Heber Agon Console8 user manual

80-23245-2

CONTENTS

1   INTRODUCTION

Thank you for looking at the Heber Agon Console8 retro computer system.

The Agon Console8 is a modern 8bit computer system based on the AgonLight made by Bernardo Kastrup from TheByteAttic™.

The original Agon firmware was developed by Dean Belfield and other contributors.

Heber and Bernardo have worked together on the design and development of the Agon Console8 system, to allow a wider audience of users to enjoy both gaming and coding on the Agon platform.

The Agon Console8 is 100% backwards compatible with the original AgonLight, the AgonLight2 and the Agon Origins edition.

The Agon Console8 has a number of enhancements to allow an elegant console form factor and an enhanced level of 'retro gaming' for two players, using the 9pin joypad/joystick standard (with two action buttons each).

Over time, developers plan to enhance both the sound capabilities and graphics modes / capabilities of the Agon Console8 platform. Make sure you check the links in this manual for updated firmware's for the machine operating system (MOS) and visual display processor (VDP), that can be updated on every Agon Console8.

This manual will focus on initial setup and getting started using the Agon Console8 platform, please also refer to the links for other community resources already available for the Agon range of 8bit electronics.

If you have any support questions or need any advice on using the system, please do not hesitate to contact Heber via The Retro Collective website www.retrocollective.co.uk or your local supplier or distributor.

For technical questions about this manual, technology or for any queries that Heber can provide, please contact shop@heber.co.uk Or visit the Heber website www.heber.co.uk

For orders and updates please see shop.heber.co.uk

The Agon Console8 is brought to you by Heber Ltd and The Retro Collective. Additional testing and collaboration with RMCRetro.

Agon Console8 complies with CE, UKCA and RoHS, REACH, documentation certificates are available if required.

2   AGON CONSOLE8

The Agon Console8 is a single board computer designed around an eZ80 8bit CPU running at ~18Mhz.

The eZ80 CPU has a high-speed serial link to a dedicated ESP32 microcontroller that handles the Video output, audio and connections for keyboard and mouse. The VDP can be updated using the Arduino IDE and a standard USB A-B cable.

Internal program storage is provided by a microSD card formatted with FAT32.

Firmware MOS (BIOS) has the ability to self-update from the micro SD card.

At the time of this manual publication the firmwares programmed into Agon Console8 are –

MOS at Version 1.04 RC2 - MOS Releases · breakintoprogram/agon-mos (github.com)

VDP is at Version 1.04 RC2 – VDP - Releases · breakintoprogram/agon-vdp (github.com)

Please check the official firmware repositories for updates and changes –

If you wish to use BBC BASIC, the bbcbasic.bin file will need to be added to the base level of your SD Card – BBC Basic Releases · breakintoprogram/agon-bbc-basic (github.com)

2.1 Agon Console8 – front

Two 9 pin D-type Joystick/Joypad ports are provided with direct I/O connected to the eZ80 CPU for high-speed reading of inputs for games and applications.

A power switch is provided along with a hardware reset button (break) and power LED.
Before you power on the unit, please check that you only have one power source connected.
Do not plug in both power sources (5V DCPSU & USB) in at the same time.

2.2 Agon Console8 – back

To get the most out of the Agon Console8 system a keyboard is recommended. The Keyboard required for Agon Console8 neds to have a USB connection that uses the PS/2 protocol. These keyboards can be a little tricky to identify, we have a dedicated Agon Console8 keyboard available. This is a German USB keyboard manufactured by Perixx – Part number PERIBOARD-409 10855. If you source your own keyboard from Perixx or a different manufacturer, please make sure it supports the PS/2 protocol over USB.

A standard round mini-DIN PS/2 mouse is also supported at the same time.

In future firmware updates it may be possible to switch around the USB keyboard port and mouse mini-DIN if you already have a mini-DIN keyboard and a USB mouse that supports the PS/2 protocol -note this function is not yet available.

3   CONNECTING UP AGON CONSOLE8 – EXAMPLE SETUP

To get started with Agon Console8, simply connect up a 5V power source to the USB-B input or the DC input jack, in the example below a standard 5V USB charger is used to provide power via USB-B.

Next, connect a VGA cable, USB keyboard that can use the PS/2 Protocol and an optional PS/2 mouse.
One or two Joypads / Joysticks can also be connected to the dual DE9 connectors on the front of the Agon Console 8.
An SD card is required to load programs into Agon Console8. The unit will still boot into MOS without an SD card installed, but BBC Basic will not run.

3.1   Joypad support

Agon Console8 supports two 2-button joypad / Joystick interfaces (See section 5.1 for connection details).

If you have purchased a deluxe Agon Console8 kit or a separate Heber Agon Console8 Joypad, these joypads are fully assembled and ready to use.

- Heber part number for the Agon Console8 Joypad - 01-23263-1

The Joypad PCB is a set of passive switches and a 9-way d-type cable, no active electronics are used, just like traditional joysticks from the 80's.
It's just a simple case of connecting the Joypad to the Agon Console8, port 1 or 2.

You are also welcome to use almost any other type of classic 'Atari / Commodore style' 9pin joypad or joysticks. Most should work just fine with the Agon Console8. Some older types may only have one button, where Agon Console8 supports two action buttons in a similar configuration to the Sega Mastersystem.

