IMPORTANT NOTICE

25 April 2023

This guide is meant only for *release 1.02* of Agon's Quark™ firmware. It is inappropriate for other releases, including release 1.03. Since its original publication, the Agon ecosystem has grown explosively. The community of developers is now much larger, and several companies are now involved in making and selling Agon. To support all this growth, all firmware documentation, including installation steps for release 1.03 onwards, are now maintained in a dedicated website run by Dean Belfield, the firmware's lead developer:

https://github.com/breakintoprogram/agon-docs/wiki

More specifically, instructions for updating Agon's firmware, from release 1.03 onwards, can be found here:

https://github.com/breakintoprogram/agon-docs/wiki/Updating-Firmware

This document is now kept mostly for legacy purposes, and for commercial parties who make and flash Agon units for the first time, for retail purposes. But it should no longer be used by end-users of Agon.

Installing Agon light™'s firmware
A step-by-step guide

Last update on: 4/25/23 2:07:58 AM

This guide is now obsolete and should be used only by parties making and flashing Agon units for the first time, for retail purposes. End-users should refer, from now on, to Agon's online Wiki at:

https://github.com/breakintoprogram/agon-docs/wiki

1. To solder the through-hole LDO regulator on the Agon light™ board, carefully follow the instructions on **page 24** of the Hardware Manual, found here: https://github.com/TheByteAttic/AgonLight/blob/main/Agon%20light%20R1.0%20Manual.pdf

2. **Page 25** of the Hardware Manual shows the correct orientations of the electrolytic capacitors.

3. **Page 26** of the Hardware Manual shows the correct positions of the header jumpers. *Make sure you place these jumpers before continuing.*

4. Now you will need (1) a Windows PC (Windows 10 will be fine); (2) a type-A to type-A male-to-male USB2 or USB3 cable; and, *if you are programming the eZ80 for the first time*, (3) a Zilog USB Smart Cable with product number `ZUSBSC00100ZACG` (now discontinued) or `ZUSBASC0200ZACG` (current; requires v5.3.5 or later of Zilog's ZDS-II IDE)*. For the cable to work, you may need to install the CP2104 device driver on your PC: https://www.silabs.com/developers/usb-to-uart-bridge-vcp-drivers?tab=downloads

   > **ATTENTION:** To update the eZ80 firmware (Quark MOS™) in an Agon light™ whose eZ80 is already programmed with an earlier version of the firmware, you do *not* need the Zilog USB Smart Cable! You can do the update using this software utility: https://github.com/envenomator/agon-flash

5. Install the Arduino IDE, which you can download from here: https://www.arduino.cc/en/software Choose version 1.8.19 or later.

6. Open the Arduino IDE.

7. Go to: `File` → `Preferences`

8. In the "`Additional Board Manager URLs`" field, enter the following URL:

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* The Zilog USB Smart Cable with product number `ZUSBESC0200ZACG` will <u>*NOT*</u> work with Agon light™.

https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json
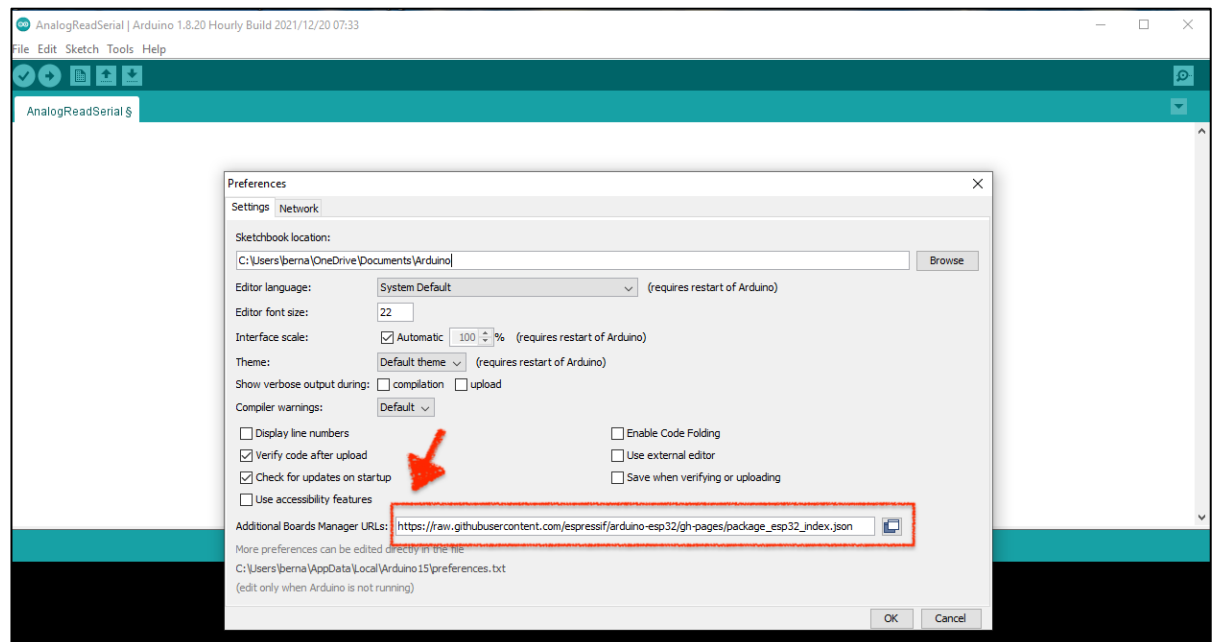

