Nucleo-144-F767ZI

U1
NUCLEO144-F767ZI

J1
2PXH2.54

+5VD +3.3V

GND
+5V

IOREF
AVDD

BOOT0
NRST RST

VDD
E5V
IOREF
+3V3
+5V
VIN
VBAT
U5V

ETH_REF_CLK/PA0 28 RMII_REF_CLK
ETH_MDIO/PA1 30 RMII_MDIO
PA2 107
PA3 109
PA4 32
PA5 83
PA6 85
ETH_CRS_DV/PA7 87 RMII_CRS_DV
USB_SOF/PA8 95 USB_OTH_FS_SOF
USB_VBUS/PA9 93 USB_OTG_FS_VUS
USB_ID/PA10 105 USB_OTG_FS_ID
USB_DM/PA11 86 USB_OTG_FS_DM
USB_DP/PA12 84 USB_OTG_FS_DP
TMS/PA13 13 TMS
TCK/PA14 15 TCK
PA15 17

PH0 29
PH1 31

PG0 59
PG1 58
PG2 42
PG3 141
PG4 140
USB_PowerSwitchOn 142 PG6/USB_GPIO_OUT
USB_OverCurrent_Protection 139 PG7/USB_GPIO_IN
138 PG8
USART_MLIDAR_RX 63 PG9
66 PG10
RMII_TX_EN 70 PG11/ETH_TX_EN
65 PG12
RMII_TXD0 68 PG13/ETH_TXD0
USAR_MLIDAR_TX 133 PG14
64 PG15

53 PF0
51 PF1
52 PF2
PF3 130 PF3 BRIDGE_B1
110 PF4 BRIDGE_A2
PF5 108 PF5
9 PF6
11 PF7
54 PF8
TESTOWA 56 PF9
PF10 114 PF10 BRIDGE_A1
134 PF11
131 PF12
129 PF13
122 PF14
132 PF15

136 PE0 SPI1_SS
46 PE1
47 PE2
48 PE3
50 PE4
116 PE5
124 PE6
112 PE7
128 PE8
124 PE9
119 PE10
128 PE11
121 PE12
PE13 TIM1_CH3 127 PE13
PE14 TIM1_CH4 123 PE14
125 PE15

PB0 34 LD1[Green]
PB1 96
PB2 94
SWO/PB3 103 SWO
PB4 99 TIM3_CH1 PB4
PB5 101 TIM3_CH2 PB5
PB6 89
LD2/PB7 21 LD2[Blue]Indicator
PB8 75 I2C_SENSORS_SDA PB8
PB9 77 I2C_SENSORS_SCL PB9
PB10 97 SPI2_SCK
PB11 90
PB12 88
ETH_TXD1/PB13 102 RMII_TXD1
LD3/PB14 100 LD3[Red]
PB15 98

PC0 38 BRIDGE_B2 PC0
ETH_MDC/PC1 36 RMII_MDC
PC2 35 SPI2_MISO
PC3 37 SPI2_MOSI
ETH_RXD0/PC4 106 RMII_RXD0
ETH_RXD1/PC5 78 RMII_RXD1
PC6 76 TIM8_CH1 PC6
PC7 91 TIM8_CH2 PC7
PC8 74
PC9 73
PC10 UART_RFID_TX
PC11 UART_RFID_RX
PC12 23 UART_ULTRASOUND_TX
BT/PC13 USER_BTN[B1]
RTC_CRYSTAL/PC14 25 RCC_OSC32_IN
RTC_CRYSTAL/PC15 27 RCC_OSC32_OUT

PD0 57 CAN1_RX
PD1 55 CAN1_TX
PD2 4 UART_ULTRASOUND_RX
PD3 40
PD4 39
PD5 41 USART_GPS_TX
PD6 43 USART_GPS_RX
PD7 45 GPIO_ELECTOMAGNET
STLINK_TX/PD8 82 STLK_RX
STLINK_RX/PD9 69 STLK_TX
PD10 137
PD11 117
PD12 115
PD13 113
PD14 118
PD15 120

GND AGND

Sensors Board

U2
X-NUCLEO-IKS01A1

+3.3V
NC
+3.3V
NC
+3.3v
NC
GND
GND
NC

NC
NC
M_INT2
M_INT1
LIS3MDL_INT1 MAGNET_INT
LIS3MDL_DRDY MAGNET_DATA_READY

I2C_SCL SENSORS_I2C_SCL
I2C_SDA SENSORS_I2C_SDA
GND
NC
NC
NC
NC
NC
NC
HTS221_DRDY HUMIDITY_DATA_READY
LPS25H_INT1 PRESSURE_INT
LSM6DSO_INT1 IMU_INT
USER_INT USER_INT
NC
NC
NC