3.2 Joypad testing ('type in' BBC BASIC listing)

In the spirit of BBC Basic type in listings, here is a simple way to check your Joypad / Joystick is operating in both Port 1 and Port 2. We made a few minor modifications to the code, thank you to EIGHTBITSWIDE for the original listing.

```
10 REM ****************************
20 REM * JOYSTICK PORT A & B TEST *
30 REM * 2 BUTTON JOYSTICK TEST   *
40 REM *   BY EIGHTBITSWIDE        *
50 REM *   AND HEBER LTD           *
60 REM ****************************
70 UP1=253
80 DOWN1=247
90 LEFT1=223
100 RIGHT1=127
110 FIREA=215
120 FIREB=119
130 UP2=254
140 DOWN2=251
150 LEFT2=239
160 RIGHT2=191
170 FIRE2A=231
180 FIRE2B=183
190 SOUND 0,-12,45,2
200 SOUND 0,-12,41,2
210 SOUND 0,-12,45,2
220 SOUND 0,-12,41,2
230 SOUND 0,-12,45,2
240 SOUND 0,-12,41,2
250 SOUND 0,-12,45,2
260 SOUND 0,-12,41,2
270 PRINTTAB(0,0)
280 PRINT "Heber Agon Console8 Joypad Test"
290 PRINT "For 2 Button Joypads and 2 players"
300 PRINT "*********************************"
310 PRINT " "
```

```
 320 PRINT " "
 330 PRINT "158 = ";:PRINT GET(158)
 340 PRINT "162 = ";: PRINT GET(162)
 350 PRINT
360 X=GET(158)
370 IF (X AND UP1) = X THEN PRINT "Player 1 UP            "
380 IF (X AND UP2) = X THEN PRINT "Player 2 UP            "
390 IF (X AND DOWN1)=X THEN PRINT "Player 1 DOWN          "
400 IF (X AND DOWN2)=X THEN PRINT "Player 2 DOWN          "
410 IF (X AND LEFT1)=X THEN PRINT "Player 1 LEFT          "
420 IF (X AND LEFT2)=X THEN PRINT "Player 2 LEFT          "
430 IF (X AND RIGHT1)=X THEN PRINT "Player 1 RIGHT         "
440 IF (X AND RIGHT2)=X THEN PRINT "Player 2 RIGHT         "
450 X=GET(162)
460 IF (X AND FIREA)=X THEN PRINT "Player 1 FIRE !!!!! (A)  "
470 IF (X AND FIREB)=X THEN PRINT "Player 1 JUMP (B)       "
480 IF (X AND FIRE2A)=X THEN PRINT "Player 2 FIRE !!!!! (A) "
490 IF (X AND FIRE2B)=X THEN PRINT "Player 2 JUMP (B)       "
500 Y=Y+1 : IF Y=50 THEN CLS:Y=0
510 PRINT"TYPE '1' To PLAY Sound";
520 INPUT A
530 IF A<>1 THEN 190
540 GOTO 270
```

4   POWER ON AND FIRST PROGRAM

Slide the power switch and the red power LED will light, in just a few seconds
If you have an SD card with **bbcbasic.bin** copied over, then you will see the following message on the monitor connected to the VGA port.
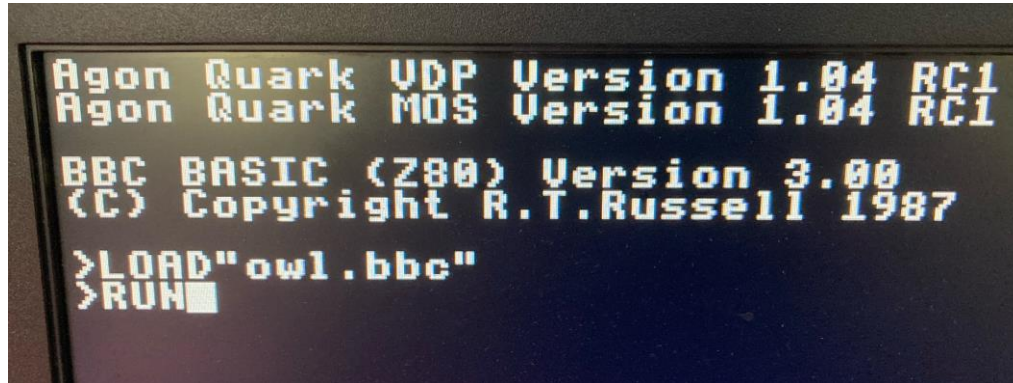
If you type *DIR
You will see the contents of the current directory on the SD card.

If some BBC basic files have been copied over to the SD card, then you can load and run with the following command – example is the owl sprite demo

LOAD"owl.bbc"
RUN
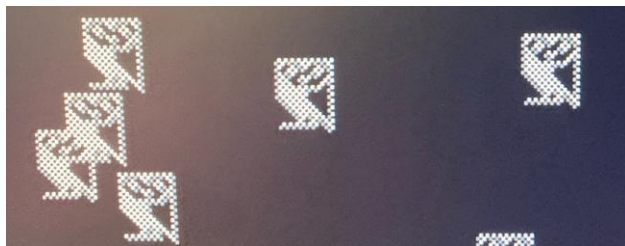
Various owl sprites will appear and move around on the screen.