9. Go to: Tools → Board → Boards Manager

10. Type "esp32" in the search box and hit ENTER.

11. Choose version 2.0.4 or higher of the "esp32" library by "Espressif Systems" and click Install:
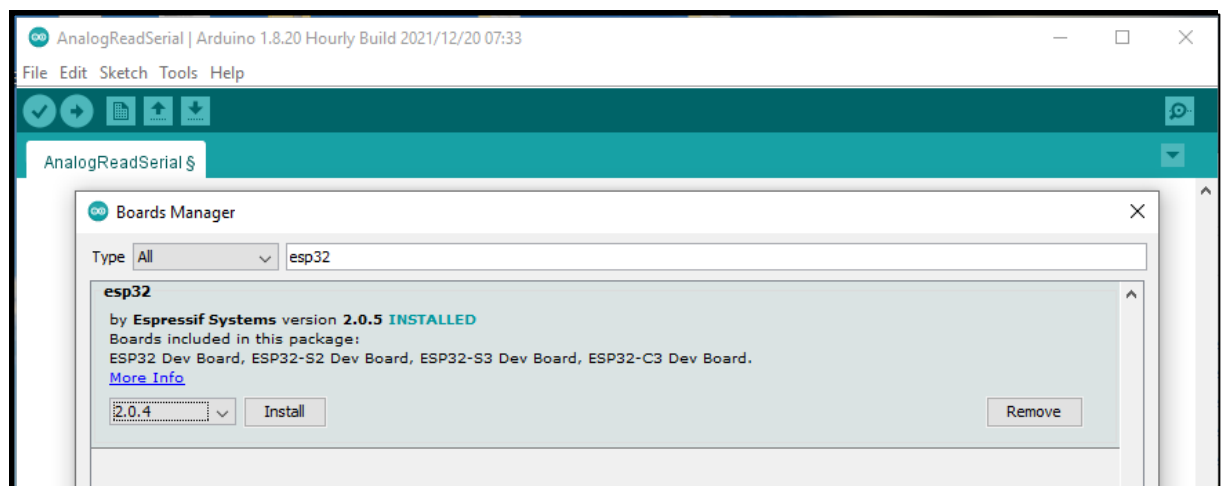
12. Go to: Tools → Manage Libraries…

13. In the search box, type "FabGL".

14. Choose the "FabGL" library by "Fabrizio Di Vittorio", version 1.0.8 or higher, and click Install.

15. Now, in your web browser, go to:
    https://github.com/breakintoprogram/agon-vdp/releases
    (Choose the latest release, even though this document is based on release 1.01).

