Controller Reprogramming

This walk through is only for use be YGK Modulator Ventilator technical staff or others in direct communication with them. It details methods necessary to upgrade the controller firmware. If performed incompletely or incorrectly the ventilator may be rendered inoperable.

Arduino IDE Setup and Firmware Install

Version 1.8.10 of the IDE has been used in developing the controller software. Multiple steps are required for the setup and more detail is provided at https://ecampusontario.pressbooks.pub/rwsnotes/back-matter/getting-started-with-the-arduino-ide/#back-matter-138-section-1

1. Install the Arduino IDE from https://www.arduino.cc/en/Main/Software
2. Download a copy of the Vent repository from https://github.com/sellensr/Vent to your Arduino folder. It will include the most up to date Vent_4 application code as well as possible later versions.
3. Copy the contents of the libraries folder in the Vent repository to the Arduino/libraries folder of your new installation and restart the Arduino IDE.
4. Use the Boards Manager in the IDE to install support for Arduino SAMD Boards and also for Adafruit SAMD Boards. You will need to add this link as an additional board manager URL in settings: https://adafruit.github.io/arduino-board-index/package_adafruit_index.json
5. Choose Tools/Board/Adafruit ItsyBitsy M0 and use the check mark icon to perform a test compile of Vent_4.ino. Do not connect to the controller board USB until this compile has been successful.

6. Connect to a spare ItsyBitsy M0, if available, using the USB. Set the appropriate port under Tools/Port, then use the arrow icon to upload the code to the ItsyBitsy. After successful upload, open the Serial Monitor to confirm that the firmware is running on the ItsyBitsy. It will display some initialization, then a banner similar to the one below, then a continuous stream of data. (uncheck Autoscroll and roll back to check if you missed the banner on startup.

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YGK Modular Ventilator

Firmware Version: 0.4.5   Model: 3    Serial Number: 30000001
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7. Once you are successful, repeat the previous step with the USB cable connected to the ItsyBitsy on the controller board of the ventilator.

Additional Notes

Much more detail on operation and programming of the ItsyBitsy is available at https://learn.adafruit.com/introducing-itsy-bitsy-m0

Note that some operations can disrupt the USB communication between the PC and the ItsyBitsy in a way that interferes with uploading new firmware. If the board is unresponsive, click the rest button twice in quick succession. The LED should cycle, then light up in green indicating it is ready for programming.

The ItsyBitsy can also operate in CircuitPython mode, emulating a very small USB drive. Your PC operating system may display a warning message that the ITSYBOOT disk was not ejected properly. This is normal as it cycles between the two modes during reprogramming.