*1 Note on using multiple Power Supply Units (PSUs):

1-1. Ensure that you wire each PSU's earth grounds together (one earth ground from each PSU must go back to a common point that then gets attached to the earth ground of the AC input power terminal).

1-2. Wire each PSU's negative (V-) terminals together so they're connected to each other.

*3 Note if using PSU of 24V for "MB_POWER_IN":

1. Calculate the maximum current draw from your 4 heaters; (13 Amps maximum for; 7 Fans, 12V rail, 5V rail and 3.3V rail); you may need to change out the "MB_POWER_IN FUSE" (F3) from 15 Amps to 20 Amps (Bigtreetech supplies one with each Octopus Pro V1.0 board).

2 - M3; M2
1 - M2; M1
0 - M1; M0

OR

3 - M3; M2
2 - M2; M1
1 - M1; M0

V_R:V_R location depends on the Stepper Driver Board

UART

(CS)

DRIVER0:	PC4
DRIVER1:	PD11
DRIVER2:	PC6
DRIVER3:	PC7
DRIVER4:	PF2
DRIVER5:	PE4
DRIVER6:	PE1
DRIVER7:	PD3

Only one (1) Jumper is needed for this mode. Jumper located in column MS3/2 and row 1& 2.

SPI

MOSI	PA7
MISO	PA6
SCK	PA5

DRIVER0-CS	PC4
DRIVER1-CS	PD11
DRIVER2-CS	PC6
DRIVER3-CS	PC7
DRIVER4-CS	PF2
DRIVER5-CS	PE4
DRIVER6-CS	PE1
DRIVER7-CS	PD3

Four (4) Jumpers are needed for this mode. Jumpers located in: columns MISO, CS, SCK, MOSI and rows 1 & 2.

NOTE:

Things to be aware of when using the SPI bus #1: The Stepper Motor Drivers share the same SPI bus as EXP2, and the MAX31865 chip (i.e. PT100, PT1000). They only share: MISO, MOSI and SCK lines. They have separate CS lines.

https://en.wikipedia.org/wiki/Serial_Peripheral_Interface

D1-DIAG PIN; V_{ref} - V_{ref} (D/D0/D1) V_{ref}-Voltage Reference

SPI / UART

RST 3/2 2/11/0

SLP 5 V DC

Motor Power Selection Jumpers

Motor Pwr = MOTOR_POWER_IN

Motor Pwr = V_{in} VDC (i.e. 24 VDC)

Z Sockets Wired in Parallel

Motor_0 A1 A2 B2 B1 | Motor_1 A1 A2 B2 B1 | Motor_2.1 A1 A2 B2 B1 | Motor_2.2 A1 A2 B2 B1 | Motor_3 A1 A2 B2 B1 | Motor_4 A1 A2 B2 B1 | Motor_5 A1 A2 B2 B1 | Motor_6 A1 A2 B2 B1 | Motor_7 A1 A2 B2 B1

DRIVER0 DRIVER1 DRIVER2 DRIVER3 DRIVER4 DRIVER5 DRIVER6 DRIVER7

12 ~ 60V

MOTOR_POWER_IN FUSE

DCIN MOTOR_POWER 12 ~ 60 V DC

MB_POWER_IN FUSE

DCIN MB_POWER 15 ~ 28 V DC (V_{in}) (24 VDC)

BED_POWER_IN FUSE

DCIN BED_POWER 12 ~ 28 V DC (24 VDC)

OUTPUT ONLY

HEATED BED BED_OUT PA1

A resouce for hooking up 2-wire, 3-wire or 4 wire PT100/PT1000 Temperature Sensor: https://cdn-learn.adafruit.com/downloads/pdf/adafruit-max31865-rtd-pt100-amplifier.pdf. See page 14, "How To Wire Up". Everytime this manual talks about soldering bridges together, just ignore that information. The PT100/PT1000 DIP switch on the Octopus Pro board, (if set appropriately), will automically bridge the appropriate contacts on the PT100/PT1000 Connector!

