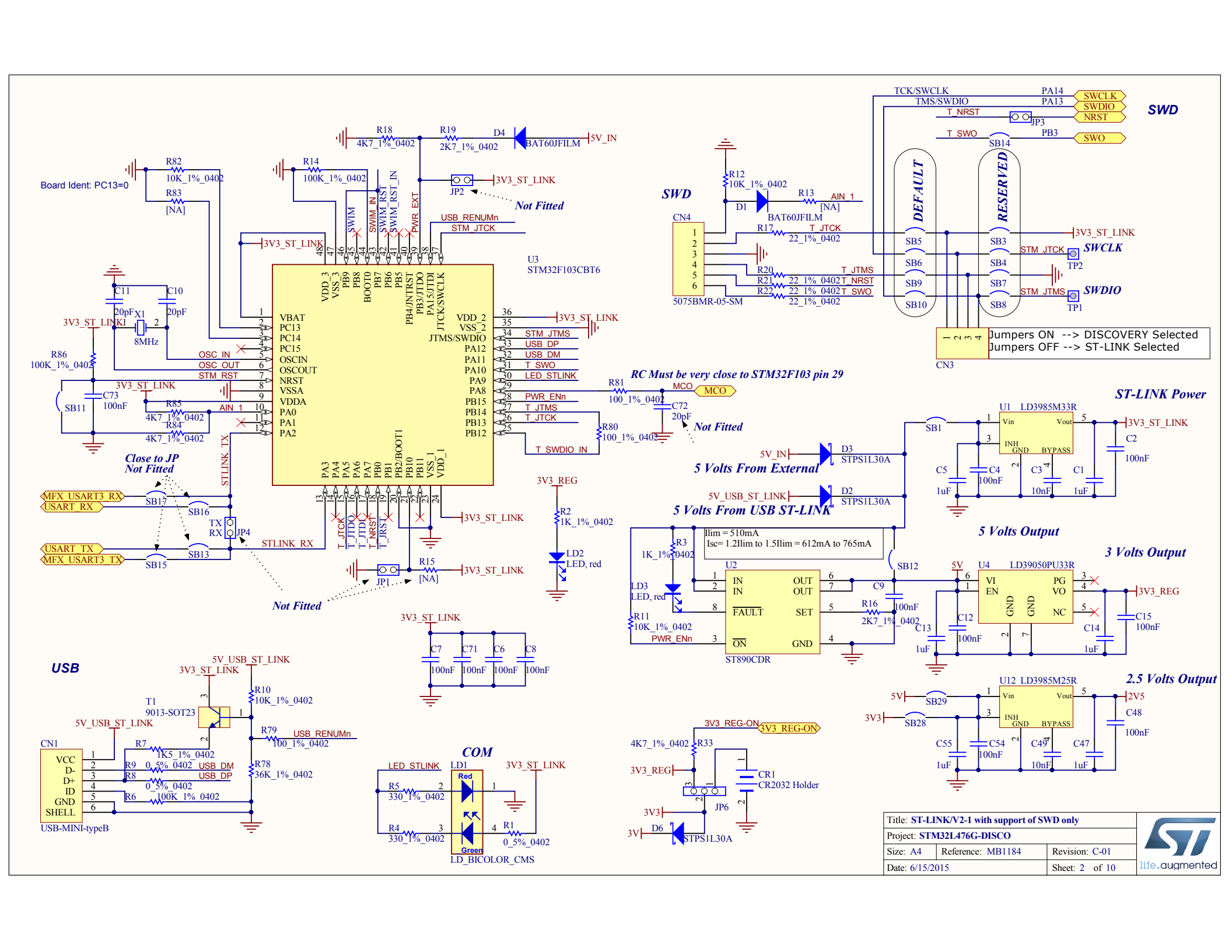
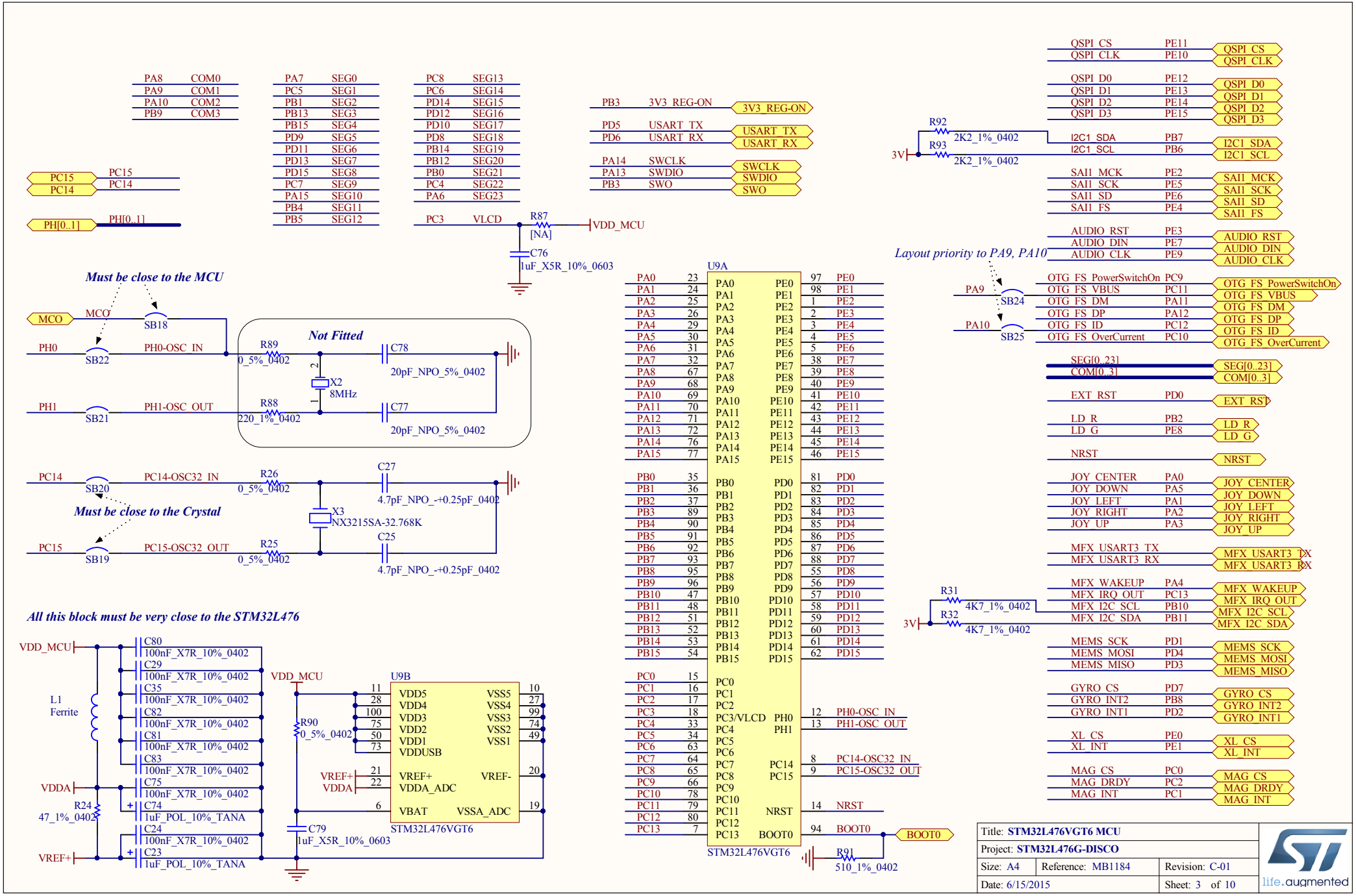
