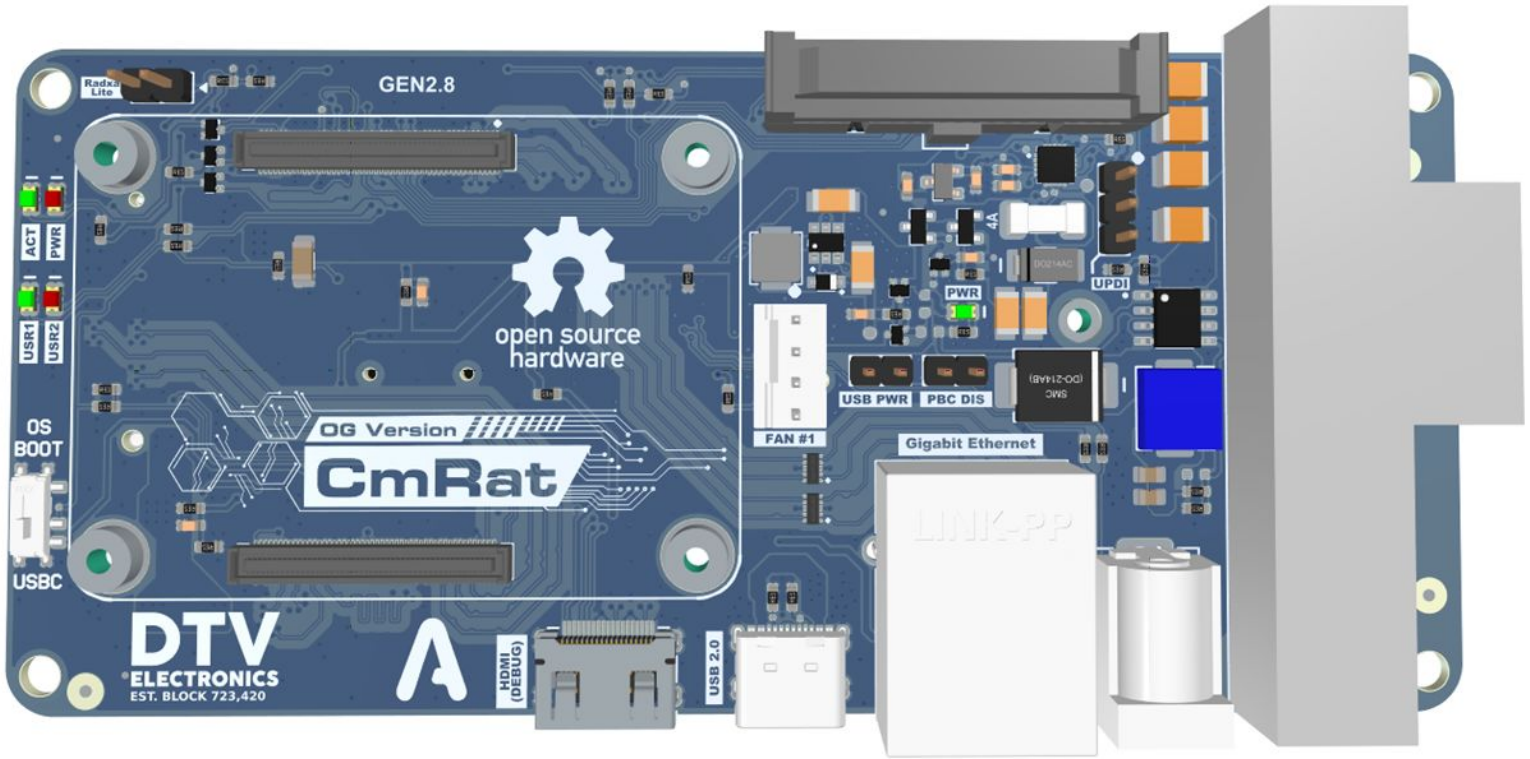
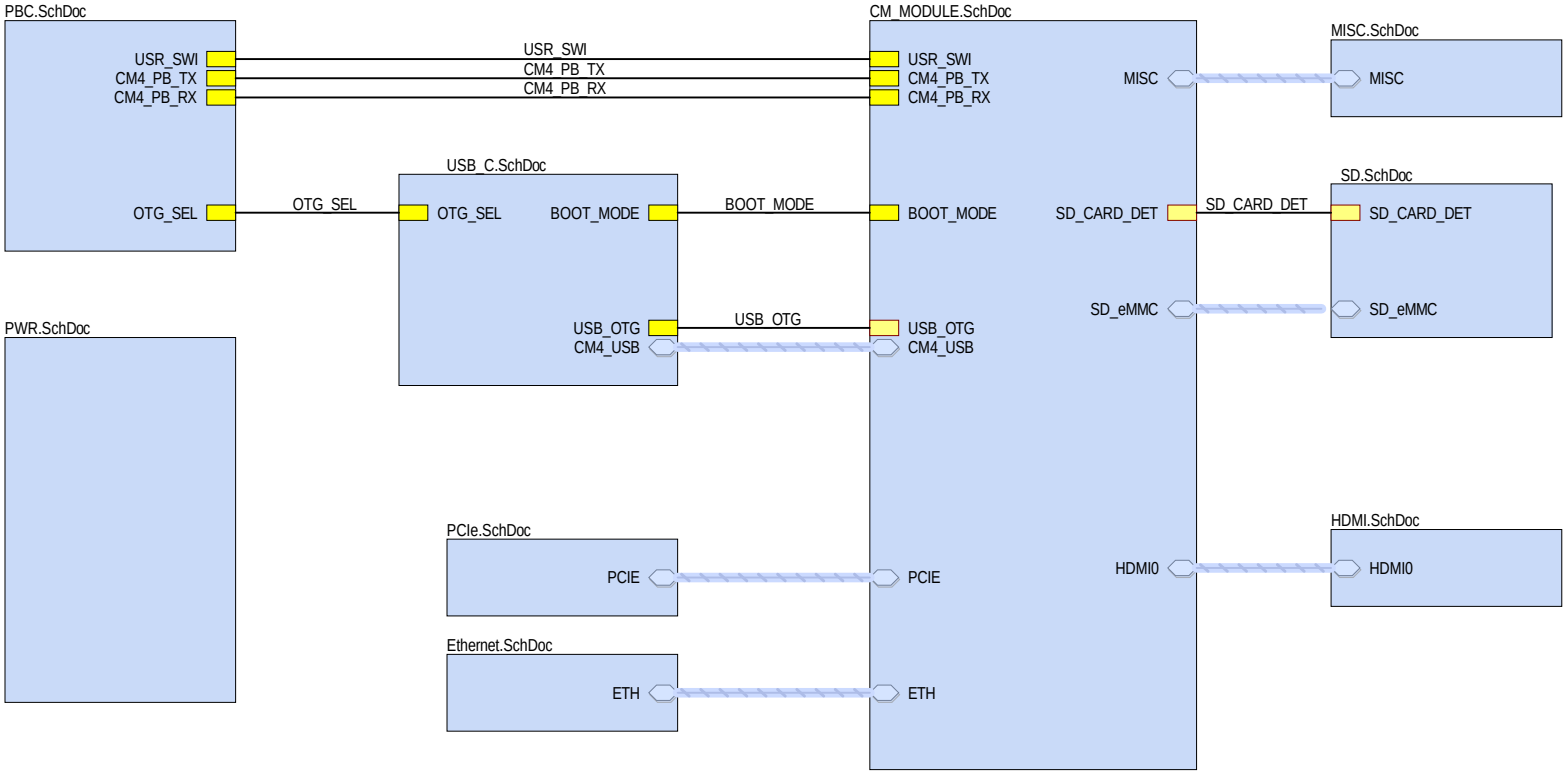
# CMRat Computer (GEN2.8)