If you wish to exit out of BBCBasic, the command *BYE will drop you back into the raw MOS mode, resetting the system will get you back into BBCBasic.

5   TECHNICAL REFERENCE

5.1   Agon Console8 – joypad / joystick interface

Two 9 pin D-type Joystick/Joypad ports are provided with direct I/O connected to the eZ80 CPU for high-speed reading of inputs for games and software applications. eZ80 Port PCx and PDx

PC1: Up A
PC3: Down A
PC5: Left A
PC7: Right A
PD5: Button 1 A
PD7: Button 2 A

PC0: Up B
PC2: Down B
PC4: Left B
PC6: Right B
PD4: Button 1 B
PD6: Button 2 B

JOYSTICK A   JOYSTICK B
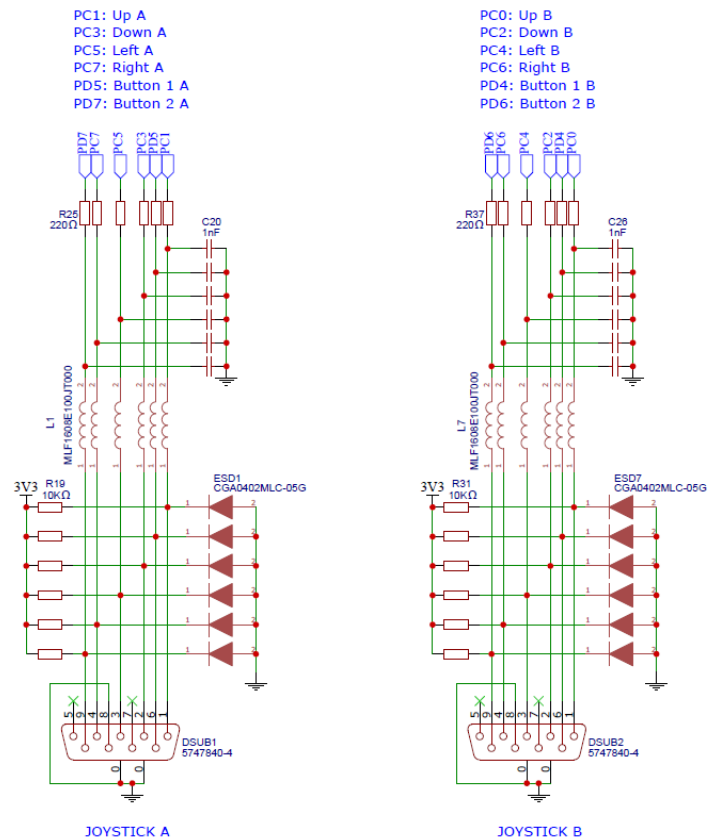
They are designed to use a two button SEGA Mastersystem pad / stick, but any Amiga/Atari single button joystick will work.

The other main difference for Agon Console8 compared to other Agon systems is the 40 way female expansion port.

Console8 Expansion port (for expansion and extra video output options)
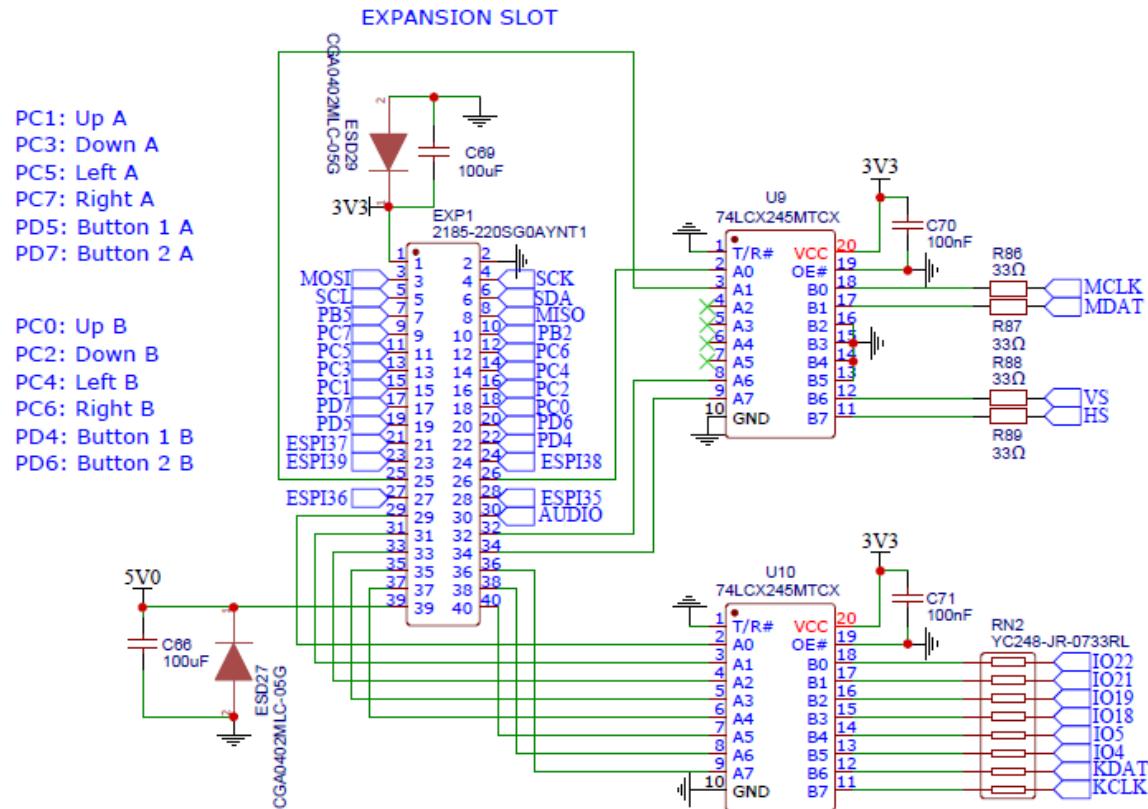
Keyboard, Mouse, all I/O including both the Joypad interfaces, Video signals and audio are all available on the EXP1 expansion connector.