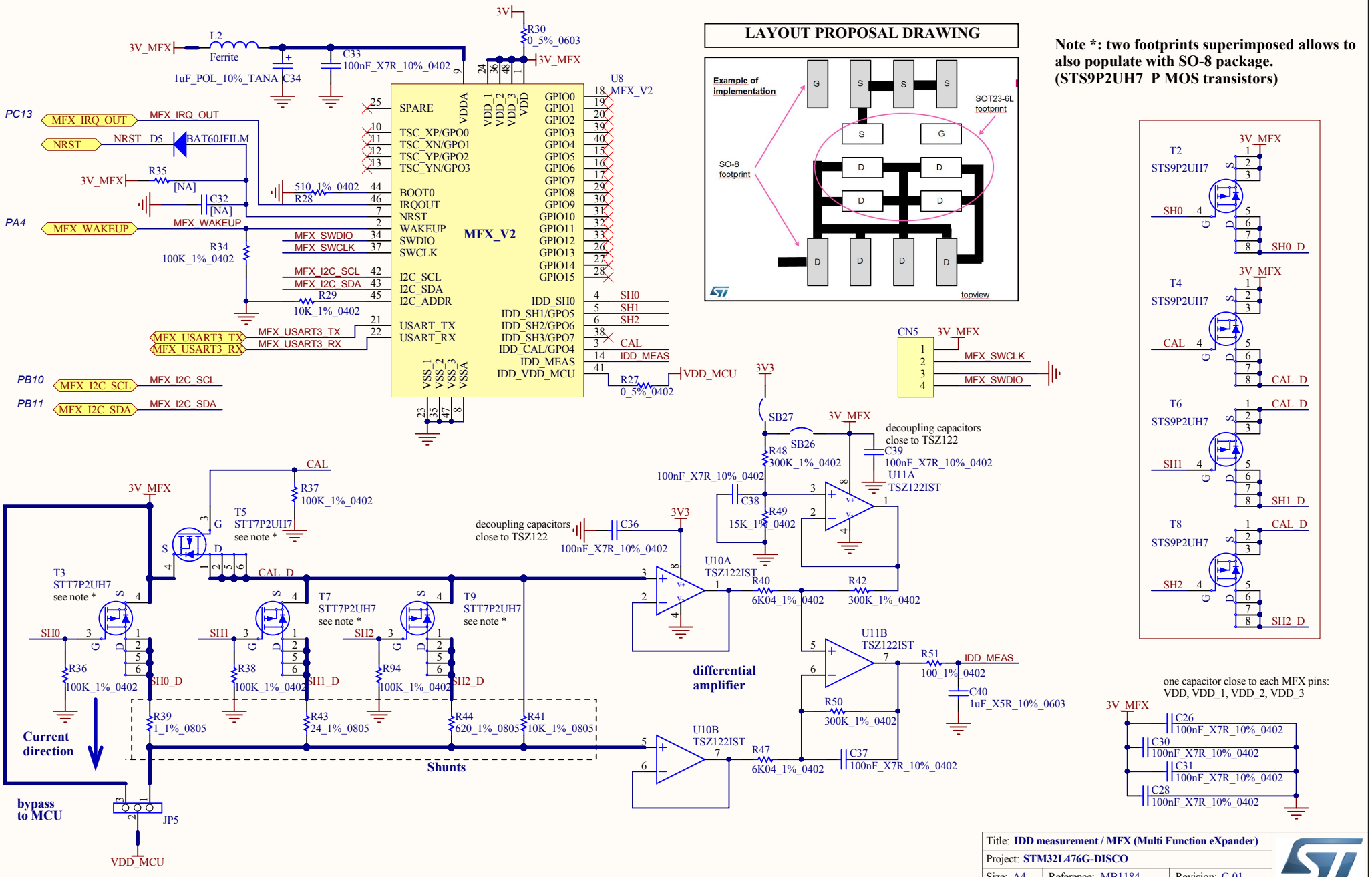
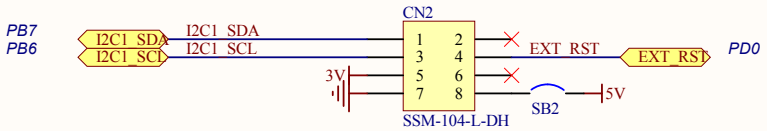