Power Selection Jumper

Board Powered by USB-C Port

Board Powered by POWER_IN

STM32F446ZET6

https://www.st.com/resource/en/datasheet/stm32f446re.pdf

https://www.st.com/resource/en/datasheet/dm00071990.pdf

STM32F429ZGT6

BIGTREETECH Octopus Pro

EXP2: Default Hardware SPI BUS (SPI1)

EXP1 EXP2

TFT

WIFI Socket

Micro SD Card Reader

USB Flash Drive U20 Type-A

"Ding Jumper" Block Labels:

MOT0-DIAG0	MOT1-DIAG1	MOT2-DIAG2	MOT3-DIAG3	MOT4-DIAG4	MOT5-DIAG5	MOT6-DIAG6	MOT7-DIAG7
PG6	PG9	PG10	PG11	PG12	PG13	PG14	PG15

PT100/PT1000 Connector

FORCE_P (+)
RTDIN_P (+)
RTDIN_N (-)
FORCE_N (-)

MAX31865 Chip

PT100/PT1000 DIP SWITCH

Redesigned Octopus Pro V1.0 PIN MAP BY GadgetAngel and Thomas White

SPI3 Header

GadgetAngel

WARNING!! ONLY PLACE ONE JUMPER ACROSS THE FAN VOLTAGE SELECTION HEADERS, ANY MORE THAN ONE CAN CONNECT TWO/THREE POWER SUPPLIES TOGETHER, AND THIS WILL DAMAGE THIS BOARD. THE SAME RESULT CAN HAPPEN IF A JUMPER IS PLACED VERTICALLY.

BLTouch *7 RGB_LED

PS_ON "Ding Jumper" Block

CAN BUS RJ11

RX1 PD0
TX1 PD1

HE0	HE1	HE2	HE3	FAN0	FAN1	FAN2	FAN3
PA2	PA3	PB10	PB11	PA8	PE5	PD12	PD13
FAN4	FAN5	FAN6	FAN7				
PD14	PD15	-	-				

15 For stepper motor drivers, the heated bed, circut logic, fans, & hotend heaters.

WARNING!! -- ONLY PLACE ONE JUMPER VERTICALLY ACROSS THE PROBE VOLTAGE SELECTION HEADER, ANY MORE THAN ONE CAN CONNECT TWO/THREE POWER SUPPLIES TOGETHER, AND THIS WILL DAMAGE THIS BOARD. THE SAME RESULT CAN HAPPEN IF A JUMPER IS PLACED HORIZONTALLY.

	EN	STEP	DIR	CS		EN	STEP	DIR	CS		EN	STEP	DIR	CS		EN	STEP	DIR	CS
DRIVER0	PF14	PF13	PF12	PC4	DRIVER1	PF15	PG0	PG1	PD11	DRIVER2	PG5	PF11	PG3	PC6	DRIVER3	PA0	PG4	PC1	PC7
DRIVER4	PG2	PF9	PF10	PF2	DRIVER5	PF1	PC13	PF0	PE4	DRIVER6	PD4	PE2	PE3	PE1	DRIVER7	PE0	PE6	PA14	PD3

WIFI

(BIGTREETECH ESP8266 module or BTT ESP-07S module)

3.3 VDC | PC1 (MISO2) | PC2 (MOSI2) | PB13 (SCK2) | NC | PG8 | NC | PG7

GND | PB14 (SCK2) | NC | PD7 | PD10 | NC | (TX3) PD8 | (RX3) PD9

Micro SD Card Reader

D2	PC10
D3	PC11
CMD	PD2
3.3V	
CLK	PC12
GND	
D0	PC8
D1	PC9
DET	PC14

Micro SD Card Reader

BIGTREETECH ESP8266 Module

BTT ESP-07 Module

MAX31865

MOSI	PA7
MISO	PA6
SCK	PA5
CS	PF8

Note: If you are unsure about any of the information provided on this PIN Diagram, please ask for help from the 3D printer community, check the Processor's data sheet and the board's schematic diagram.