Cannot open file G:\Mój dysk\Praca\Kaico\GFX\MiXXjugo.png. File does not exist.




open source hardware

| | |
|---|---|
| Title: COVER PAGE.SchDoc | |
| Project: CMRat Computer | Version V2.8 |
| Variant: FULL | |

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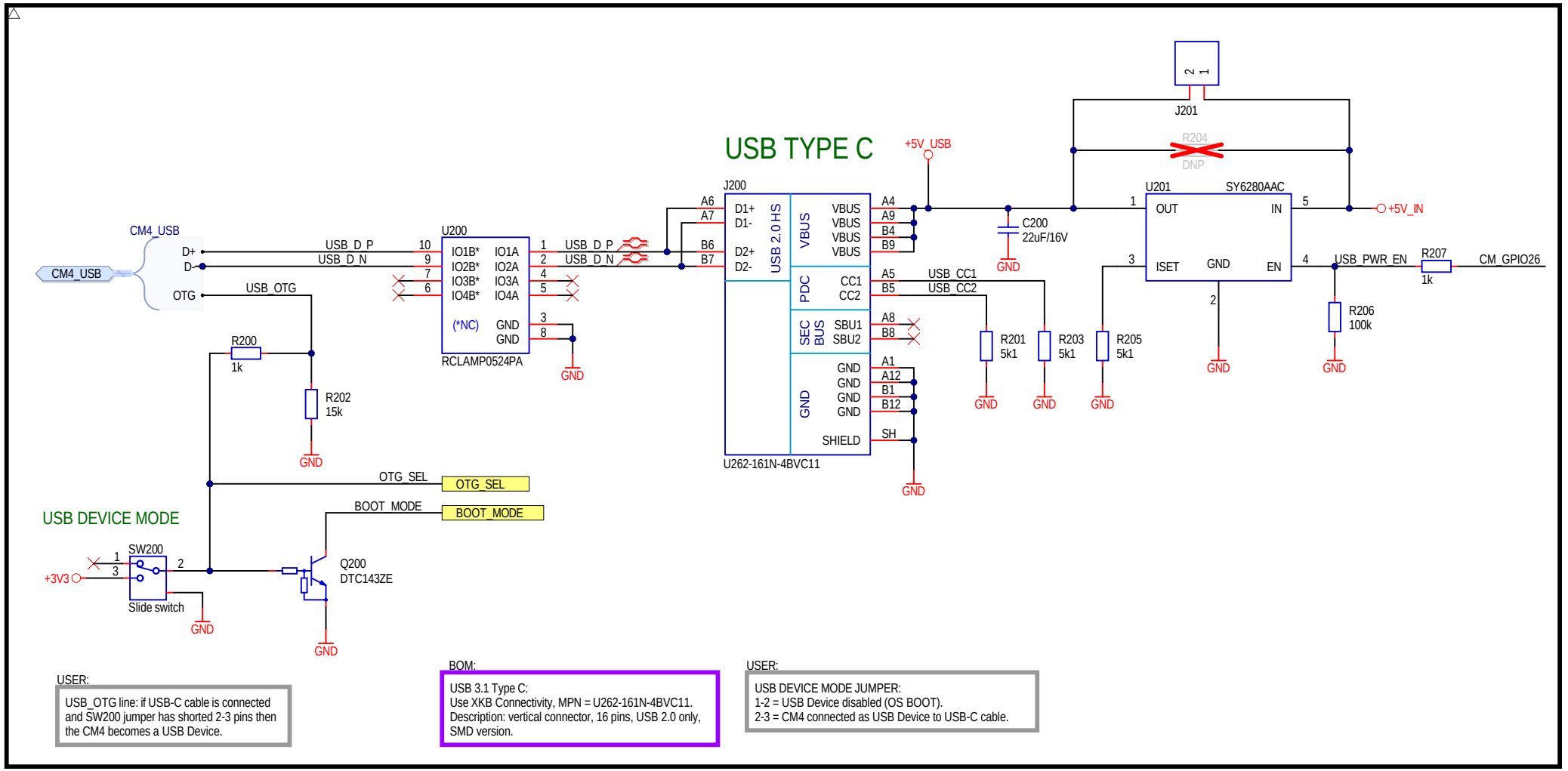
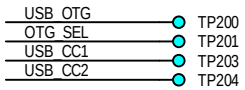
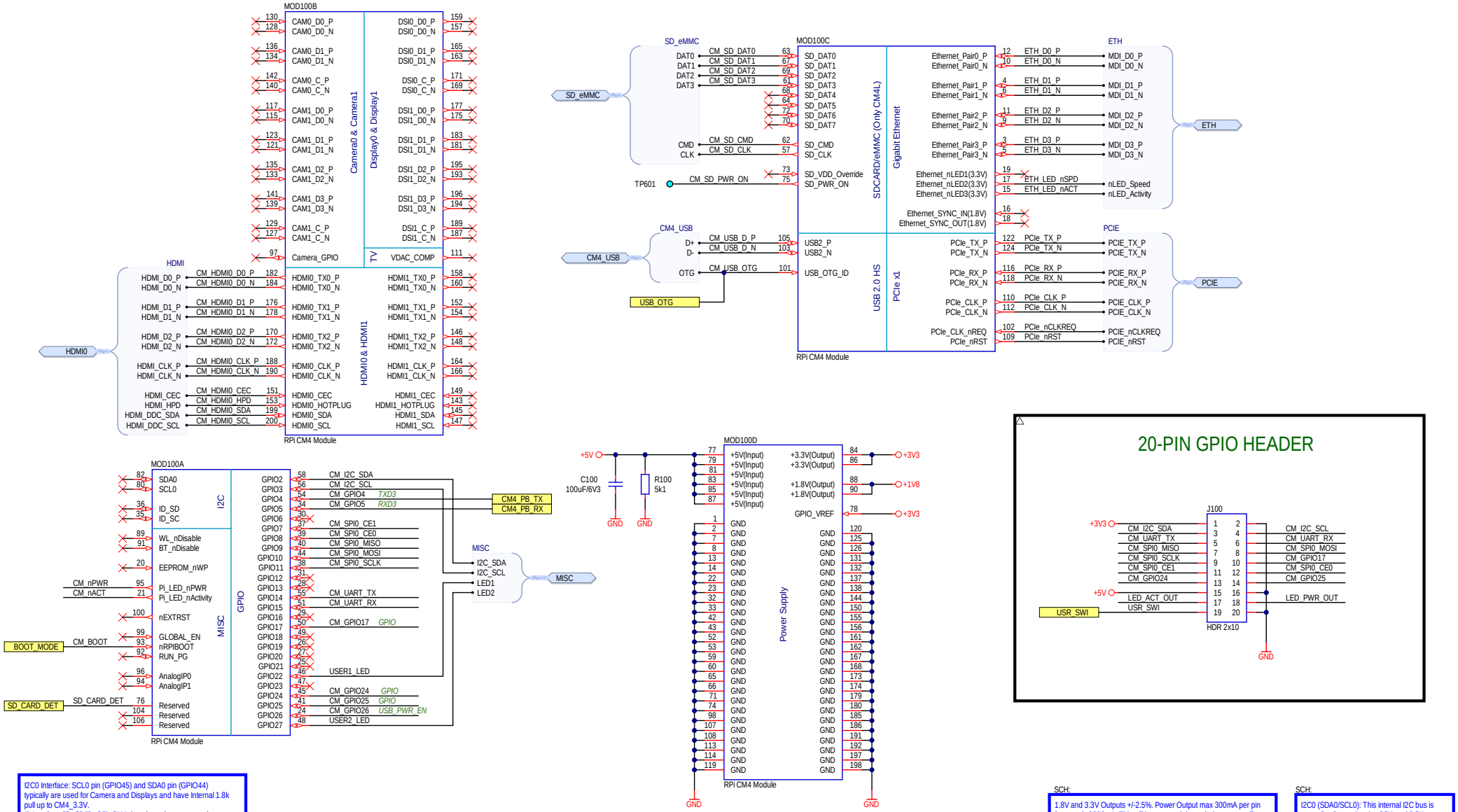
|---|---|
| Title | TOP.SchDoc |
| Project: | CMRat Computer |
| Variant: | FULL |
| Version | V2.8 |