U_LCD_GH08172
LCD_GH08172.SchDoc
SEG[0..23]
COM[0..3]
U_QSPI
QSPI.SchDoc
QSPI_CS
QSPI_CLK
QSPI_D0
QSPI_D1
QSPI_D2
QSPI_D3
U_AUDIO
AUDIO.SchDoc
AUDIO_RST
AUDIO_DIN
AUDIO_CLK
SAI1_MCK
SAI1_SCK
SAI1_SD
SAI1_FS
I2C1_SDA
I2C1_SCL
U_ST_LINK_V2-1
ST_LINK_V2-1.SCHDOC
USART_RX
USART_TX
MFX_USART3_RX
MFX_USART3_TX
3V3_REG-ON
SWCLK
SWDIO
SWO
NRST
MCO
U_STM32Lx
STM32Lx.SchDoc
QSPI_CS
QSPI_CLK
QSPI_D0
QSPI_D1
QSPI_D2
QSPI_D3
AUDIO_RST
AUDIO_DIN
AUDIO_CLK
SAI1_MCK
SAI1_SCK
SAI1_SD
SAI1_FS
I2C1_SDA
I2C1_SCL
EXT_RST
MCO
SWCLK
SWDIO
SWO
NRST
BOOT0
3V3_REG-ON
USART_RX
USART_TX
MFX_WAKEUP
MFX_IRQ_OUT
MFX_I2C_SDA
MFX_I2C_SCL
MFX_USART3_RX
MFX_USART3_TX
PC14
PC15
PH[0..1]
COM[0..3]
SEG[0..23]
JOY_CENTER
JOY_DOWN
JOY_LEFT
JOY_RIGHT
JOY_UP
LD_R
LD_G
OTG_FS_PowerSwitchOn
OTG_FS_OverCurrent
OTG_FS_DM
OTG_FS_DP
OTG_FS_ID
OTG_FS_VBUS
MEMS_SCK
MEMS_MOSI
MEMS_MISO
GYRO_CS
GYRO_INT2
GYRO_INT1
XL_CS
XL_INT
MAG_CS
MAG_DRDY
MAG_INT
U_Peripherals
Peripherals.SchDoc
NRST
LD_R
LD_G
JOY_CENTER
JOY_DOWN
JOY_LEFT
JOY_RIGHT
JOY_UP
EXT_RST
I2C1_SCL
I2C1_SDA
U_USB_OTG_FS
USB_OTG_FS.SchDoc
OTG_FS_PowerSwitchOn
OTG_FS_OverCurrent
OTG_FS_DM
OTG_FS_DP
OTG_FS_ID
OTG_FS_VBUS
U_MEMS
MEMS.SchDoc
MEMS_SCK
MEMS_MOSI
MEMS_MISO
GYRO_CS
GYRO_INT2
GYRO_INT1
XL_CS
XL_INT
MAG_CS
MAG_DRDY
MAG_INT
P2
1 GND
2
3
4
5 GND
6
7
8
9
10
11 GND
12
13
14
15
16
17
18
19 GND
20
5V_USB_ST_LINK
5V_IN
OTG_FS_VBUS
5V
PC14
PC15
PH0
PH1
NRST
QSPI_CS PE11
QSPI_CLK PE10
QSPI_D0 PE12
QSPI_D1 PE13
QSPI_D2 PE14
QSPI_D3 PE15
Header 20
P1
3V3
2V5
3V
PB3 3V3_REG-ON
PB2 LD_R
PE8 LD_G
PA0 JOY_CENTE
PA5 JOY_DOWN
PA1 JOY_LEFT
PA2 JOY_RIGHT
PA3 JOY_UP
PB6 I2C1_SCL
PB7 I2C1_SDA
PD0 EXT_RST
NC
Header 20
U_IDD_measurement
IDD_measurement.SchDoc
Wired on Solder Side
JP8
JP7
Rev A-01 --> PCB label MB1184 A-01
Rev B-01 --> PCB label MB1184 B-01, Remove R91, Replace COM4..7 by COM0..3,
Add SB for USB_OTG, add VBUS on P2 for USB USER power supply
Rev C-01 --> PCB label MB1184 C-01, Remove SWCLK and SWO shorted,
Replaced on P1, PB8..9 by PB6..7.
--> MP45DT02 replaced by MP34DT01
--> Xtal 32.768kHz replaced by NX3215SA
--> Change values of C27, C25 : C27=C25=4.7pF
--> Change values of resistors : R40=R47=6.04k, R49=15k,
Title: STM32L476 Discovery
Project: STM32L476G-DISCO
Size: A4
Reference: MB1184
Revision: C-01
Date: 6/15/2015
Sheet: 1 of 10
life.augmented

