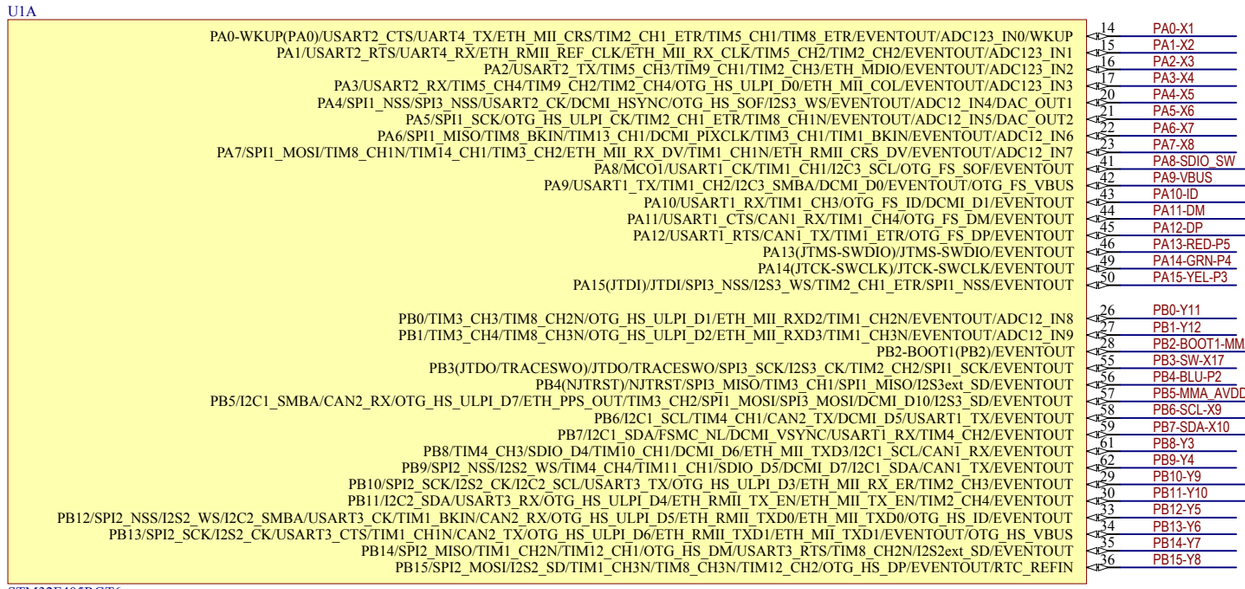
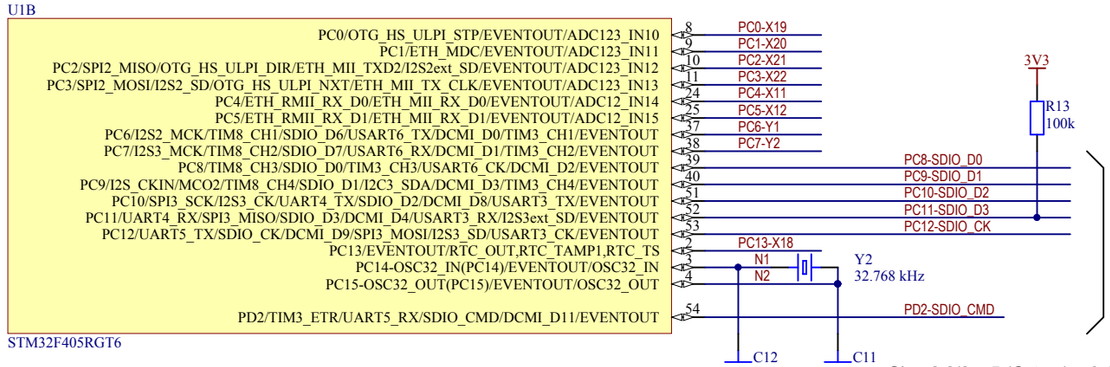
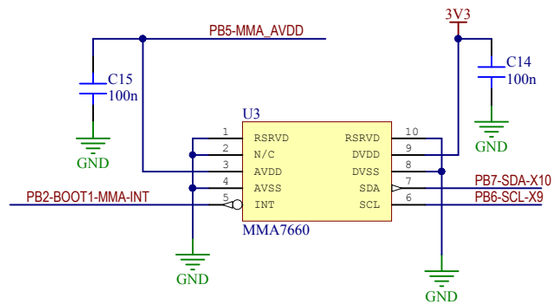
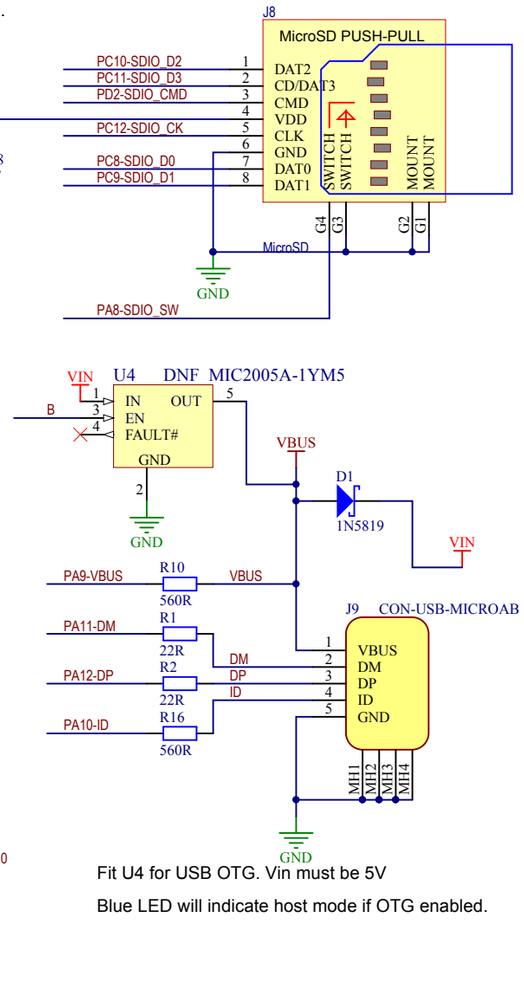
USB DFU requires stable levels on PA10, PB5, PB11 & PC11. PB2 must be low during boot.

