Peristaltic pump connector

Peristaltic pump motor control

Servo Connector

Mosfet or Transistor Power switching options

Fan Connector

Optical interrupt Connector

Programming port

atmega328p zif socket

Motor battery lipo voltage monitoring circuit option

Microcontroller circuit protection (b)

Motor battery power 5v in

Motor battery power 5v out (to 5amp boost converter)

24v power connector (from external 5amp boost converter)

Real Time Clock

Shift register 1 (pins 0-7)

Shift register 2 (pins 8-15)

Shift register 3 (pins 16-23)

SD card reader

Power on pulse main system

Single inverter Logic gate

HC-12 connection with switch

Sensor Board Connection

65nm Nema 48 stepper motor connection

Stepper motor power control

HX711 Load Cell 1

HX711 Load Cell 2

Photo interrupter

Added CH4 power connector

(a) 2 exposed copper pads that can be connected to enable the spread cycle on tmc2100 stepper drivers

(b) All control components are through hole to allow later changes to values. Incase the circuit does not work, or components are not available, I have included copper pads to be soldered to the circuit to be used. If no circuit protector is used, be cautious.

- 2oz copper pcb. All 5v traces 0.3mm (1.65 amps), other than the servo which should be higher if possible (0.684mm for 3amps). All 24v traces 1.38mm (5amps)

TITLE: Automatic GHG Chamber schematic version 2	REV: 1.0
Company: IGB-Berlin	Sheet: 1/1
Date: 23-08-2021 Drawn By:	

Ben Archer

Editing notes:

1. Removed switches and the spare sensor board connections
2. Removed L293D stepper driver
3. Added 3rd shift register (Just incase more pins are needed in the future).
4. Removed boost convertor circuit
5. Removed the ICSP header pins, because I never used them on the V1. For most of the reprogramming I just removed the ATMEGA and re_burned the bootloader on the bootloader programming shield that I have
6. Converted the dupont connection points to JST type (JST sales America)
7. Removed 28BYJ-48 connector
8. Added the zif 24 pin socket in place of the atmega. This will need to be ordered from mouser rather than lcsc electronics...unless I can find one
9. Added socket for TMC2208 motor driver shield. This MUST be a removable shield because it is a part that can break regularly
10. Added the schematic for the Watterott electronics StepSTick-protector V2
11. Added relays
12. Change the connections for the shift registers
13. Added ferrite bead
14. Wired up the added shift register to include the individual methane sensors and moved any switching pins from the atmega to this shift register, to make space for additional load cell
15. Added a single NOT inverter logic gate, where I had a 6x IC logic gate on the perf board. This is more sensible in terms of space
16. Wired the right colour wire to the right output from the stepper motor
17. 2 options for Optical input...the electrics on the main board connector for 4 wired, and the old style connector (with electronics on seperate board) just incase
18. reverse voltage protection efuse for just the arduino and electronics control. The heavier stuff run away from it because the efuse I have is only up to 1.6 amps, the 2amp version is not available
19. microusb powering option for 5v