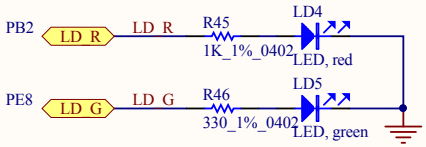

Board Ident: PC13=0
R82 10K_1%_0402
R83 [NA]
R18 4K7_1%_0402
R19 2K7_1%_0402
D4 BAT60JFILM
5V_IN
R14 100K_1%_0402
JP2
3V3_ST_LINK
Not Fitted
USB_RENUMn
STM_JTCK
SWIM
SWIM_IN
SWIM_RST
SWIM_RST_IN
PWR_EXT
U3
STM32F103CBT6
VBAT
PC13
PC14
PC15
OSCIN
OSCOUT
NRST
VSSA
VDDA
PA0
PA1
PA2
VDD_2
VSS_2
JTMS/SWDIO
PA12
PA11
PA10
PA9
PA8
PB15
PB14
PB13
PB12
C11 20pF
C10 20pF
X1 8MHz
OSC_IN
OSC_OUT
STM_RST
R86 100K_1%_0402
C73 100nF
SB11
R85 4K7_1%_0402
R84 4K7_1%_0402
AIN_1
STLINK_TX
STLINK_RX
Close to JP
Not Fitted
MFX_USART3_RX
USART_RX
USART_TX
MFX_USART3_TX
SB17
SB16
SB15
SB13
TX
RX
JP4
JP1
R15 [NA]
Not Fitted
T_JTCK
T_JTDO
T_JTDI
T_NRST
T_JRST
T_SWDIO_IN
R81 100_1%_0402
MCO
C72 20pF
Not Fitted
RC Must be very close to STM32F103 pin 29
R80 100_1%_0402
3V3_REG
R2 1K_1%_0402
LD2 LED, red
C7 100nF
C71 100nF
C6 100nF
C8 100nF
SWD
CN4
5075BMR-05-SM
R12 10K_1%_0402
D1 BAT60JFILM
R13 [NA]
R17 22_1%_0402
R20 22_1%_0402
R21 22_1%_0402
R22 22_1%_0402
T_JTMS
T_NRST
T_SWO
TCK/SWCLK
TMS/SWDIO
T_NRST
T_SWO
JP3
SB14
PA14
PA13
PB3
SWCLK
SWDIO
NRST
SWO
DEFAULT
RESERVED
SB5
SB6
SB9
SB10
SB3
SB4
SB7
SB8
STM_JTCK
STM_JTMS
TP2
TP1
SWCLK
SWDIO
CN3
Jumpers ON --> DISCOVERY Selected
Jumpers OFF --> ST-LINK Selected
ST-LINK Power
5V_IN
D3 STPS1L30A
5 Volts From External
5V_USB_ST_LINK
D2 STPS1L30A
5 Volts From USB ST-LINK
SB1
U1 LD3985M33R
Vin
Vout
INH
GND
BYPASS
C5 1uF
C4 100nF
C3 10nF
C1 1uF
C2 100nF
5 Volts Output
3 Volts Output
Ilim = 510mA
Isc= 1.2Ilim to 1.5Ilim = 612mA to 765mA
R3 1K_1%_0402
LD3 LED, red
R11 10K_1%_0402
PWR_ENn
U2
IN
OUT
FAULT
SET
ON
GND
ST890CDR
C9 100nF
R16 2K7_1%_0402
SB12
5V
U4 LD39050PU33R
VI
VO
EN
PG
GND
NC
C12 100nF
C13 1uF
C14 1uF
C15 100nF
3V3_REG
USB
5V_USB_ST_LINK
3V3_ST_LINK
T1 9013-SOT23
R10 10K_1%_0402
R79 100_1%_0402
USB_RENUMn
R78 36K_1%_0402
R7 1K5_1%_0402
R9 0_5%_0402
R8 0_5%_0402
R6 100K_1%_0402
USB_DM
USB_DP
CN1
VCC
D-
D+
ID
GND
SHELL
USB-MINI-typeB
COM
LED_STLINK
LD1
Red
Green
R5 330_1%_0402
R4 330_1%_0402
R1 0_5%_0402
LD_BICOLOR_CMS
3V3_REG-ON
R33 4K7_1%_0402
CR1 CR2032 Holder
JP6
D6 STPS1L30A
2.5 Volts Output
U12 LD3985M25R
SB29
SB28
2V5
C55 1uF
C54 100nF
C49 10nF
C47 1uF
C48 100nF
Title: ST-LINK/V2-1 with support of SWD only
Project: STM32L476G-DISCO
Size: A4
Reference: MB1184
Revision: C-01
Date: 6/15/2015
Sheet: 2 of 10
life.augmented