16. There, click on: `Source code (zip)` to download the ZIP file:
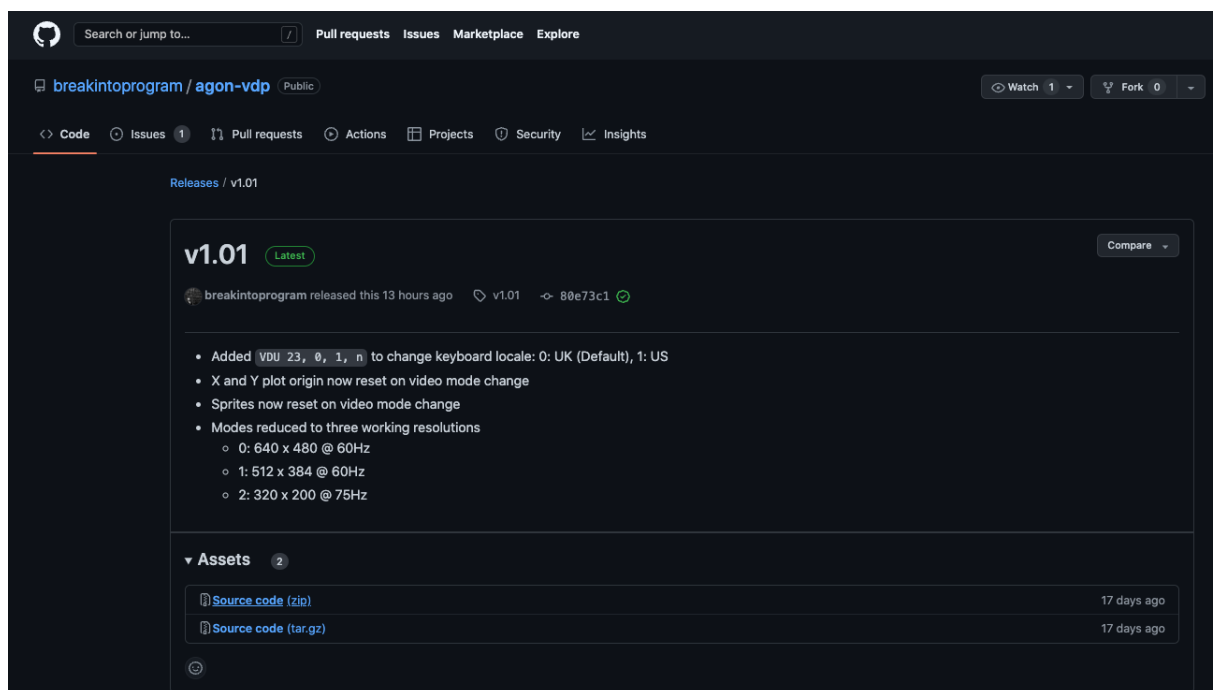
17. Uncompress the ZIP file in your Windows PC.