5.2 Agon Console8 – Full Schematic

PC1: Up A
PC3: Down A
PC5: Left A
PC7: Right A
PD5: Button 1 A
PD7: Button 2 A

PC0: Up B
PC2: Down B
PC4: Left B
PC6: Right B
PD4: Button 1 B
PD6: Button 2 B

SYSTEM MEMORY

U4
AS7C34096A-10TCN

R25
220Ω

C20
1nF

R37
220Ω

C26
1nF

L1
MLF1608E100JT000

L7
MLF1608E100JT000

ESD1
CGA0402MLC-05G

ESD7
CGA0402MLC-05G

3V3 R19
10KΩ

3V3 R31
10KΩ

DSUB1
5747840-4

DSUB2
5747840-4

JOYSTICK A

JOYSTICK B

3V3

C32
10 F

C33
100nF

C36
100nF

C37
10 F

3V3

CLOCK OSCILLATOR

3V3

OSC1
ASV-18.432MHZ-EJ-T

R45
33Ω

CLK

C34
10nF

10KΩ
R44

VDD
TRI-STATE_ENABLE/DISABLE

OUTPUT
GND/CASE

RESET (OPEN COLLECTOR)

3V3

3V3

R43
10KΩ

U5
APX803S-29SA-7

GND   VCC
RSET#

C38
100nF

C35
1 F

RST1
TS-1093A-A12B3-D2

!RST/EN
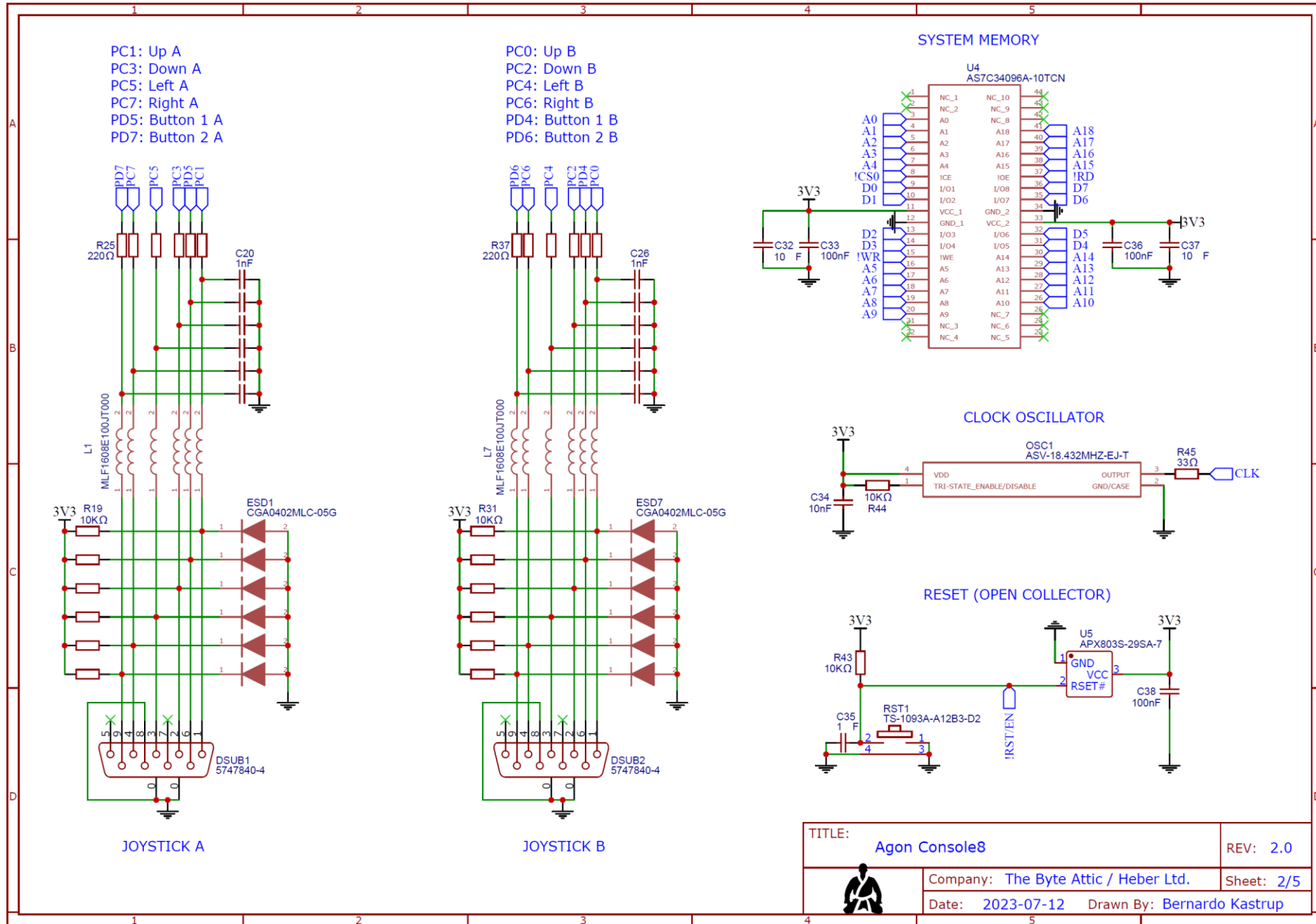
TITLE:		REV:	2.0
Agon Console8			
Company: The Byte Attic / Heber Ltd.		Sheet:	2/5
Date: 2023-07-12	Drawn By: Bernardo Kastrup		
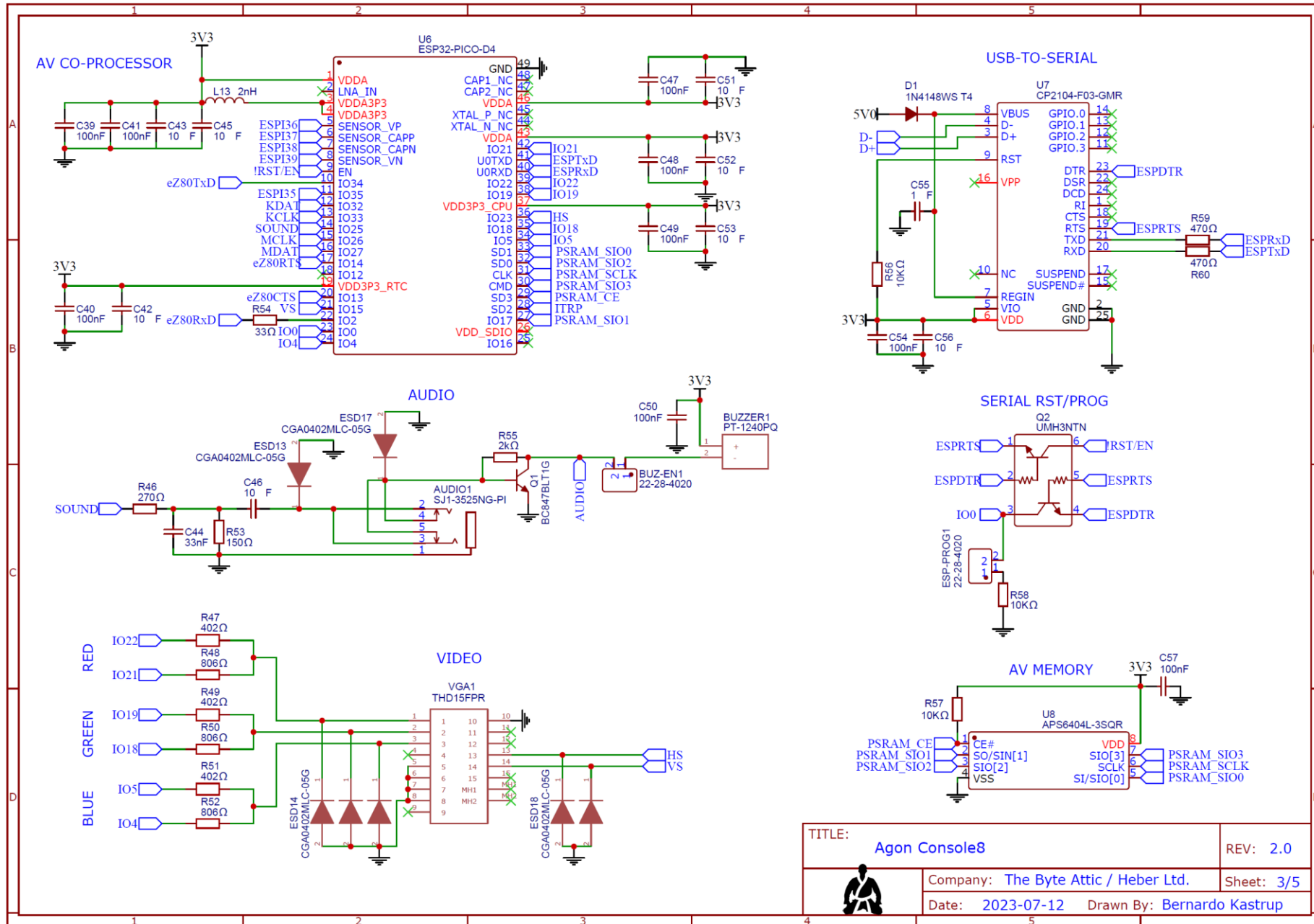
Agon Console8

REV: 2.0

Company: The Byte Attic / Heber Ltd.