R12, R13, R20 & R21 provide stable input levels for DFU.





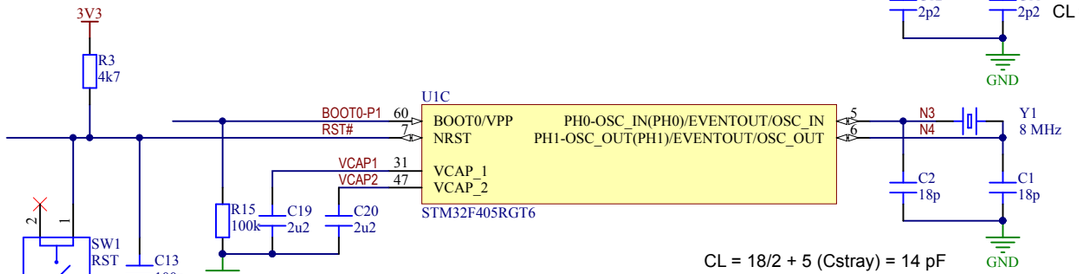




Fit U4 for USB OTG. Vin must be 5V

Blue LED will indicate host mode if OTG enabled.

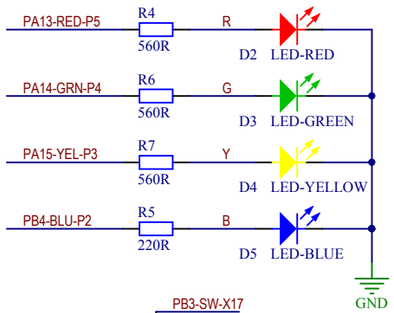
R19 prevents a silicon failure from short circuiting the backup battery.