18. Back to the Arduino IDE, go to: `File` → `Open`

19. Then open the file "`video.ino`" that you have just downloaded and uncompressed.
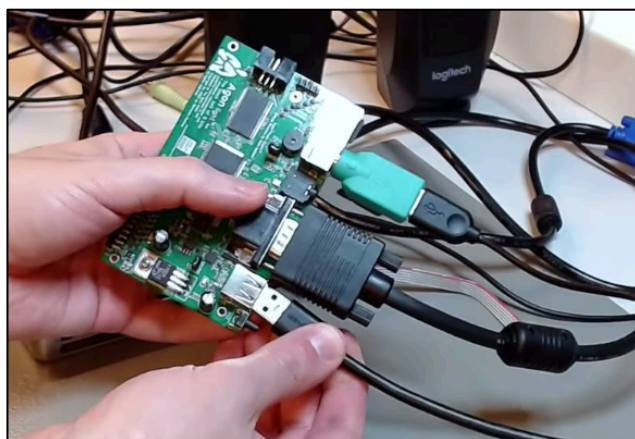
20. The Arduino IDE will ask if you want to place the sketch into a new folder. Click on OK to accept:
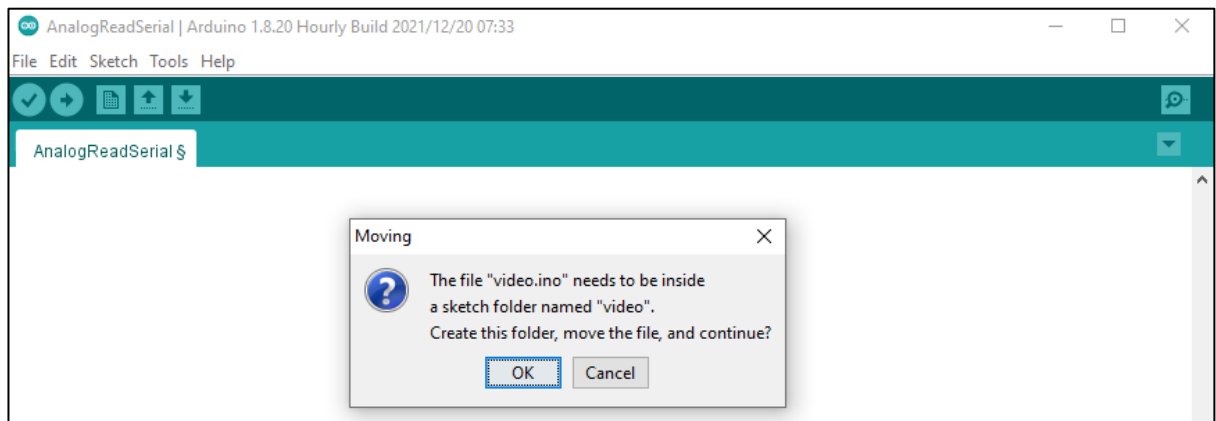
21. A new folder will be created with the name "`video`". Move all other files from the original uncompressed ZIP file into the new folder "`video`":
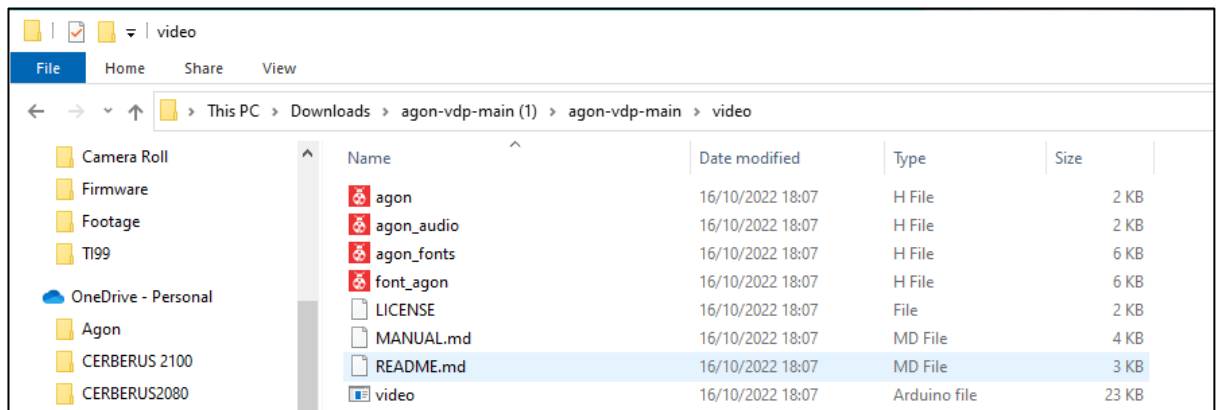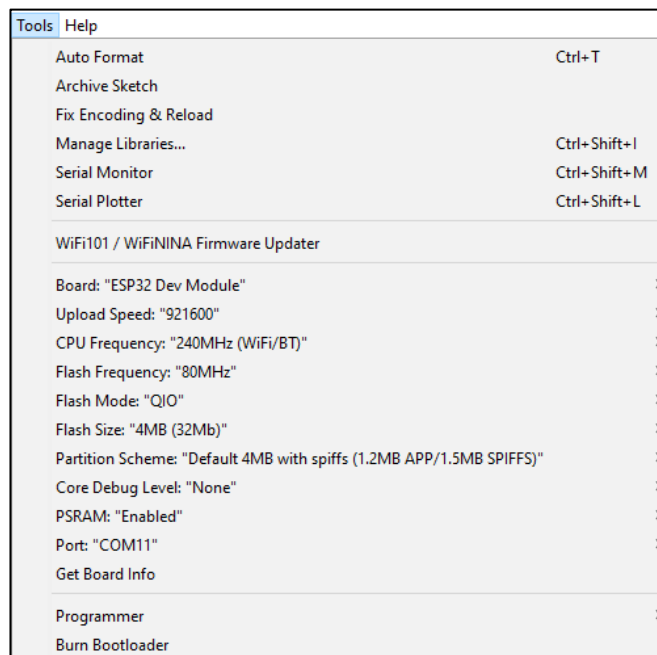