Sheet: 3/5

Date: 2023-07-12   Drawn By: Bernardo Kastrup

MOUSE

KEYBOARD

PSU
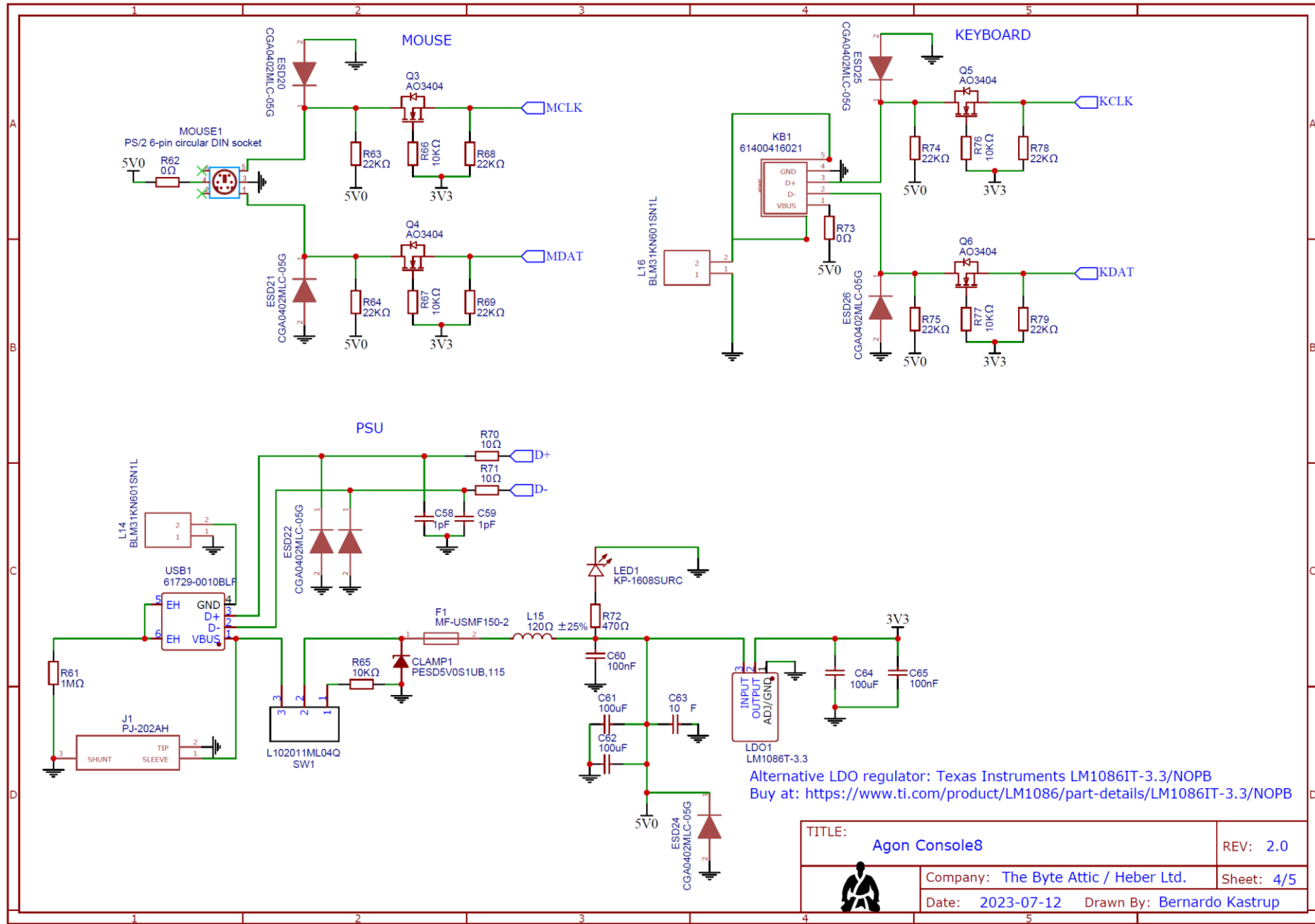
Alternative LDO regulator: Texas Instruments LM1086IT-3.3/NOPB
Buy at: https://www.ti.com/product/LM1086/part-details/LM1086IT-3.3/NOPB

TITLE: Agon Console8

REV: 2.0

Company: The Byte Attic / Heber Ltd.

