UART1

1k

1k

LM324

UART6

GND
VCC (3.3V)
SCL
SDA

74HC244

4.7k

74HC244

GPIO GPIO TRIG

SPI

ENCODER

4.7k

PWM

74HC244

OPAMP_EXT

ANALOG_EXT

LM324

1k

UART2

pin number	STM32 pin	library usage	GPIO capabilities
1	GND	-	-
2	PA15	UART1 TX [uart.c/h]	in/out
3	PB7	UART1 RX [uart.c/h]	in/out
4	3V3	-	-
5	3V3	-	-
6	PA0	ADC_0 [ADC.c/h]	in
7	PA1	ADC_1 [ADC.c/h]	in
8	PC0	ADC_2 [ADC.c/h]	in
9	PC1	ADC_3 [ADC.c/h]	in
10	PC2	ADC_4 [ADC.c/h]	in
11	PC3	ADC_5 [ADC.c/h]	in
12	GND	-	-
13	3V3	-	-
14	-	-	op-amp_1 +
15	-	-	op-amp_1 out
16	-	-	op-amp_1 -
17	-	-	op-amp_2 out
18	-	-	op-amp_2 +
19	-	-	op-amp_2 -
20	GND	-	-
21	GND	-	-
22	PA7	-	in
23	PA6	-	in
24	3V3	-	-
25	GND	-	-
26	PC12	-	in
27	PC5	-	in
28	3V3	-	-
29	GND	-	-
30	PC4	-	in
31	PD2	-	in

pin number	STM32 pin	library usage	GPIO capabilities
32	3V3	-	-
33	GND	-	-
34	PB12	-	out
35	PB13	-	out
36	PB15	-	out
37	PB14	-	in
38	3V3	-	-
39	GND	-	-
40	PB5	ENC_B [QEI.h]	in
41	PB4	ENC_A [QEI.h]	in
42	3V3	-	-
43	GND	-	-
44	PA2	-	in/out
45	PA3	-	in/out
46	3V3	-	-
47	3V3	-	-
48	PA8	PWM_0 [pwm.c/h]	out
49	PA9	PWM_1 [pwm.c/h]	out
50	PA10	PWM_2 [pwm.c/h]	out
51	PA11	PWM_3 [pwm.c/h]	out
52	PB6	PWM_4 [pwm.c/h]	out
53	PB8	PWM_5 [pwm.c/h]	out
54	GND	-	-
55	3V3	-	-
56	PB10	SCL [I2C.c/h]	-
57	PB9	SDA [I2C.c/h]	in
58	GND	-	-
59	GND	-	-
60	PC6	UART6 TX [uart.c/h]	in/out
61	PC7	UART6 RX [uart.c/h]	in/out
62	3V3	-	-

LED Drive Buffer
U1
74HC244

GP_LED0, GP_LED1, GP_LED2, GP_LED3, GP_LED4, GP_LED5, GP_LED6, GP_LED7
LED0, LED1, LED2, LED3, LED4, LED5, LED6, LED7

PWM Drive / Encoder Capture Buffer
U3
74HC244

TIM1_CH2, TIM1_CH3, TIM1_CH4, TIM4_CH4, TIM4_CH1, ENC_B, ENC_A
PWM0, PWM1, PWM2, PWM3, PWM4, PWM5, TIM3_CH1

PWM Drive / Encoder Capture Buffer
U7
74HC244

SPI2_NSS, SPI2_CLK, SPI2_MOSI, GP_EXT_IN2, SPI_EXT_MISO, EXT_TRIGGER, GP_EXT_IN1, GP_EXT_IN0
SPI_EXT_NSS, SPI_EXT_CLK, SPI_EXT_MOSI, GP_IN2, SPI2_MISO, TIM3_ETR, GP_IN1, GP_IN0