22. Connect the Agon light™ board to your Windows PC using a male-to-male (type-A to type-A) USB cable:

23. On the Arduino IDE, go to: `Tools` ➔ `Port` and choose the currently active port.

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24. The other settings under the `Tools` menu should be as follows:


```
Tools  Help
    Auto Format                                                    Ctrl+T
    Archive Sketch
    Fix Encoding & Reload
    Manage Libraries...                                            Ctrl+Shift+I
    Serial Monitor                                                 Ctrl+Shift+M
    Serial Plotter                                                 Ctrl+Shift+L

    WiFi101 / WiFiNINA Firmware Updater

    Board: "ESP32 Dev Module"                                             >
    Upload Speed: "921600"                                                >
    CPU Frequency: "240MHz (WiFi/BT)"                                     >
    Flash Frequency: "80MHz"                                              >
    Flash Mode: "QIO"                                                     >
    Flash Size: "4MB (32Mb)"                                              >
    Partition Scheme: "Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS)"  >
    Core Debug Level: "None"                                              >
    PSRAM: "Enabled"                                                      >
    Port: "COM11"                                                         >
    Get Board Info

    Programmer                                                            >
    Burn Bootloader
```

25. Now click on: `Sketch` → `Upload` and wait for the sketch to be compiled and uploaded into Agon light™ (it will take a few minutes).

26. The firmware of the ESP32 on the Agon light™ board is now uploaded.

27. In your web browser, go to:
    https://github.com/breakintoprogram/agon-mos/releases
    (Choose the latest release, even though this document is based on release 1.01).

28. Click on `Source code (zip)` to download the ZIP file.

29. Uncompress the ZIP file in your Windows PC. Among the uncompressed files, there will be one named "`MOS.zdsproj`".

30. In your web browser, go to:
    https://www.zilog.com/index.php?option=com_zcm&task=view&soft_id=54&Itemid=74

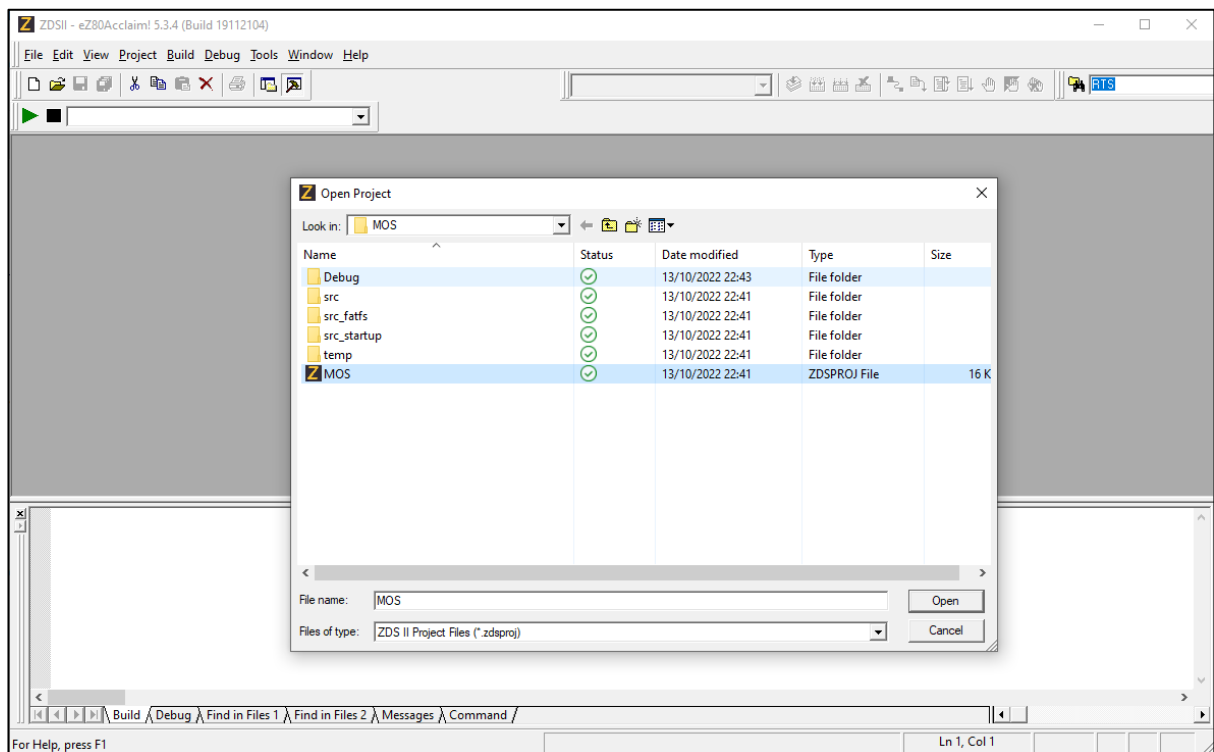31. Read and accept the Software License.