Sheet: 4/5

Date: 2023-07-12   Drawn By: Bernardo Kastrup

EXPANSION SLOT

PC1: Up A
PC3: Down A
PC5: Left A
PC7: Right A
PD5: Button 1 A
PD7: Button 2 A

PC0: Up B
PC2: Down B
PC4: Left B
PC6: Right B
PD4: Button 1 B
PD6: Button 2 B

ESD29
CGA0402MLC-05G

C69
100uF

3V3

EXP1
2185-220SG0AYNT1

MOSI
SCL
PB5
PC7
PC5
PC3
PC1
PD7
PD5
ESPI37
ESPI39
ESPI36

SCK
SDA
MISO
PB2
PC6
PC4
PC2
PC0
PD6
PD4
ESPI38
ESPI35
AUDIO

5V0

C66
100uF

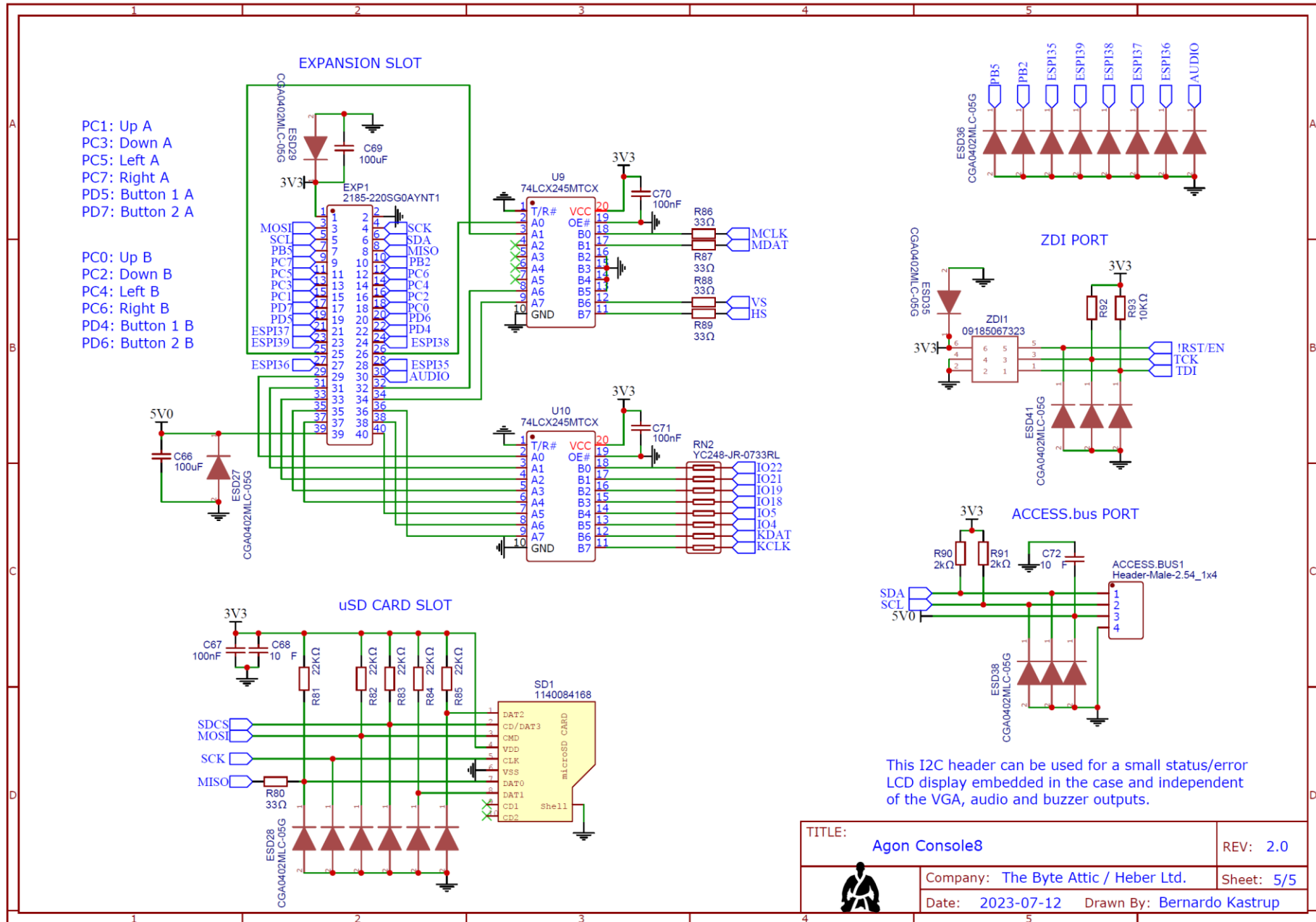ESD27
CGA0402MLC-05G

3V3

C70
100nF

U9
74LCX245MTCX

T/R#   VCC
A0   OE#
A1   B0
A2   B1
A3   B2
A4   B3
A5   B4
A6   B5
A7   B6
GND   B7

R86
33Ω
MCLK
MDAT

R87
33Ω

R88
33Ω
VS
HS

R89
33Ω

3V3

C71
100nF

U10
74LCX245MTCX

T/R#   VCC
A0   OE#
A1   B0
A2   B1
A3   B2
A4   B3
A5   B4
A6   B5
A7   B6
GND   B7

RN2
YC248-JR-0733RL

IO22
IO21
IO19
IO18
IO5
IO4
KDAT
KCLK

PB5
PB2
ESPI35
ESPI39
ESPI38
ESPI37
ESPI36
AUDIO

ESD36
CGA0402MLC-05G

ZDI PORT

ESD35
CGA0402MLC-05G

3V3

3V3

ZDI1
09185067323

6 5
4 3
2 1

R92
R93
10KΩ

!RST/EN
TCK
TDI

ESD41
CGA0402MLC-05G

ACCESS.bus PORT

3V3

R90
2kΩ
R91
2kΩ
C72
10 F

ACCESS.BUS1
Header-Male-2.54_1x4

SDA
SCL
5V0

1
2
3
4

ESD38
CGA0402MLC-05G

This I2C header can be used for a small status/error
LCD display embedded in the case and independent
of the VGA, audio and buzzer outputs.

uSD CARD SLOT

3V3

C67
100nF
C68
10 F

R81 R82 R83 R84 R85
22KΩ 22KΩ 22KΩ 22KΩ 22KΩ

SD1
1140084168

SDCS
MOSI

SCK

MISO

R80
33Ω

DAT2
CD/DAT3
CMD
VDD
CLK
VSS
DAT0
DAT1
CD1   Shell
CD2

microSD CARD

ESD28
CGA0402MLC-05G

TITLE: Agon Console8		REV: 2.0
Company: The Byte Attic / Heber Ltd.		Sheet: 5/5
Date: 2023-07-12	Drawn By: Bernardo Kastrup	

6   AGON CONSOLE8 SD CARD

The Agon Console8 has the main MOS (Machine Operating System) and VDP (Video Display System) already flashed onto the main board. These can be updated as needed via the SD card.