## TESTPOINTS (DEBUG)




| | |
|---|---|
| Title | USB_C.SchDoc |
| Project: | CMRat Computer |
| Variant: | FULL |
| Version | V2.8 |




I2C0 Interface: SCL0 pin (GPIO45) and SDA0 pin (GPIO44) typically are used for Camera and Displays and have Internal 1.8k pull up to CM4_3.3V.
ID Interface (ID_SD/ID_SC): CM4 datasheet does not mention about pull-up resistors on ID_SD and ID_SC pins.

I2C1 (GPIO2/GPIO3) have 1.8k pull-up resistors added on CM 4 module.

SCH:
USB_OTG_ID: Input (3.3V signal) USB OTG Pin. Internal pulled up. The USB_OTG pin is used to select between USB host and device that is typically wired to the ID pin of a Micro usb connector. To use this functionality it must be enabled in the O S that is used. If using either as a fixed slave or fixed master, please tie the USB OTGID pin to ground.

SCH:
1.8V and 3.3V Outputs +/-2.5%. Power Output max 300mA per pin for a total of 600mA. This will be powered down during power off or GLOBAL_EN being set low.

SCH:
I2C0 (SDA0/SCL0): This internal I2C bus is normally allocated to the CSI1 and DSI1 as these devices are controlled by the firmware.

SCH:
I2C (ID_SD/ID_SC): This I2C bus is normally used for identifying HATs (HAT ID EEPROM) and controlling CSI0 and DSI0 devices.

At boot time this I2C interface will beinterrogated to look for an EEPROM that identifes the attached board andallows automagic setup of the GPIOs (and optionally, Linux drivers).

DO NOT USE these pins for anything other than attaching an I2C ID EEPROM. Leave unconnected if ID EEPROM not required.

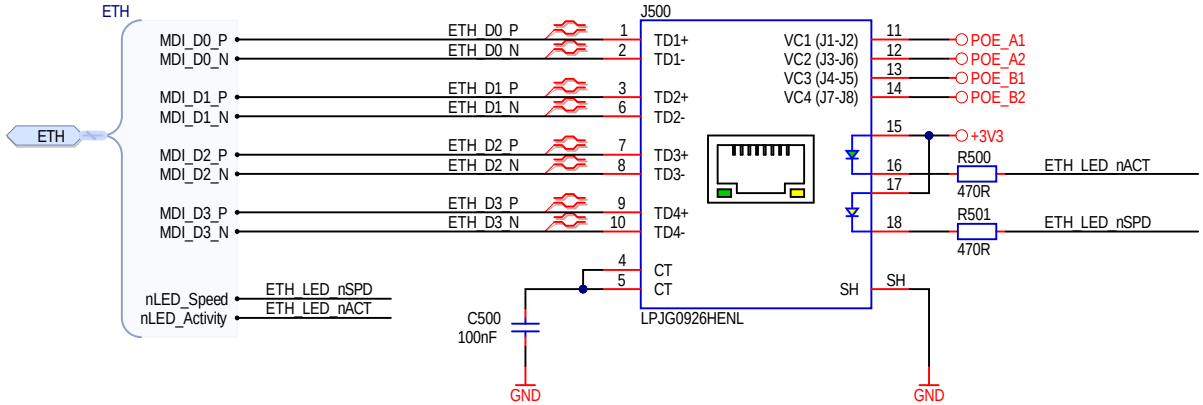
SCH:
nRPIBOOT: A low on this pin force booting from an RPI server. If not used leave floating. Internally pulled via 10K to +3.3V.