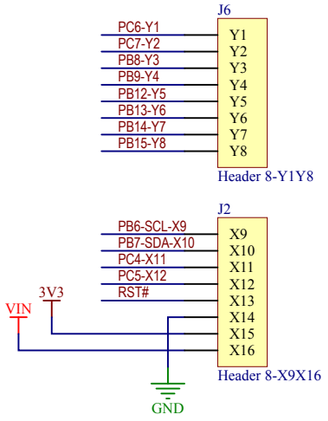


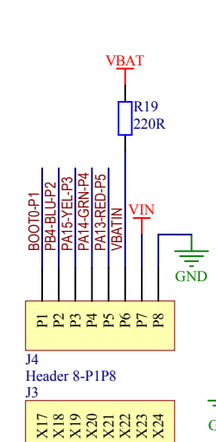
CL = 2.2/2 + 5 (Cstray) = 6.1 pF

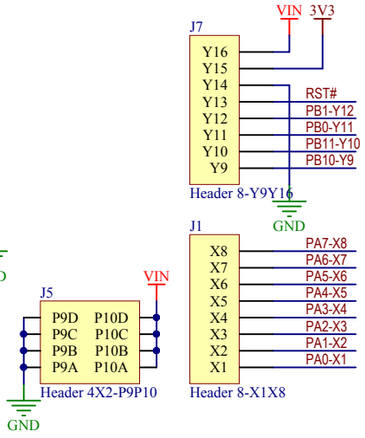
CL = 18/2 + 5 (Cstray) = 14 pF

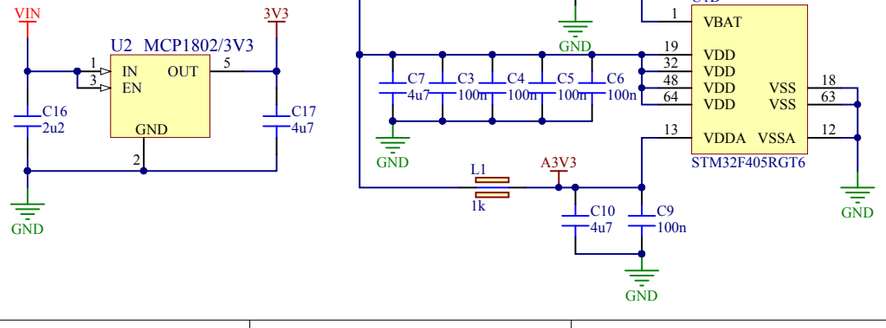
Reduced for reliable startup.

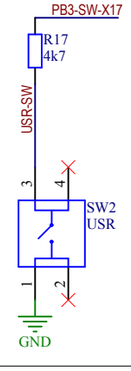












Test points for JTAG debug available on bottom connector

Note: LED resistors may need to be removed for debug (tbd).

All pins are 5V tolerant except PA4 & PA5

Therefore X skin SPI is not 5V tolerant

PC13 is limited to 3mA out.

Original design: Damien George	Project Micro Python Board STM32F405 48pin.		
Revised by: Chris Mason	Title Schematic		
(C) 2013, 2014 Damien P. George CC Attribution 3.0 Unported License	Size: A3	Number: PYBv1.0	Revision:
	Date: 14/09/2015 Time: 12:30:46 AM	Sheet 2 of 2	
File: L:_NEW_Projects\MICRO_PYTHON\PYB\PYBv10b\PYBv10b-sh2.SchDoc			

The Micro Python Board

pyboard

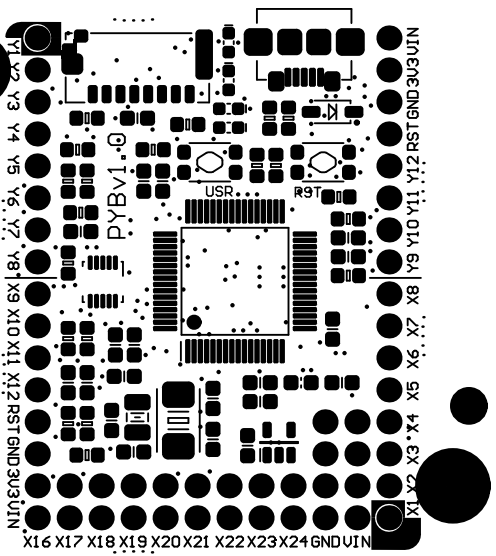
A project by Damien George

http://micropython.org

Note: Functions marked * are standardised symetrical functions (except CAN1**).
PB6/7 and PB10/11 are extra symetrical Serial ports for F405 module.
Not available on CPUs with 2 serial ports.
Other functions may not be available with different CPUs

1.3in x 1.65in 33mm x 42mm

PC6/TX6*/PWM*	Y1
PC7/RX6*/PWM*	Y2
PB8/CANRX1**/PWM*	Y3
PB9/CANTX1**/PWM*	Y4
PB12/SS2*/CANRX2	Y5
PB13/SCK2*/CANTX2/PWM	Y6
PB14/MISO2*/PWM	Y7
PB15/MOSI2*/PWM	Y8
PB6/SCL1*/4k7PU/TXD1/PWM	X9
PB7/SDA1*/4k7PU/RXD1/PWM	X10
PC4/ADC*	X11
PC5/ADC*	X12
RST*	X13
GND	X14
3V3	X15
VIN	X16



Y16	VIN
Y15	3V3
Y14	GND
Y13	RST*
Y12	PB1/ADC*/PWM
Y11	PB0/ADC*/PWM
Y10	PB11/SDA2*/4k7PU/RX3/PWM
Y9	PB10/SCL2*/4k7PU/TX3/PWM
X8	PA7/MOSI1*/ADC/PWM
X7	PA6/MISO1*/ADC/PWM
X6	PA5/SCK1*/ADC/DAC/PWM (3V3)
X5	PA4/SS1*/ADC/DAC (3V3)
X4	PA3/RX2/ADC/PWM*/SERVO
X3	PA2/TX2/ADC/PWM*/SERVO
X2	PA1/RX4*/ADC/PWM*/SERVO
X1	PA0/TX4*/ADC/PWM*/SERVO