U2 NUCLEO64-SHIELD

BOOT0, RESET
PH0, PH1
PD2
PC0, PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, PC12, PC13, PC14, PC15
PA0 ADC1_IN0, PA1 ADC1_IN1, PA2 USART2_TTL_TX, PA3 USART2_TTL_RX, PA4 ADC1_IN4, PA5 NUCLEO_LED, PA6 GP_IN3, PA7 GP_IN4, PA8 TIM1_CH1, PA9 TIM1_CH2, PA10 TIM1_CH3, PA11 TIM1_CH4, PA12 USART1_TTL_RTS, PA13 STLINK_TMS/PA13, PA14 STLINK_TCK/PA14, PA15 USART1_TTL_TX
STLINK_UART_TX/PA2, STLINK_UART_RX/PA3
STLINK_SWO/PB3
PB0 GP_LED4, PB1 GP_LED5, PB2 GP_LED6, PB4 GP_LED7, PB5 TIM3_CH1, PB6 TIM3_CH2, PB7 USART1_TTL_RX, PB8 TIM4_CH3, PB9 SDA, PB10 SCL, PB12 SPI2_NSS, PB13 SPI2_CLK, PB14 SPI2_MISO, PB15 SPI2_MOSI
ADC1_IN10, ADC1_IN11, ADC1_IN12, ADC1_IN13, GP_IN0, GP_IN1, USART6_TTL_TX, USART6_TTL_RX, GP_LED0, GP_LED1, GP_LED2, GP_LED3, GP_IN2
TIM3_ETR
AVDD, AGND, GND

Analog Inputs
U5A / U5B / U5C / U5D LM324
ANALOG0 ADC1_IN0, ANALOG1 ADC1_IN1, ANALOG2 ADC1_IN10, ANALOG3 ADC1_IN11
U6A / U6B / U6C / U6D / U5E / U6E LM324
ANALOG5 ADC1_IN13, ANALOG4 ADC1_IN12, ANALOG_EXT0_P, ANALOG_EXT0_N, ANALOG_EXT0_OUT, ANALOG_EXT1_P, ANALOG_EXT1_N, ANALOG_EXT1_OUT

J13 PWM
VCC_3v3, PWM0, PWM1, PWM2, PWM3, PWM4, PWM5, GND

Potentiometer
VR1 10k, ADC1_IN4, GND

J9 OPAMP_EXT
VCC_3v3, ANALOG_EXT0_OUT, ANALOG_EXT1_OUT, ANALOG_EXT1_N
ANALOG_EXT0_P, ANALOG_EXT0_N, ANALOG_EXT1_P, GND

J10 ANALOG_EXT
ANALOG0, ANALOG2, ANALOG4, GND
ANALOG1, ANALOG3, ANALOG5

SPI
J5 SPI
VCC_3v3, SPI_EXT_MISO, SPI_EXT_MOSI, SPI_EXT_CLK, SPI_EXT_NSS, GND

I2C External
J6 I2C
VCC_3v3, SCL, SDA, GND
RN4 4.7k

Screen
J1 OLED
SDA, SCL, VCC_3v3, GND

GPIO Input Pullups
RN3 1k
EXT_TRIGGER, GP_EXT_IN0, GP_EXT_IN1, GP_EXT_IN2

Encoder Ext
J8 ENCODER
VCC_3v3, ENC_A, ENC_B, GND

Ext Trigger
J7 TRIG
VCC_3v3, EXT_TRIGGER, GP_EXT_IN0, GND

Ext GPIO
J11 GPIO
VCC_3v3, GP_EXT_IN1, GP_EXT_IN2, GND
J12 GPIO
VCC_3v3, GP_IN3, GP_IN4, GND

UART
J2 UART6
USART6_TTL_RX, USART6_TTL_TX, VCC_3v3, GND
J3 UART1
USART1_TTL_RX, USART1_TTL_TX, VCC_3v3, GND

Passthru for the ST-LINK USB->Serial port
J4 UART2
USART2_TTL_RX, USART2_TTL_TX, VCC_3v3, GND

Switches
S1 PTS645SM43SMTR92 LFS, GP_EXT_IN0
S2 PTS645SM43SMTR92 LFS, GP_EXT_IN1
S3 PTS645SM43SMTR92 LFS, GP_EXT_IN2
S4 PTS645SM43SMTR92 LFS, EXT_TRIGGER
S5 EG1218, GP_IN3
S6 EG1218, GP_IN4
RN5 4.7k, VCC_3v3

LEDs
D1 LED0, D2 LED1, D3 LED2, D4 LED3, RN1 1k
D5 LED4, D6 LED5, D7 LED6, D8 LED7, RN2 1k