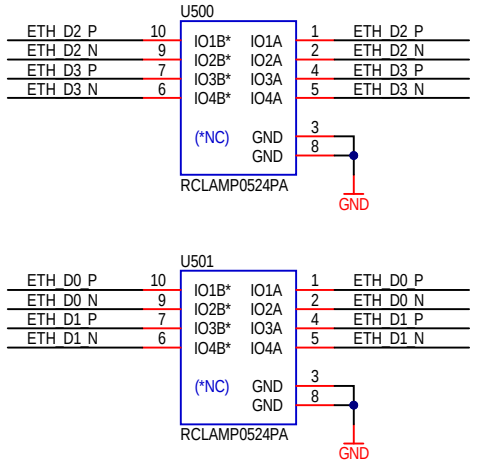
SCH:
EEPROM_nWP pin: Leaving floating NB internally pulled up to CM4_3.3V via 100k (VIL <0.8V) but can be grounded to prevent writing to the on board EEPROM which stores the bootcode.

SCH:
GLOBAL_EN: Drive low to power off CM4. Internally pulled up with a 100K to +5V.

| | |
|---|---|
| Title | CM_MODULE.SchDoc |
| Project: | CMRat Computer |
| Variant: | FULL |
| Version | V2.8 |

# 100/1000M ETH + POE/POE+

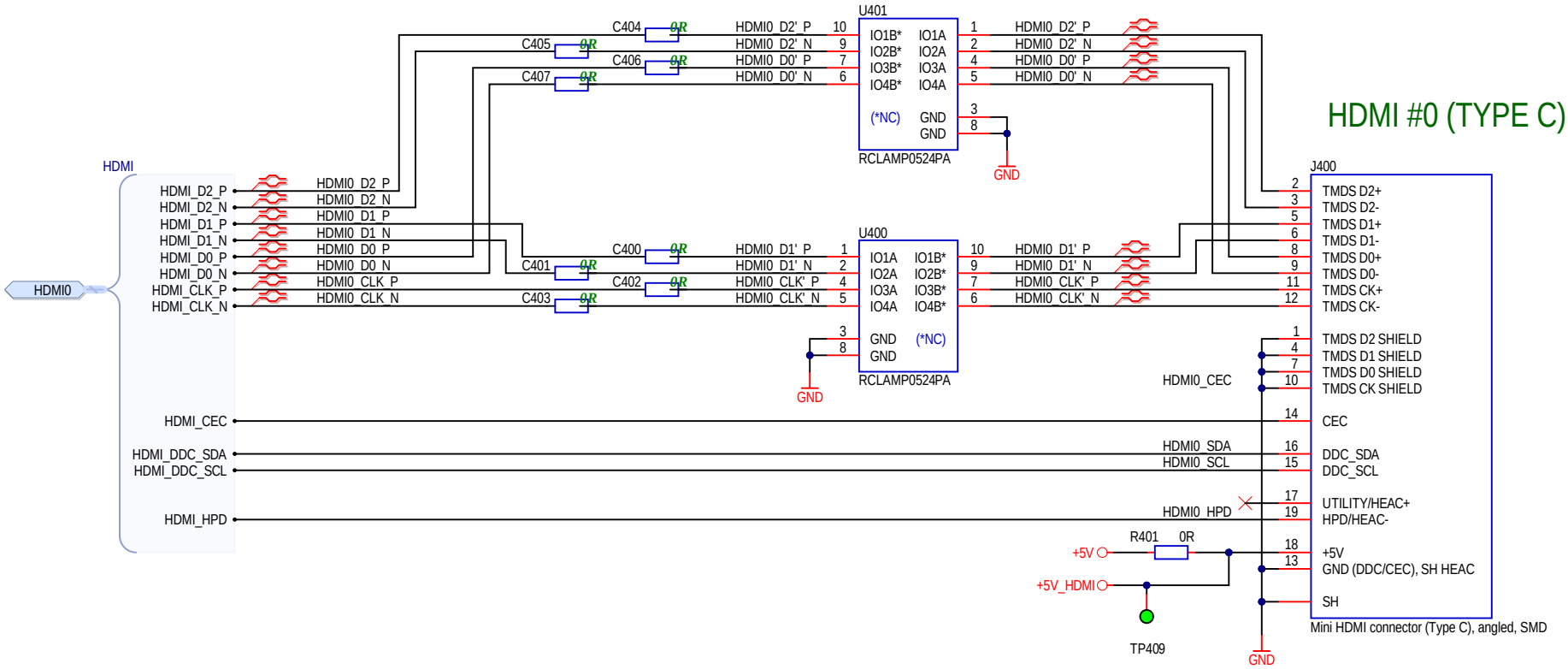



BOM:

RJ45 connector: 100/1000M RJ45, Tab-down, G/Y LEDs, PoE/PoE+:
Link-PP, LPJG0926HENL
Link-PP, LPJG4926HENL
HULYN, HRK1-1B71PG5-36A1BB-1R
TRXCOM, TRJG0926HENL

| | |
|---|---|
| Title: Ethernet.SchDoc | A |
| Project: CMRat Computer | Version V2.8 |
| Variant: FULL | |



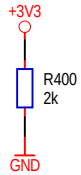

BOM:

HDMI #0 connector:
XKB Connectivity, MPN = A71-05H4-111N1
Wurth Elektronik, MPN = 685119136923
Description: Type C (Mini), 19 pins, 0.4mm pitch, angled, SMD.