Internal use ports

PA9/OTG-VBUS
PA10/OTG-ID
PA11/USB-DM
PA12/USB-DP

PC8/SDIO_D0
PC9/SDIO_D1
PC10/SDIO_D2
PC11/SDIO_D3
PC12/SDIO_CK
PA8/SDIO_SW
PD2/SDIO_CMD

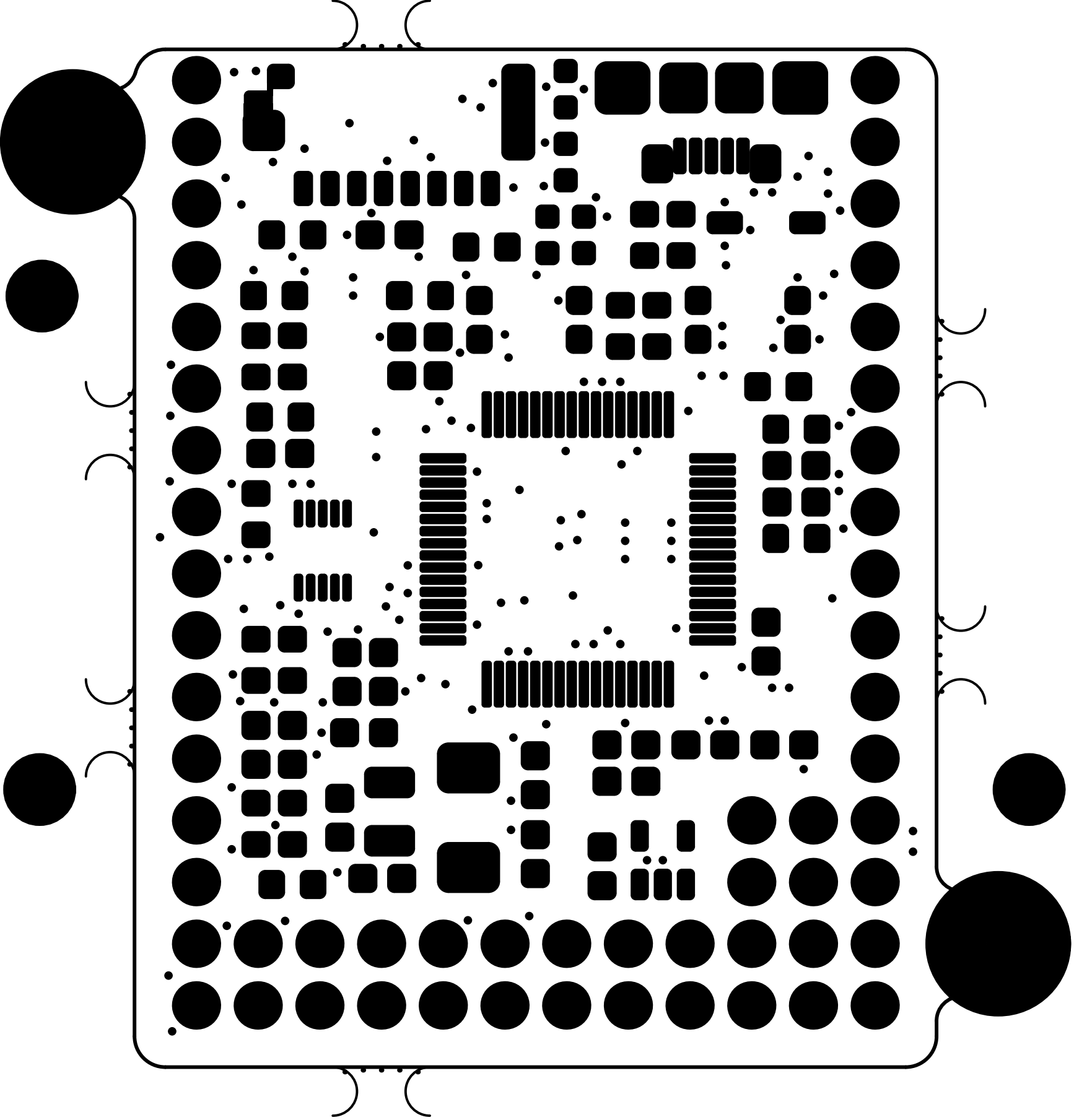
PB6/SCL/MMA-SCL (shared with pin)
PB7/SDA/MMA-SDA (shared with pin)
PB2/BOOT1//MMA_INT
PB5/MMA_AVDD