GND

Power management

+5VD +12V
Power Management
+12V
+5VD
GND
Power_management.sch
GND

TODO: electronic ruler

Encoders

+5VD
Encoders
PC6 5V
PC7 A1
PC7 B1
TODO Z1
PB4 A2
PB5 B2
TODO Z2
GND
encoders.sch
GND

Motors and H-Bridge

U3
X-NUCLEO-IHM04A1

NC
NC
NC
NC
NC
NC
NC
NC
NC

PF3 BRIDGE_B1 1 IN1B
PC0 BRIDGE_B2 2 IN2B
ADC-4
ADC-4
PE14 TIM1_CH4 5 EN-B

NC
NC
NC
GND
ADC-6
GND
GND
GND

NC
IN1A BRIDGE_A1 PF10
IN2A BRIDGE_A2 PF5
EN-A TIM1_CH3 PE13
NC
NC

Screw Terminal
A+ A- B+ B- GND Vin

GND +12V

RIGHT_MOTORS
LEFT_MOTORS

EN input are used to
turn on the MOSFETs.
Could be used for
overcurrent protection
(R8 i R9 should be around
10k for OCP 2.5A
Typically there are 5.1k
resistors here - 5A OCP)

ADC are not used and
should be connected to GND.

LEFT_MOTORS
A- A+ red
M1 M3
DC Motor 12V 300RPM DC Motor 12V 300RPM
black

RIGHT_MOTORS
B- B+ red
M2 M4
DC Motor 12V 300RPM DC Motor 12V 300RPM
black

DC Motors with gearbox
XD-37G520

Nucleo144-F767ZI Ardunio Connector usage

JP7
Bridge closed
1 2 SENSORS_I2C_SDA

JP8
Bridge closed
1 2 SENSORS_I2C_SCL

J2
Ardu Conn 01x08
1 IOREF
2 NRST
3 +3.3V
4 +5V
5
6
7 GND
8 +5VD

J3
Ardu Conn 01x06
1 PA3
2 PC0
3 PC3
4 PF3
5 PF5
6 PF10

J4
Ardu Conn 01x10
10 PB8
9 PB9
8 AVDD
7 GND
6 PA5
5 PA6
4 PA7
3 PD14
2 PD15
1 PF12

J5
Ardu Conn 01x08
8 PF13
7 PE9
6 PE11
5 PF14
4 PE13
3 PF15
2 PG14
1 PG9

JP1
Bridge open
MAGNET_INT 1 2

JP2
Bridge open
MAGNET_DATA_READY 1 2

JP3
Bridge open
1 2 HUMIDITY_DATA_READY

JP4
Bridge open
1 2 PRESSURE_INT

JP5
Bridge open
1 2 IMU_INT

JP6
Bridge open
1 2 USER_INT

Bridge numbers may be different

+5V

+5V
GND

GND

+5V

GND

Left wheel encoder

1	VCC
2	GND
3	DO
4	AO

U4
Optical_sensor

A1
B1
Z1

1	VCC
2	GND
3	DO
4	AO

U5
Optical_sensor

1	VCC
2	GND
3	DO
4	AO

U6
Optical_sensor

+5V

GND

Right wheel encoder

1	VCC
2	GND
3	DO
4	AO

U7
Optical_sensor

A2
B2
Z2

1	VCC
2	GND
3	DO
4	AO

U8
Optical_sensor

1	VCC
2	GND
3	DO
4	AO

U9
Optical_sensor

+12VD ▷→ +12V
+5VD ▷→ +5VD
GND ▷→ GND

+12C   SW1   +12V
        Main power switch
        1 o o 2

+12V

D1
GREEN_LED

J6
Jack DC 5.5/2.5mm f

F1
5A

BT1
GEL BATTERY 12V 7Ah
XTREME 82-211

R1
5k1

Charging input
13.6-15.5 VDC

GND

GND

+12V
Yellow insulation
J7
DC-Jack 5.5/2.5mm f

GND

+12P
Yellow insulation
J8
Jack DC 5.5/2.5mm m

GND

+12P   +5VD
                        +5V_STM32
U10
Pololu-D24V50F5
EN
VIN OUT5V
GND   GND

J9
2PXH2.54

GND

+12P   +5V
                        +5V_NVIDIA
U11
Pololu-D24V50F5
EN
VIN OUT5V
GND   GND

J10
DC-Jack 5.5/2.5mm m

GND