## 3V3 LOAD

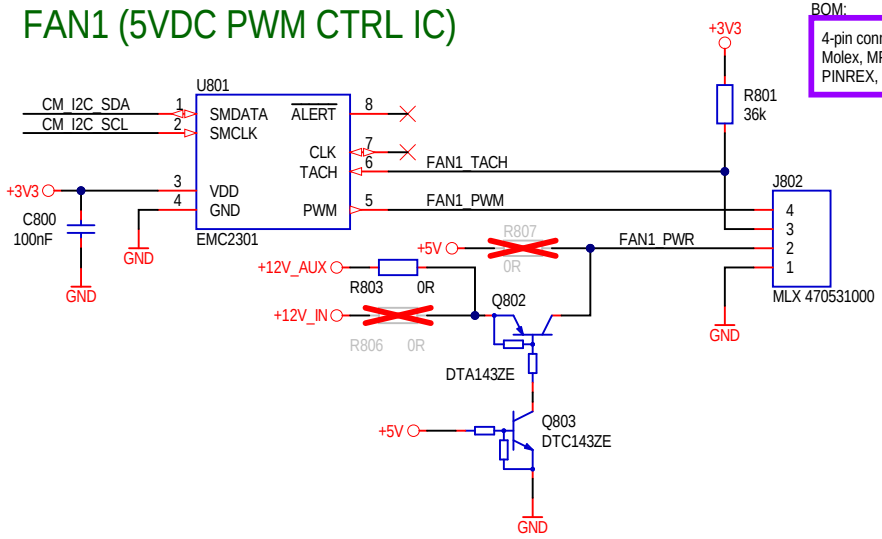
SCH:

Extra load on the 3V3 power rail to fix the HDMI issue with 5V LED.




| | |
|---|---|
| Title | HDMI.SchDoc |
| Project: | CMRat Computer |
| Variant: | FULL |
| Version | V2.8 |

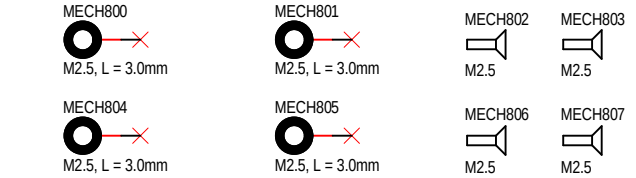
## FAN1 (5VDC PWM CTRL IC)




BOM:

4-pin connector (2.54mm pitch):
Molex, MPN = 47053-1000.
PINREX, MPN = 744-81-04TW30.

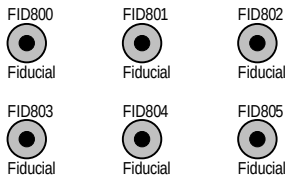
## M2.5 STEEL SPACERS



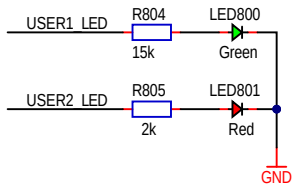

BOM:

SMT Steel Spacer with internal Thread M2.5, L = 3.0mm:
Use Wurth Elektronik, MPN = 977 403 015 1.

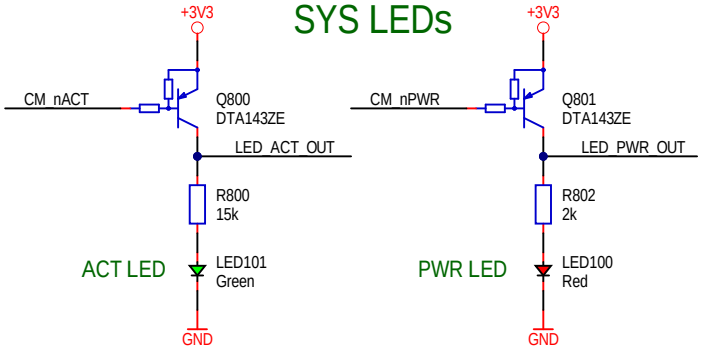
## PCB MARKING

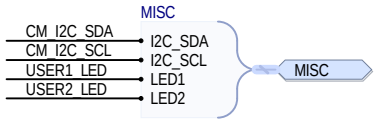



## USER LEDs




## SYS LEDs



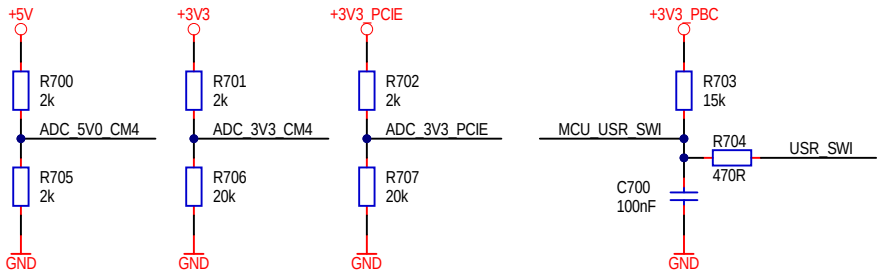

PCB801

LAYER INDICATOR

PCB_LAYER_STACKUP

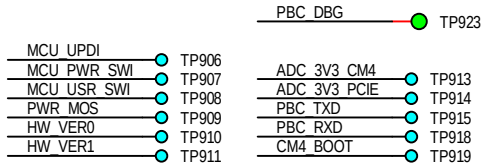
| | |
|---|---|
| Title | MISC.SchDoc |
| Project: | CMRat Computer |
| Variant: | FULL |
| Version | V2.8 |