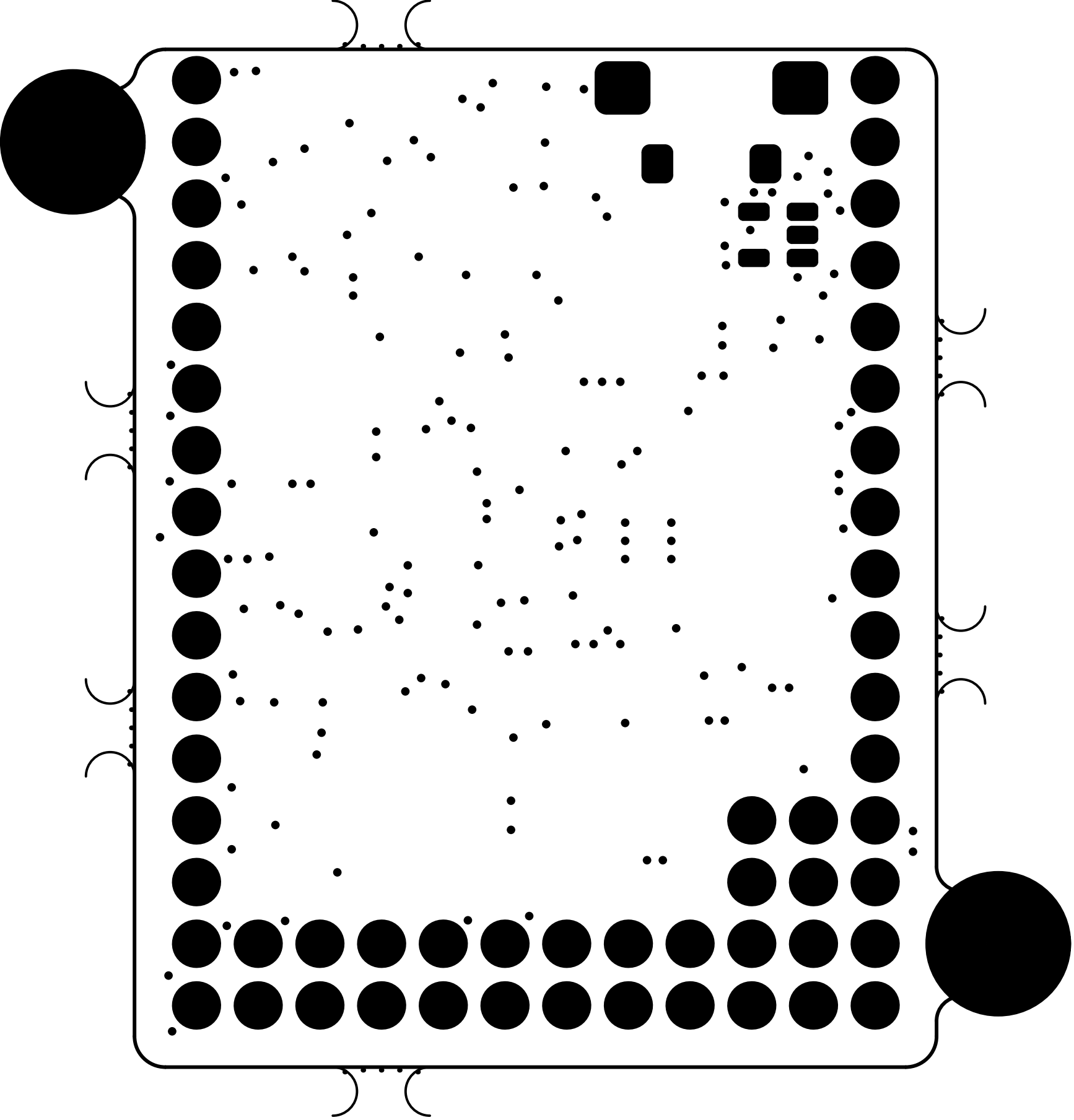
PB4/BLUE_LED/JTAG-TRST (shared with pin)
PA13/RED_LED/JTAG-TMS/SWDIO (shared with pin)
PA14/GRN_LED/TCK/SWCLK (shared with pin)
PA15/YEL_LED/TDI (shared with pin)
PB3/USR_SW/TDO/TRACESWO (shared with pin)