32. The ZDS2 IDE installation file will now be downloaded to your Windows PC.

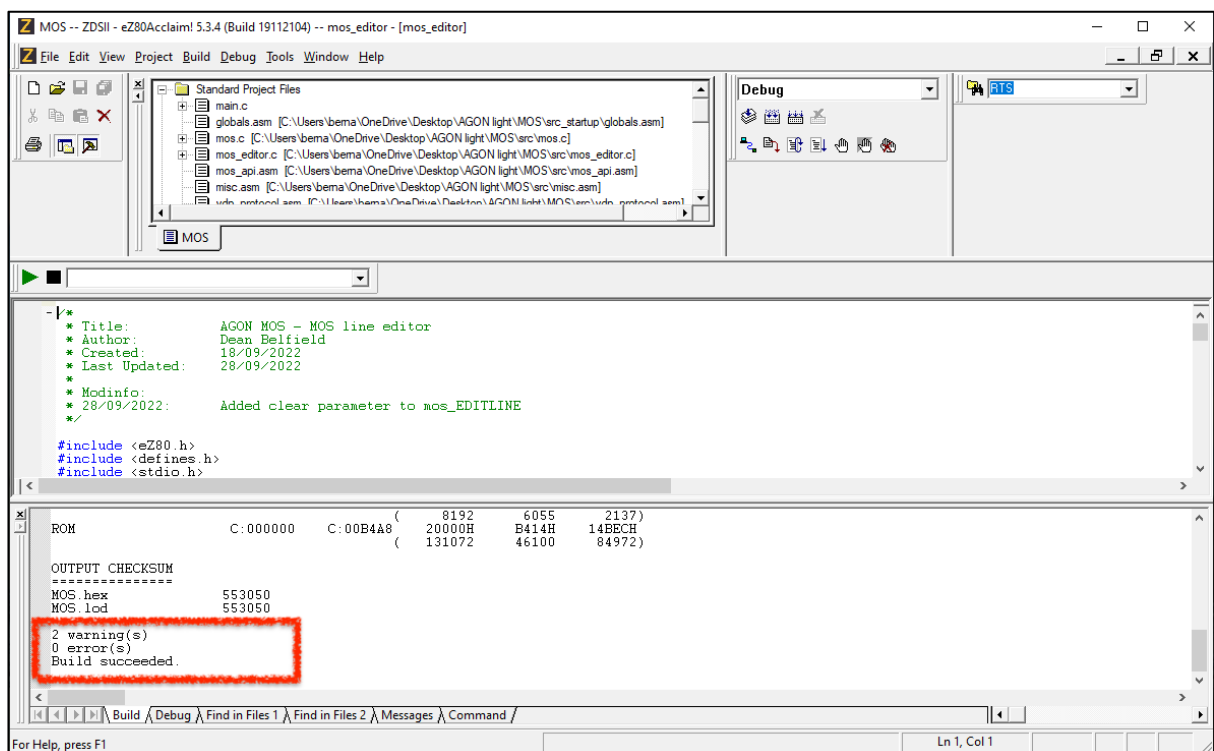33. Double-click on the downloaded ZIP file and install the ZDS2 IDE on your PC.