## PBC INTERFACE



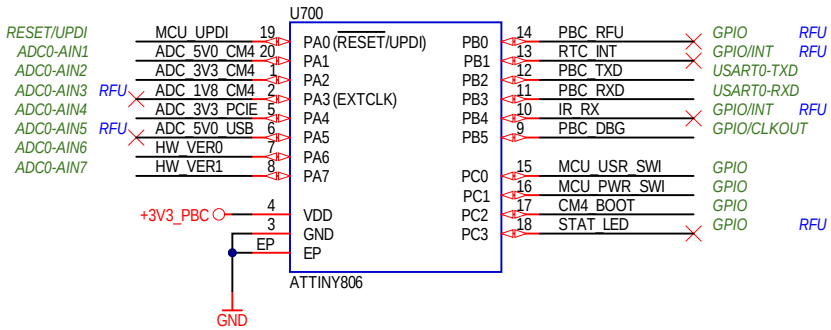

### USER SWITCH

## TESTPOINTS (DEBUG)

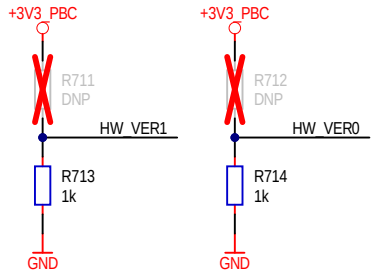



## PUSH-BUTTON CONTROLLER

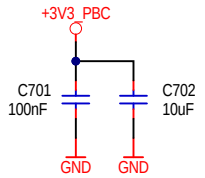
### MCU



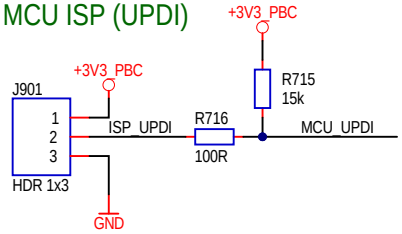

### HARDWARE VERSION



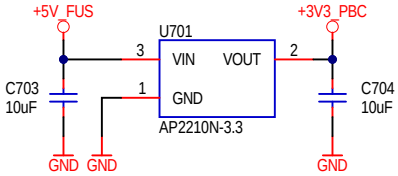

*HV_VER = 0000_0000 => BitPiRat (0000) + GEN2.1 (0000)*




### MCU ISP (UPDI)

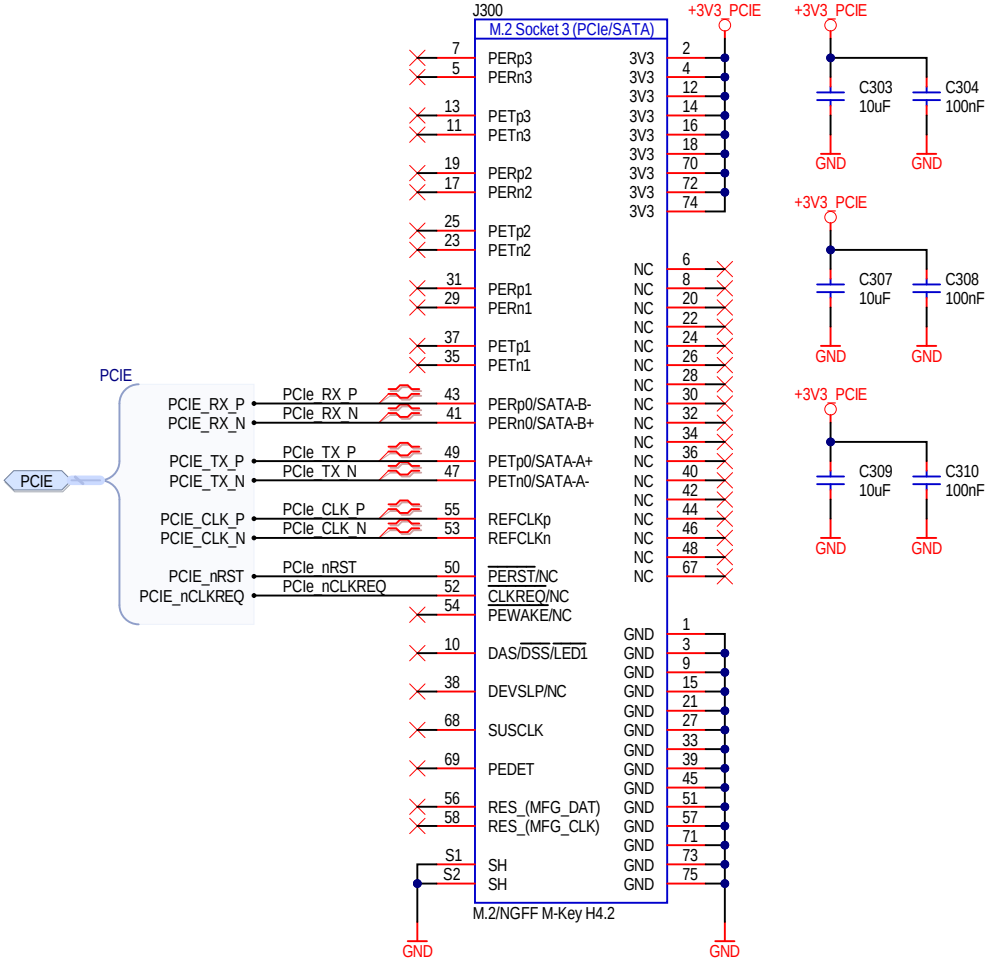



### 3.3V/300mA LDO

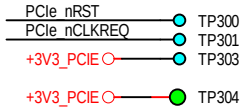



| | |
|---|---|
| Title | PBC.SchDoc |
| Project: | CMRat Computer |
| Variant: | FULL |