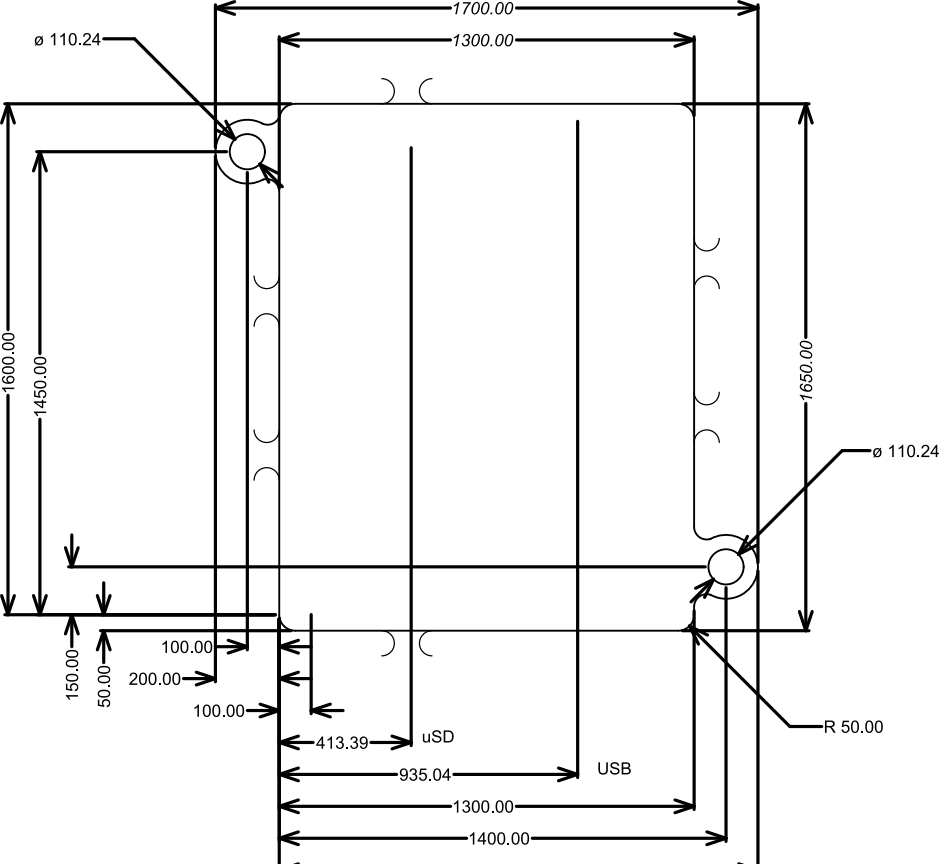
	X17	P1																					
	X18	P2	BOOT0																				
	X19	P3	PB4/BLU_LED/TRST																				
	X20	P4	PA15/YEL_LED/TDI																				
	X21	P5	PA14/GRN_LED/TCK																				
	X22	P6	PA13/RED_LED/TMS																				
	X23	P7	VBAT	VIN	GND																		
	X24	P8																					
	GND																						
	VIN																						
INNER ROW (P)	P9A-D																						
	P10A-D																						
	SERVO GND																						
	SERVO VIN																						
OUTER ROW (X)	PB3/USR_SW/TDO	PC13(3mA)	PC0/ADC	PC1/ADC	PC2/ADC	PC3/ADC	A3V3	AGND															

DESIGN RULES.
Board profile and connector grid. 1.27mm (50mil).
Component placement grid. 0.25mm
Routing grid. 0.05mm
Minimum track and spacing. 0.15mm (6mil).
Minimum via size. Hole 0.25mm, pad 0.6mm.

PCB spec.
2 layer 1.6mm FR4. Green mask. White legend - 2 sides. Gold finish pb free. Electrical te



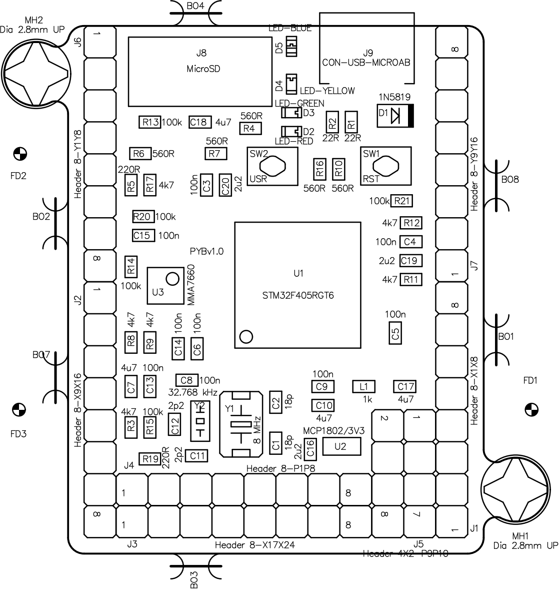




The board origin (0,0) is the bottom left corner of a half size skin compatible with X or Y position.