34. Open the ZDS2 IDE.

35. Go to: `File → Open project…`

36. Open the file "`MOS.zdsproj`" that you have downloaded earlier:

37. Click on: `Build → Rebuild all`. There should be no error messages (perhaps just a couple of warnings):

38. Now connect the Zilog USB Smart Cable with product number
ZUSBSC00100ZACG (discontinued) or ZUSBASC0200ZACG (current; requires
v5.3.5 or later of Zilog's ZDS-II IDE)* to your windows PC and to the ZDI port on
the Agon light™ board:
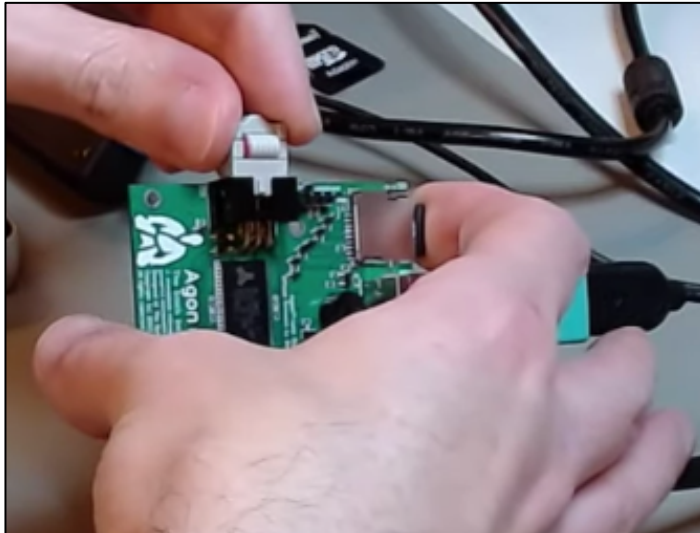
39. You may have to install the CP2104 device driver. If so, it can be found here:
https://www.silabs.com/developers/usb-to-uart-bridge-vcp-drivers?tab=downloads

40. Click on: Debug → Download Code. The project will now be downloaded into
the eZ80F92 in Agon light™'s board.

41. If the process was carried out correctly, you should get the following messages (the
checksum may vary depending on the version being installed):

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* The Zilog USB Smart Cable with product number ZUSBESC0200ZACG will _NOT_ work with Agon light™.
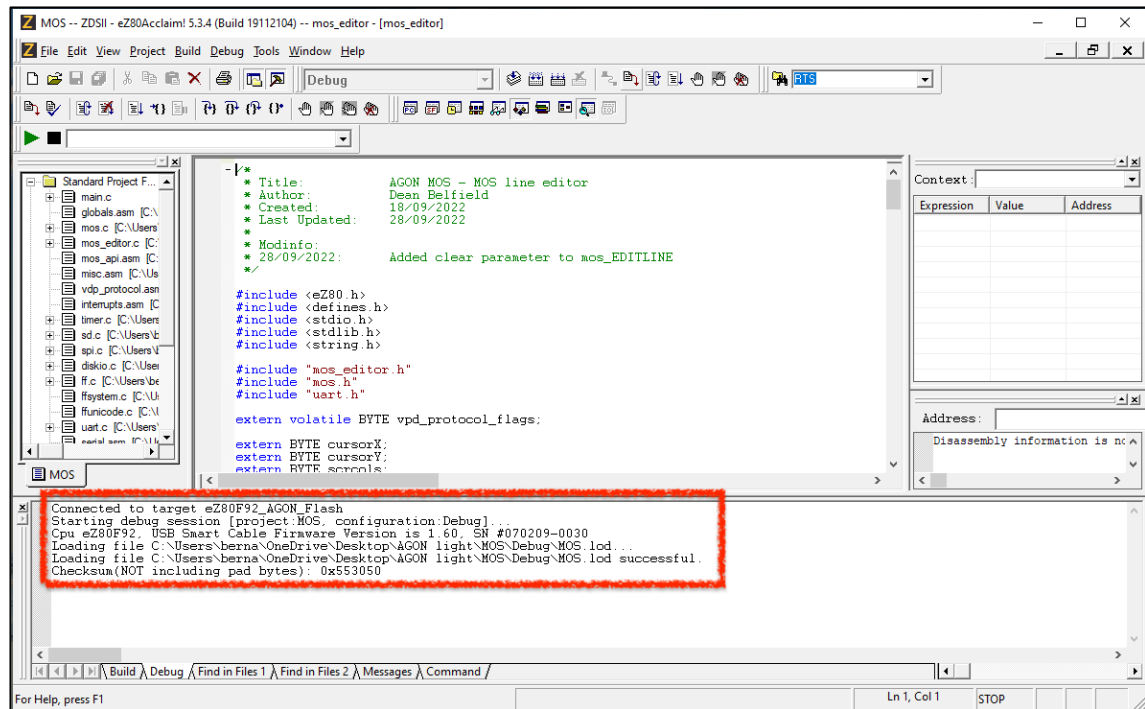
42. Now turn Agon light™ off by removing the USB cable from it. You can also close the ZDS2 IDE.