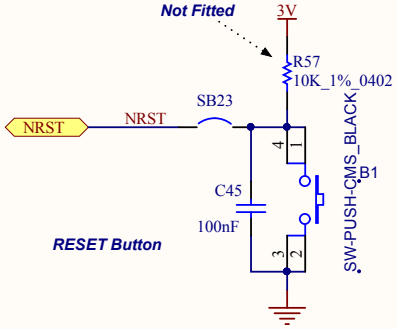

PA8 COM0
PA9 COM1
PA10 COM2
PB9 COM3
PA7 SEG0
PC5 SEG1
PB1 SEG2
PB13 SEG3
PB15 SEG4
PD9 SEG5
PD11 SEG6
PD13 SEG7
PD15 SEG8
PC7 SEG9
PA15 SEG10
PB4 SEG11
PB5 SEG12
PC8 SEG13
PC6 SEG14
PD14 SEG15
PD12 SEG16
PD10 SEG17
PD8 SEG18
PB14 SEG19
PB12 SEG20
PB0 SEG21
PC4 SEG22
PA6 SEG23
PB3 3V3_REG-ON
PD5 USART_TX
PD6 USART_RX
PA14 SWCLK
PA13 SWDIO
PB3 SWO
PC15
PC14
PH[0..1]
PC3 VLCD
R87
[NA]
VDD_MCU
C76
1uF_X5R_10%_0603
Must be close to the MCU
MCO
SB18
PH0
SB22
PH0-OSC_IN
PH1
SB21
PH1-OSC_OUT
Not Fitted
R89
0_5%_0402
R88
220_1%_0402
X2
8MHz
C78
20pF_NPO_5%_0402
C77
20pF_NPO_5%_0402
PC14
SB20
PC14-OSC32_IN
R26
0_5%_0402
C27
4.7pF_NPO_-+0.25pF_0402
Must be close to the Crystal
X3
NX3215SA-32.768K
PC15
SB19
PC15-OSC32_OUT
R25
0_5%_0402
C25
4.7pF_NPO_-+0.25pF_0402
All this block must be very close to the STM32L476
VDD_MCU
L1
Ferrite
C80
C29
C35
C82
C81
C83
C75
C74
C24
C23
100nF_X7R_10%_0402
1uF_POL_10%_TANA
VDDA
R24
47_1%_0402
VREF+
R90
0_5%_0402
U9B
VDD5
VDD4
VDD3
VDD2
VDD1
VDDUSB
VREF+
VDDA_ADC
VBAT
VSS5
VSS4
VSS3
VSS2
VSS1
VREF-
VSSA_ADC
STM32L476VGT6
C79
1uF_X5R_10%_0603
U9A
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7 PA8 PA9 PA10 PA11 PA12 PA13 PA14 PA15
PB0 PB1 PB2 PB3 PB4 PB5 PB6 PB7 PB8 PB9 PB10 PB11 PB12 PB13 PB14 PB15
PC0 PC1 PC2 PC3/VLCD PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13
PE0 PE1 PE2 PE3 PE4 PE5 PE6 PE7 PE8 PE9 PE10 PE11 PE12 PE13 PE14 PE15
PD0 PD1 PD2 PD3 PD4 PD5 PD6 PD7 PD8 PD9 PD10 PD11 PD12 PD13 PD14 PD15
PH0 PH1
PH0-OSC_IN
PH1-OSC_OUT
PC14-OSC32_IN
PC15-OSC32_OUT
NRST
BOOT0
STM32L476VGT6
R91
510_1%_0402
QSPI_CS PE11
QSPI_CLK PE10
QSPI_D0 PE12
QSPI_D1 PE13
QSPI_D2 PE14
QSPI_D3 PE15
R92
R93
2K2_1%_0402
3V
I2C1_SDA PB7
I2C1_SCL PB6
SAI1_MCK PE2
SAI1_SCK PE5
SAI1_SD PE6
SAI1_FS PE4
AUDIO_RST PE3
AUDIO_DIN PE7
AUDIO_CLK PE9
Layout priority to PA9, PA10
PA9
SB24
PA10
SB25
OTG_FS_PowerSwitchOn PC9
OTG_FS_VBUS PC11
OTG_FS_DM PA11
OTG_FS_DP PA12
OTG_FS_ID PC12
OTG_FS_OverCurrent PC10
SEG[0..23]
COM[0..3]
EXT_RST PD0
LD_R PB2
LD_G PE8
NRST
JOY_CENTER PA0
JOY_DOWN PA5
JOY_LEFT PA1
JOY_RIGHT PA2
JOY_UP PA3
MFX_USART3_TX
MFX_USART3_RX
R31
R32
4K7_1%_0402
MFX_WAKEUP PA4
MFX_IRQ_OUT PC13
MFX_I2C_SCL PB10
MFX_I2C_SDA PB11
MEMS_SCK PD1
MEMS_MOSI PD4
MEMS_MISO PD3
GYRO_CS PD7
GYRO_INT2 PB8
GYRO_INT1 PD2
XL_CS PE0
XL_INT PE1
MAG_CS PC0
MAG_DRDY PC2
MAG_INT PC1
Title: STM32L476VGT6 MCU
Project: STM32L476G-DISCO
Size: A4
Reference: MB1184
Revision: C-01
Date: 6/15/2015
Sheet: 3 of 10
life.augmented