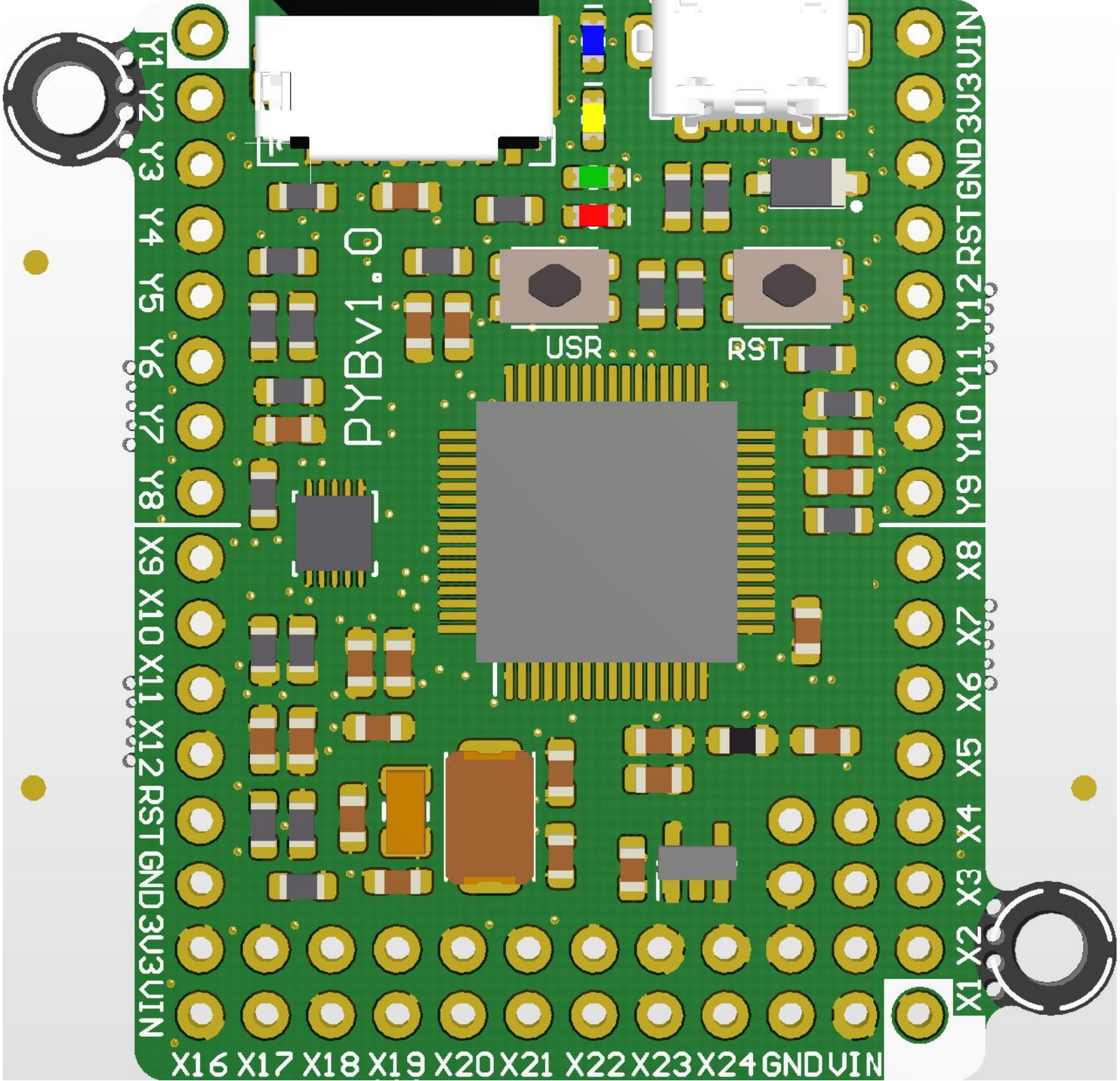
The pyboard extends 1.27mm (50mil) below the origin to allow for labels on the bottom connector.