43. In your web browser, go to:
    https://github.com/TheByteAttic/AgonLight

44. Click on: `Code -> Download ZIP`

45. Uncompress the downloaded ZIP file in your Windows PC.

46. Enter the folder "`uSD card files`" by double-clicking it, then copy its contents.

47. Insert a *class-10* uSD card in your Windows PC (*pre-formatted as Fat32 and with a partition of maximum 32GB*).

48. Paste the contents of the folder "`uSD card files,`" which you've copied in step 46, onto the uSD card.

49. Eject the uSD card from your Windows PC.

50. Insert the uSD card into the Agon light™ board.

51. Connect a VGA monitor and a PS/2 keyboard (or a PS/2-compatible USB keyboard, via a PS/2 adapter) to the Agon light™ unit.

52. Turn the Agon light™ board on by connecting it to power via the USB cable:
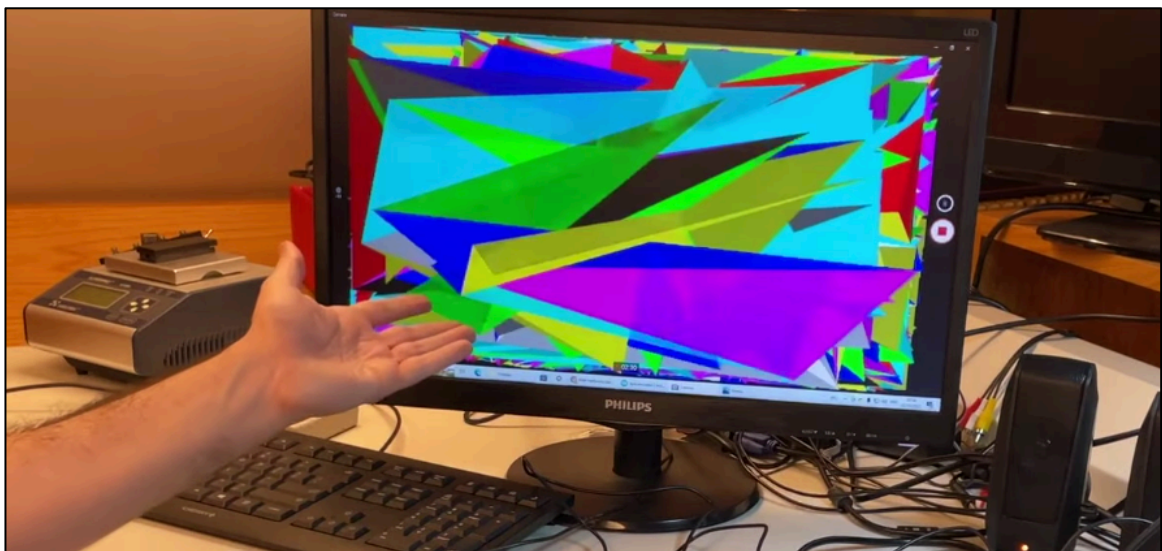
53. You should now see the following text on the screen:

54. You are now ready to test the Agon light™ unit. Type:
    LOAD "triangles.bbc"
    followed by ENTER.

55. Type "RUN" followed by ENTER.

56. You should now see random colored triangles being rendered on the screen:

57. Press ESC to stop execution

58. Now type:
    LOAD "sound.bbc"

followed by `ENTER`.

59. Type "`RUN`" followed by `ENTER`.

60. You should now hear tones coming from Agon light™'s piezo buzzer.

61. Press `ESC` to stop execution.

62. You are now done. If any step above is unclear, you can watch the following step-by-step video:
https://youtu.be/gztIQh_kIwM