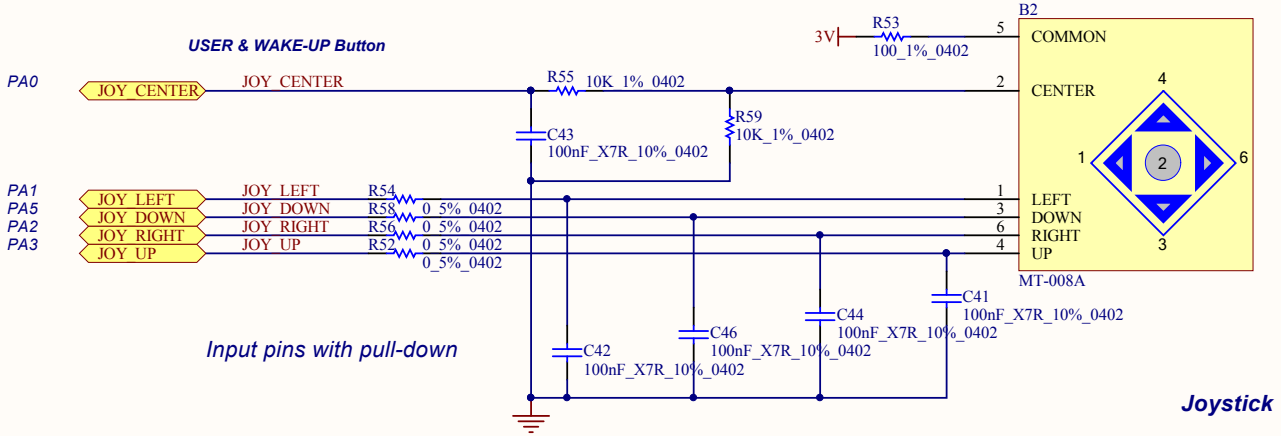

LAYOUT PROPOSAL DRAWING
Example of implementation
SO-8 footprint
SOT23-6L footprint
topview
Note *: two footprints superimposed allows to also populate with SO-8 package.
(STS9P2UH7 P MOS transistors)
MFX_V2
U8
SPARE
TSC_XP/GPO0
TSC_XN/GPO1
TSC_YP/GPO2
TSC_YN/GPO3
BOOT0
IRQOUT
NRST
WAKEUP
SWDIO
SWCLK
I2C_SCL
I2C_SDA
I2C_ADDR
USART_TX
USART_RX
IDD_SH0
IDD_SH1/GPO5
IDD_SH2/GPO6
IDD_SH3/GPO7
IDD_CAL/GPO4
IDD_MEAS
IDD_VDD_MCU
GPIO0
GPIO1
GPIO2
GPIO3
GPIO4
GPIO5
GPIO6
GPIO7
GPIO8
GPIO9
GPIO10
GPIO11
GPIO12
GPIO13
GPIO14
GPIO15
MFX_IRQ_OUT
NRST
MFX_WAKEUP
MFX_SWDIO
MFX_SWCLK
MFX_I2C_SCL
MFX_I2C_SDA
MFX_USART3_TX
MFX_USART3_RX
VDD_MCU
SH0
SH1
SH2
CAL
IDD_MEAS
differential amplifier
Current direction
Shunts
bypass to MCU
decoupling capacitors close to TSZ122
one capacitor close to each MFX pins: VDD, VDD_1, VDD_2, VDD_3
Title: IDD measurement / MFX (Multi Function eXpander)
Project: STM32L476G-DISCO
Size: A4
Reference: MB1184
Revision: C-01
Date: 6/15/2015
Sheet: 4 of 10
life.augmented

EXT/RF E2P Connector





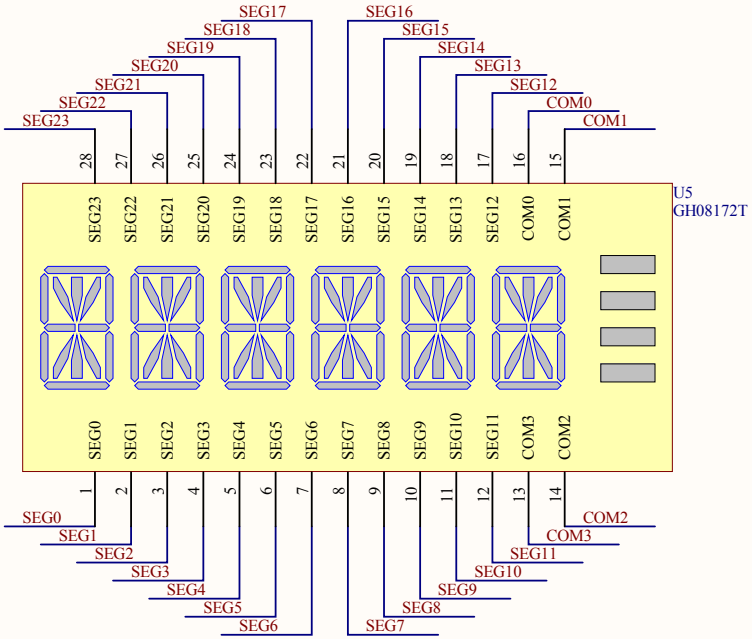




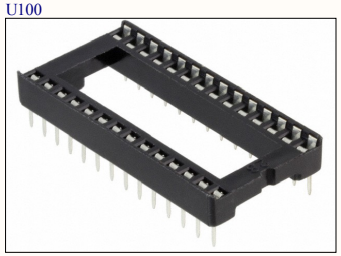
Title: **Joystick, ACP, LEDs and Push Button**		
Project: **STM32L476G-DISCO**		
Size: A4	Reference: MB1184	Revision: C-01
Date: 6/15/2015		Sheet: 5 of 10