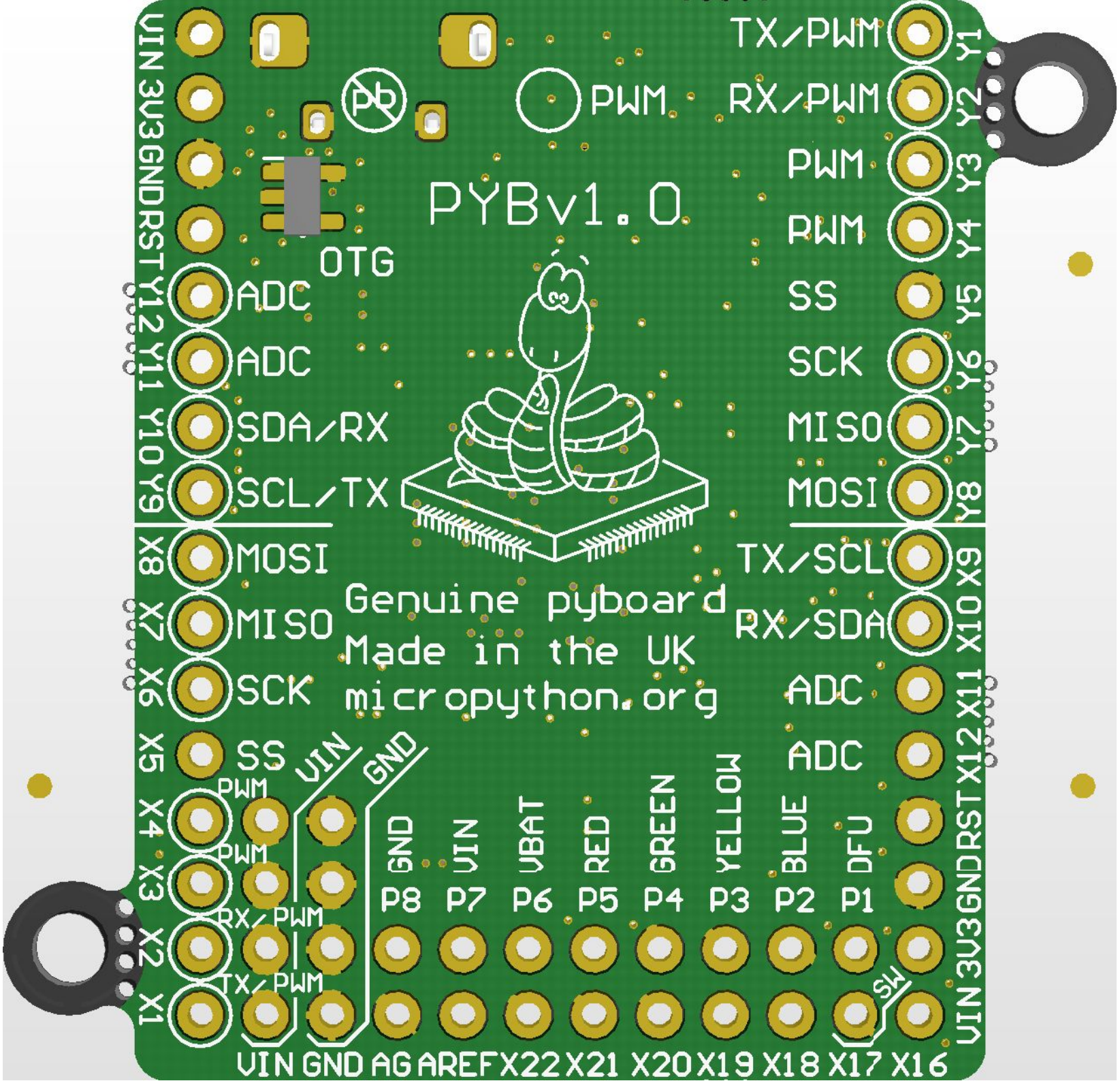
Dimensions in italics are for reference only.



MH2
Dia 2.8mm UP
BO4
LED-BLUE
J6
J8
MicroSD
D5
J9
CON-USB-MICROAB
D4
LED-YELLOW
1N5819
D1
LED-GREEN
D3
R13 100k
C18 4u7
560R
R4
D2
LED-RED
R2 22R
R1 22R
Header 8-Y1Y8
Header 8-Y9Y16
FD2
R6 560R
560R
R7
SW2
USR
SW1
RST
R16
R10
560R
560R
220R
R5
R17 4k7
100n
C3
C20
2u2
BO8
100k R21
BO2
R20 100k
C15 100n
4k7 R12
100n C4
PYBv1.0
U1
STM32F405RGT6
2u2 C19
R14
100k
U3
MMA7660
4k7 R11
J7
J2
100n
C5
BO1
4k7
R8
4k7
R9
100n
C14
100n
C6
BO7
Header 8-X1X8
Header 8-X9X16
4u7
C7
100n
C13
C8 100n
32.768 kHz
100n
C9
L1
1k
C17
4u7
FD1
4k7
R3
100k
R15
2p2
C12
Y2
Y1
C2
18p
8 MHz
C10
4u7
FD3
C1
18p
MCP1802/3V3
2u2
C16
U2
J4
R19
220R
2p2
C11
Header 8-P1P8
MH1
Dia 2.8mm UP
J1
J3
Header 8-X17X24
J5
Header 4X2 P9P10
BO3

DNF MIC2005A–1YM5


PYBv1.0
USR
RST
Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8
Y9 Y10 Y11 Y12 RST GND 3V3 VIN
X9 X10 X11 X12 RST GND 3V3 VIN
X1 X2 X3 X4 X5 X6 X7 X8
X16 X17 X18 X19 X20 X21 X22 X23 X24 GND VIN


PYBv1.0
OTG
PWM
Genuine pyboard
Made in the UK
micropython.org
VIN
3V3
GND
RST
Y12
Y11
Y10
Y9
ADC
ADC
SDA/RX
SCL/TX
TX/PWM
RX/PWM
PWM
PWM
SS
SCK
MISO
MOSI
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
X8
X7
X6
X5
X4
X3
X2
X1
MOSI
MISO
SCK
SS
PWM
PWM
RX/PWM
TX/PWM
TX/SCL
RX/SDA
ADC
ADC
X9
X10
X11
X12
RST
GND
3V3
VIN
VIN
GND
GND
VIN
VBAT
RED
GREEN
YELLOW
BLUE
DFU
P8
P7
P6
P5
P4
P3
P2
P1
SW
VIN
GND
AG
AREF
X22
X21
X20
X19
X18
X17
X16