# STM32G031G8 MCU

SWD programming port

Reset button

Test button

+3.3V

J2

R5 10k

MCU_RESET

SWDIO

SWCLK

R4 10k

GND

01x05 male P=1.27mm

+3.3V

R15 10k

MCU_RESET

C18 100nF

GND

SW2

+3.3V

SW1

SWCLK

Debug serial port

+3.3V

4  UART2 TX
2  UART2 RX
1  GND

J1

01x04 male P=1.27mm

+3.3V

C37 100nF   C9 1uF

GND

U2

PF2  5
PC6  17
PC14 1
PC15 2

PA0  6   I_AMPLIFIED
PA1  7   MOSFET_ENABLE
PA2  8   UART2 TX
PA3  9   UART2 RX
PA4  10  TEMPERATURE
PA5  11  HALL1
PA6  12  HALL2
PA7  13  HALL3
PA8  16  TIM1_CH1
PA11/PA9 17 TIM1_CH4
PA12/PA10 18 RS485_EN
PA13 19  SWDIO
PA14 21  SWCLK
PA15 22

MCU_RESET
TIM3_CH1
LED_RED
LED_GREEN

TIM3_CH4 TIM3_CH3
TIM14_CH1

PB0  14  MEASURE_24V
PB1  15
PB3  23  TIM1_CH2
PB4  24  TIM3_CH1
PB5  25  TIM3_CH2
PB6  26  RS485_D
PB7  27  RS485_R
PB8  28  OVERVOLTAGE

TIM3_CH1 TIM16_CH1
TIM14_CH1 TIM17_CH1 TIM3_CH2

TIM16_CH1

VSS  4

GND

STM32G031G8Ux

# Overvoltage detection

+10V

C22 1uF

GND

OVERVOLTAGE

R8 1.5k

R23 10k

GND

U3 LM321

GND

C28 100nF

R25 10k

TIM1_CH4

C30 100pF

MEASURE_24V

R24 10k

C36 100nF

GND

GND

R27 18k

+24V

R26 1.5k

GND

# Current sense amplifier

+10V

C40 1uF

GND

I_AMPLIFIED

R3 33K

U9 LM321

+10V   +10V

R7 680K   R10 300K

R14 10K   I_SENSE

C42 NC

R9 10k

GND   GND

C43 100pF

GND

# RS485 transciever

+3.3V

C35 100nF

GND

U10 SP3485EN

RS485_R  1  RO
RS485_EN 2  RE
         VCC
RS485_D  3  DE  A  6  RS485_A
         4  DI  B  7  RS485_B
         5  GND

+3.3V

R17 10k

R13 10k

GND

R2 10k

GND   GND

Input power

J4

GND  1  GND
+24V 2  +24V
     3  A
     4  B
     5  A
     6  B

RS485 interface

RS485_A
RS485_B

# Hall sensors

+3.3V

U7 AH49HSC
VCC  VOUT  HALL1
GND
C17 1nF

U6 AH49HSC
VCC  VOUT  HALL2
GND
C20 1nF

U4 AH49HSC
VCC  VOUT  HALL3
GND
C23 1nF

GND

# Motor driver

+24V

C12 10uF  C14 10uF  C15 10uF  C19 10uF  C7 10uF  C8 10uF  C10 10uF  C11 10uF  C13 10uF  C16 10uF  C2 10uF  C6 10uF  C27 10uF  C29 10uF  C31 10uF  C32 10uF  C33 10uF  C34 10uF  C38 10uF  C39 10uF

GND

Bulk capacitors for powering the motor. 200uF total. Putting less quantity of higher uF capacitors appears to be more expensive.

Q5 MMBT3904

MOSFET_ENABLE

R16 10K

R6 10K

R19 10K

+10V

SS8550 Y2 Q6

DRIVER_VCC

C46 4.7uF

GND

DRIVER_VCC

C21 100nF

GND

U1 U5315

TIM1_CH2
TIM1_CH1

HIN1
HIN2
HIN3

GND

LIN1
LIN2
LIN3

VCC 7

VB1 20
HO1 19
VS1 18
LO1 11

VB2 17
HO2 16
VS2 15
LO2 10

VB3 14
HO3 13
VS3 12
LO3 9

COM 8

GND

C1 10uF

C5 10uF

+24V

Q2A AGM412MAP

Q2B AGM412MAP

A+ 1

+24V

Q1A AGM412MAP

Q1B AGM412MAP

A− 1

Stepper motor connection (Phase A)

10m R1

I_SENSE

TP1

GND

DRIVER_VCC

C3 100nF

GND

U8 U5315

TIM3_CH2
TIM3_CH1

HIN1
HIN2
HIN3

GND

LIN1
LIN2
LIN3

VCC 7

VB1 20
HO1 19
VS1 18
LO1 11

VB2 17
HO2 16
VS2 15
LO2 10

VB3 14
HO3 13
VS3 12
LO3 9

COM 8

GND

C4 10uF

C24 10uF

+24V

Q3A AGM412MAP

Q3B AGM412MAP

B+ 1

+24V

Q4A AGM412MAP

Q4B AGM412MAP

B− 1

Stepper motor connection (Phase B)

# Voltage regulators

U11 L78L10_SOT89

+24V   IN  OUT   +10V

C44 100nF   C45 1uF

GND

U5 GM7333

+10V   VIN  VOUT   +3.3V

C26 10uF   C25 4.7uF

GND

# Status LEDs

LED_RED   1.5k R12
LED_GREEN 470R R11

D1 KT-0603R   GND
D2            GND

MHT192UGCT

# Temperature monitoring

+3.3V

R29 4.7k

TEMPERATURE

C41 100nF

GND

TH1 100k 1% NTC