life.augmented

LCD



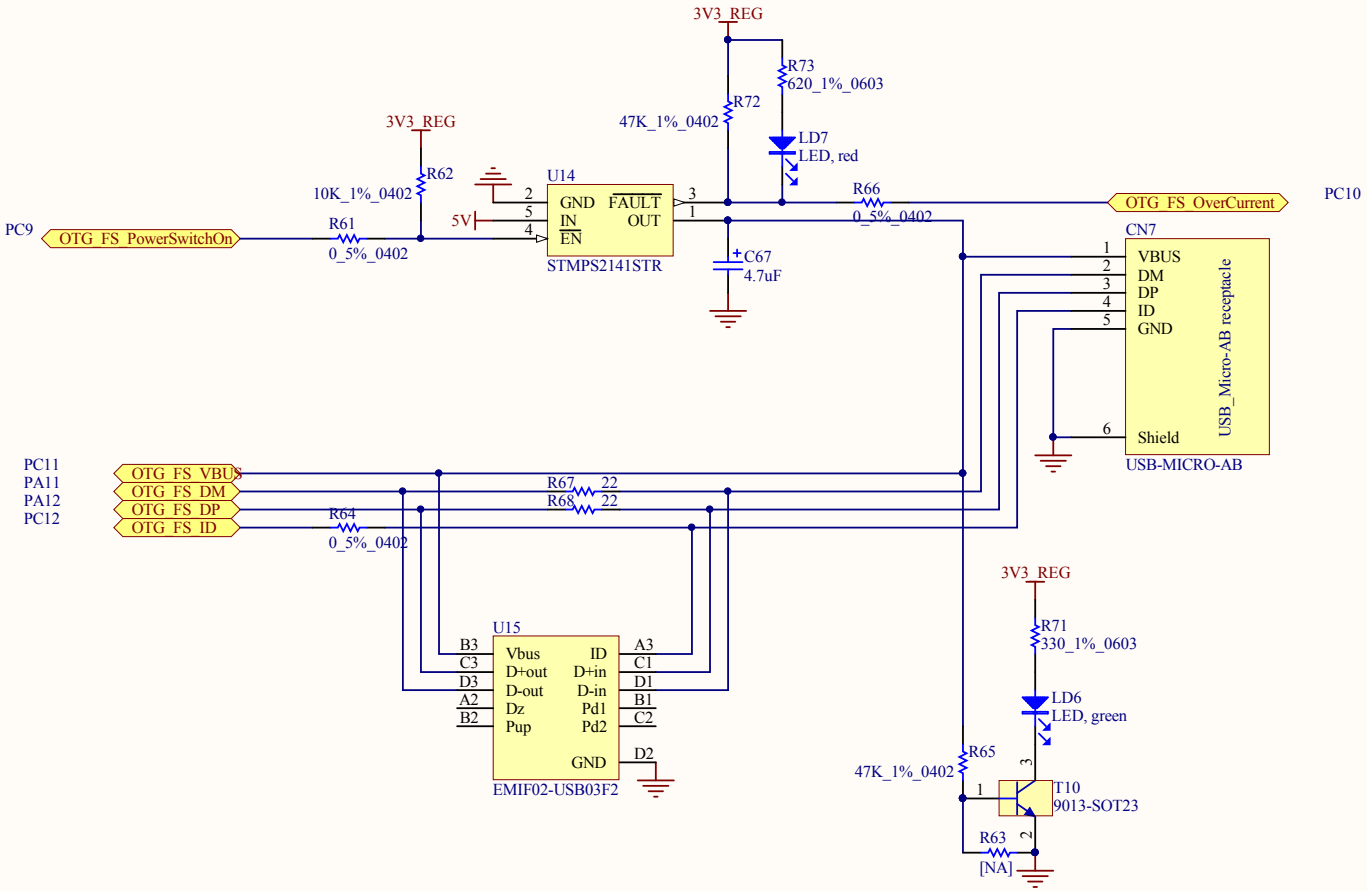
U100



Socket DIP28

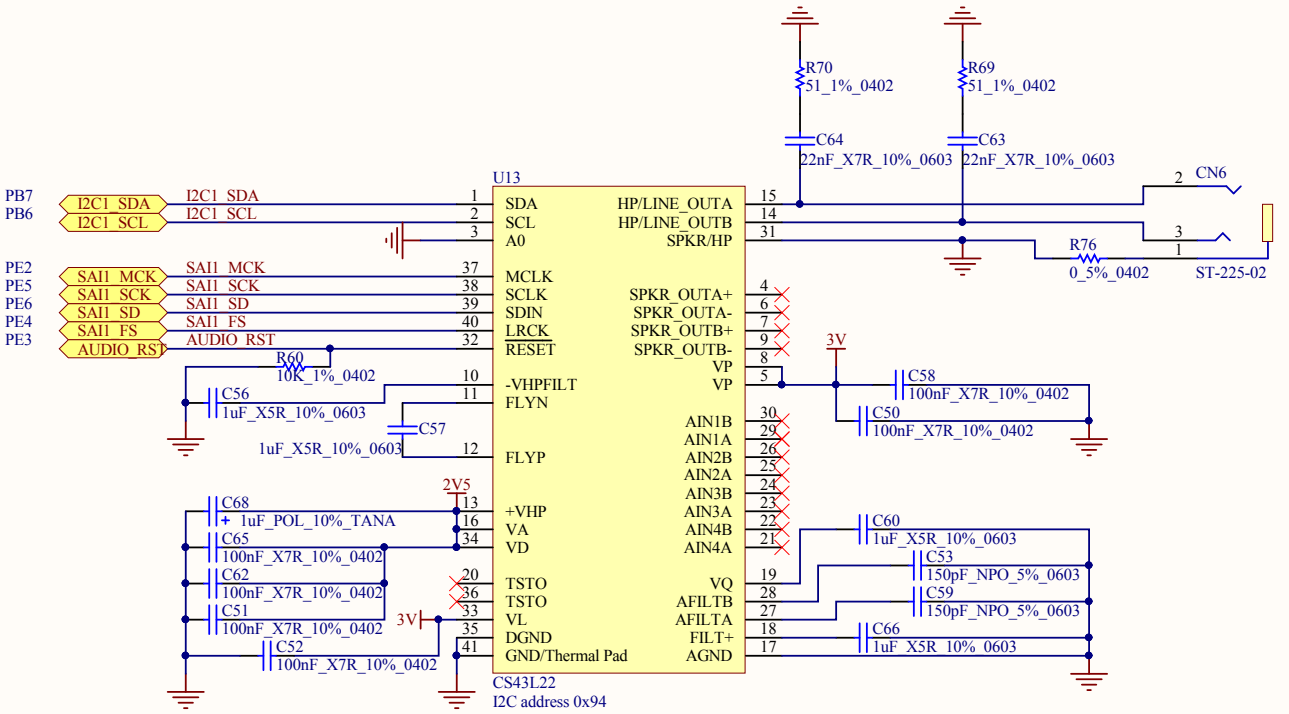
Title: **LCD Display**		
Project: **STM32L476G-DISCO**		
Size: A4	Reference: MB1184	Revision: C-01
Date: 6/15/2015		Sheet: 6 of 10