STALLGUARD (Sensor-less Homing)

	DIAG PIN	ENDSTOP	
M_0	MOT0-DIAG0	PG6	Stop_0
M_1	MOT1-DIAG1	PG9	Stop_1
M_2	MOT2-DIAG2	PG10	Stop_2
M_3	MOT3-DIAG3	PG11	Stop_3
M_4	MOT4-DIAG4	PG12	Stop_4
M_5	MOT5-DIAG5	PG13	Stop_5
M_6	MOT6-DIAG6	PG14	Stop_6
M_7	MOT7-DIAG7	PG15	Stop_7

EN ENABLED

EN DISABLED

DIAG pin to/from Driver

Endstops to/from MCU

M 0M 1M 2M 3M 4M 5M 6M 7

Note1 Concerning the TMC2209/TMC2226 in UART Mode ONLY: If using limit switches/endstops, ensure the DIAG pin is NOT connected to the MCU Endstop (i.e., ensure the "Ding Jumper" is removed).

Note2 For TMC2209/TMC2226 in UART Mode ONLY: If you are using it for your extruder motor and you want to use a filament runout sensor, ensure the DIAG/DIAG1/DIAG0 PIN is NOT connected to the MCU Endstop to allow the filament runout sensor to work properly (i.e., ensure the "Ding Jumper" is removed for the corresponding extruder motor).

PT100/PT1000 DIP Switch Settings

ON DIP OFF *2

1	2	3	4	Sensor model
ON	ON	ON	OFF	Two-wire PT100 Sense Ω = 430
ON	ON	OFF	ON	Two-wire PT1000 Sense Ω = 4300
OFF	ON	ON	OFF	Three-wire PT100 Sense Ω = 430
OFF	ON	OFF	ON	Three-wire PT1000 Sense Ω = 4300
OFF	OFF	ON	OFF	Four-wire PT100 Sense Ω = 430
OFF	OFF	OFF	ON	Four-wire PT1000 Sense Ω = 4300

*2 Note the default setting is all DIP switches set to OFF (i.e. Please set DIP Swithches before you install the board!!!).

*4

*4 The integrated MAX31865 is hardware configured from the factory with the "2/4" pads bridged with a 0 Ω resistor (as seen in the red box in the picture to the left). This factory default setup is for PT100/PT1000 sensors that have a 2-wire or 4-wire arrangment.

If you are using a 3-wire PT100/PT1000 sensor, then you will need to move the 0 Ω resistor to the "3" pads on the board (as seen in the blue box in the picture to the left) .

*7 Note on using RGB Header:

If you are using "NeoPixels" and they are NOT operating as expected, please try the following: Additional Equipment needed: 100 Ohm resistor, 1000 uF Capacitor, and use a seperate 5V PSU. DO NOT use the Octopus to drive the LEDS. The 5V PSU and Octopus board should have a shared GND (V-).

Octopus MCU | RGB Port | GND | PF14

Place the 100 Ohm resistor at the beginning of the signal wire [in-line with PB0] (as close to the MCU as possible)!

100 Ohm Resistor | 1000 uF Cap | 5VDC PSU | NeoPixels

*5 | *6

Klipper

Klipper Building Options for The Octopus Pro (F446):	Klipper Building Options for The Octopus Pro (F429):
Clock Frequency : (12 MHz)	Clock Frequency: (8 MHz)

For F429: all options the same as F446 except for Clock Frequency & Processor model!. The Example below is for the F446.

```
(Top)
Klipper Firmware Configuration
[*] Enable extra low-level configuration options
    Micro-controller Architecture (STMicroelectronics STM32) --->
    Processor model (STM32F446) --->
    Bootloader offset (32KiB bootloader) --->
    Clock Reference (12 MHz crystal) --->
    Communication interface (USB (on PA11/PA12)) --->
    USB ids --->
[ ] Specify a custom step pulse duration (NEW)
[*] GPIO pins to set at micro-controller startup (NEW)
```

*5 For F429 choose STM32F429 *6 For F429 choose 8 MHz