For loading of BBCBasic and any other program you will require a SD Card with at least the following files added

The minimum number of files you require on your SD card in the root directory are shown below –

autoexec.txt
bbcbasic.bin

When the Agon Console8 boots, it will read the autoexec.txt from the SD card and follow the commands (shown below) to boot BBCBasic and any other programs or settings you require.

Listed below is the contents of the autoexec.txt file (example, feel free to use or modify as required)

SET KEYBOARD 0
LOAD bbcbasic.bin
CD new
RUN . JOYTESTH2.BAS

The above command sets the Keyboard to be UK
BBCBasic is loaded into memory
We change directory to 'new' – if BBCBasic programs are added here, we will see them and be able to run them from the command prompt as per the power on first example in section 4 above.

You can add directories for games, demos and flash utilities as required. Please read the full documentation (links in section 7 below) for details of all the Agon & Agon Console8 utilities and software available.

Example SD Card setup -

Developers	23/01/2024 10:37	File folder	
examples	23/01/2024 10:37	File folder	
games	23/01/2024 10:37	File folder	
mos	23/01/2024 10:37	File folder	
new	23/01/2024 10:37	File folder	
tests	23/01/2024 10:37	File folder	
VDP_Updates	23/01/2024 10:37	File folder	
autoexec.txt	06/12/2023 12:56	Text Document	1 KB
bbcbasic.bin	28/11/2023 10:25	BIN File	16 KB
flash_legacy.bin	19/04/2023 10:47	BIN File	7 KB
MOS.bin	07/09/2023 17:04	BIN File	54 KB
zMOS.bin	02/05/2023 15:02	BIN File	49 KB

7 AGON CONSOLE8 DOCUMENTATION AND LINKS

The Agon Console8 may not require a dedicated set of manuals, this overview guide is designed to provide links to the already well developed Agon eco-system.

If in doubt, do check out Dean Belfield (breakintoprogram) GitHub pages for the latest updates to documentation, firmware and other utilities - **breakintoprogram (Dean Belfield) (github.com)**

Development Tools –
Flash Upgrade tool - **GitHub - envenomator/agon-flash: Agon MOS firmware upgrade utility**

Ref Documentation –
Sprite in BBC Basic - **GitHub - sandergroen/OWL: BBC Micro owl sprite Agon Light**

Agon – Console8 BBC Basic manual -
GitHub - oldpatientsea/agon-bbc-basic-manual: Adaptation of R.T. Russell's BBC BASIC (Z80) Manual to describe the implementation of BBC BASIC on the Agon light™ and AgonLight 2
GitHub - oldpatientsea/agon-notes-and-examples: Notes about and code examples for the Agon light™ and AgonLight2

7.1 Agon Console8 – PC Emulator

There is an emulator for the Agon Light, Agon Light 2, and Agon Console8 8-bit computers.

tomm/fab-agon-emulator: Agon Light, Agon Light 2, Agon Console8 Emulator for Linux, Windows, any system with libSDL (github.com)

Windows release (V0.7.5 at time of this document) – **Releases · tomm/fab-agon-emulator (github.com)**

8   COMMUNITY AGON DOCUMENTATION AND LINKS

This section is provided to share a number of links, websites and repositories from the wider Agon community. These resources are not specific to Agon Console8, but as they are based around the Agon project, many of these resources will be fully compatible with Agon Console8.

Main website for The Byte Attic™ (original designer of Agon platform) -
https://www.thebyteattic.com/2022/04/announcing-agon.html [Agon Light™, the black-belt of 8 bits | The Byte Attic™](https://www.thebyteattic.com/2022/04/announcing-agon.html)

Search GitHub - [agon-light · GitHub Topics · GitHub](https://github.com)

https://github.com/TheByteAttic/AgonLight
SDCard_Source Files - [AgonLight/uSD card files at main · TheByteAttic/AgonLight · GitHub](https://github.com)

Games –
[GitHub - pngwen/agon-bas: Some of my favorite BASIC programs for the Agon Light](https://github.com)

Utilities –
[GitHub - lennart-benschop/agon-utilities: MOS utilities for Agon: copy, view, editor...](https://github.com)

Video examples – Agon Facebook group:
https://www.facebook.com/groups/agoncomputer/permalink/1246200102748036
https://www.facebook.com/groups/agoncomputer/permalink/1238338956867484
https://www.facebook.com/groups/agoncomputer/posts/1239246753443371/
https://www.facebook.com/groups/agoncomputer/posts/1219315962103117/
https://www.facebook.com/groups/agoncomputer/posts/1253829185318461/
https://www.facebook.com/groups/agoncomputer/posts/1249217952446251/