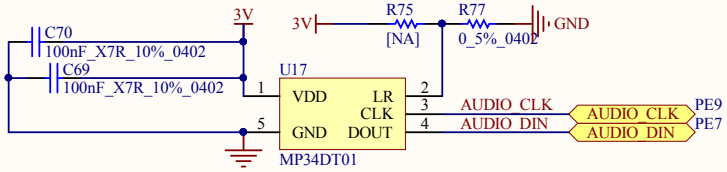
life.augmented



Title: **OTG USB FS**		
Project: **STM32L476G-DISCO**		
Size: A4	Reference: MB1184	Revision: C-01
Date: 6/15/2015		Sheet: 7 of 10

life.augmented

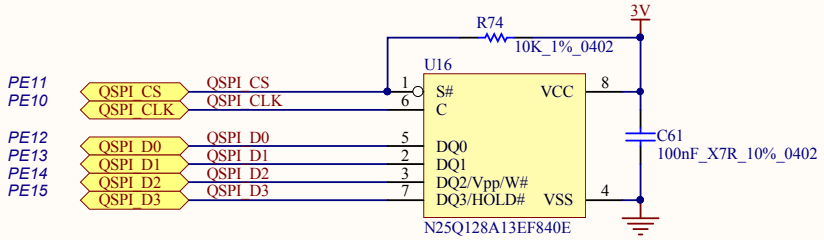




Title: **Audio Codec and Microphone MEMS**		
Project: **STM32L476G-DISCO**		
Size: A4	Reference: MB1184	Revision: C-01
Date: 6/15/2015		Sheet: 8 of 10

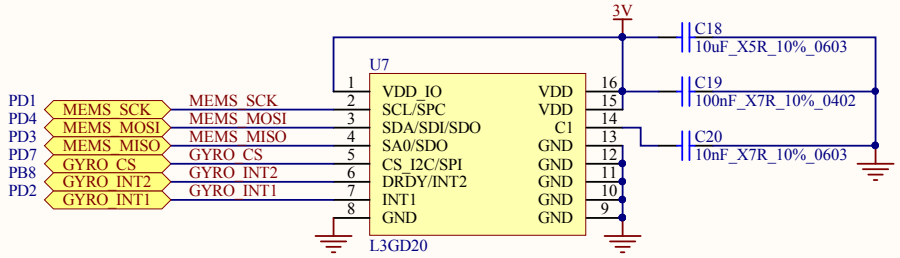
life.augmented

Quad SPI Flash Memory

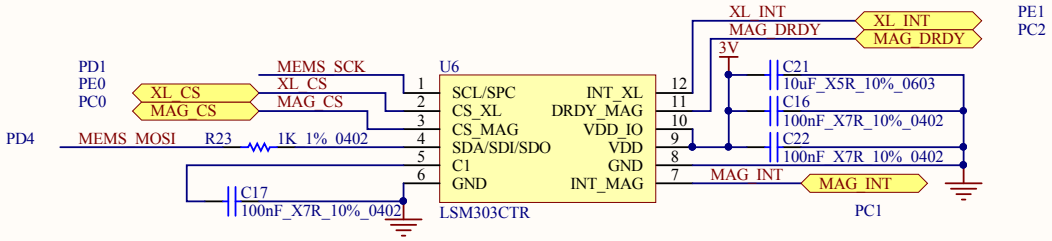


Title: **Quad SPI Flash Memory**		
Project: **STM32L476G-DISCO**		
Size: A4	Reference: MB1184	Revision: C-01
Date: 6/15/2015		Sheet: 9 of 10

life.augmented



MEMS



Title: **Gyroscope, Accelerometer, Magnetometer MEMS**		
Project: **STM32L476G-DISCO**		
Size: A4	Reference: MB1184	Revision: C-01
Date: 6/15/2015		Sheet: 10 of 10

life.augmented