| Version | V2.8 |

# M.2 Socket 3 (M-Key) PCIe x1




## TESTPOINTS (DEBUG)




## STAND-OFF HEIGHT TABLE

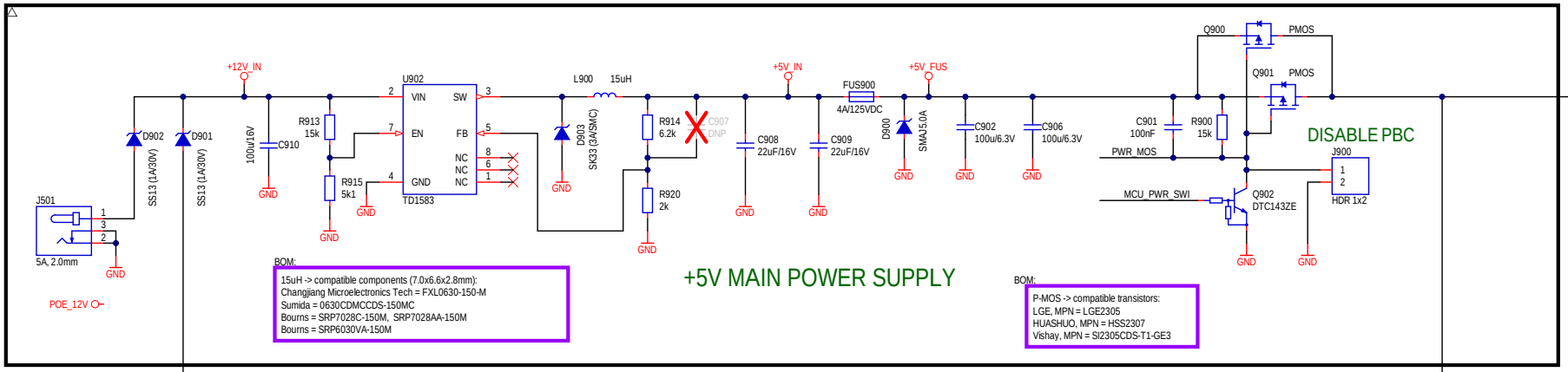
| Connector Height Descriptor | L1 |
|---|---|
| H2.3 | 0.35 ± 0.03 |
| H2.5 | 0.55 ± 0.03 |
| H2.8 | 0.80 ± 0.03 |
| H3.2 | 1.45 ± 0.03 |
| H4.2 | 2.45 ± 0.03 |

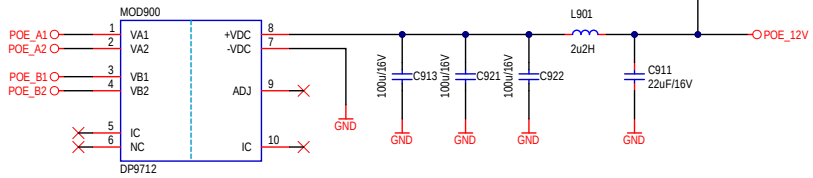


BOM:

M.2 connector (NGFF), M-Key:
H2.3 -> Lotes, MPN = APCI0146-P001A
H3.2 -> Lotes, MPN = APCI0079-P002A
H4.2 -> Lotes, MPN = APCI0107-P001A
H4.8 -> Lotes, MPN = APCI0113-P001A
H3.2 -> TE Connectivity, MPN = 1-2199119-5
H4.2 -> TE Connectivity, MPN = 1-2199230-5

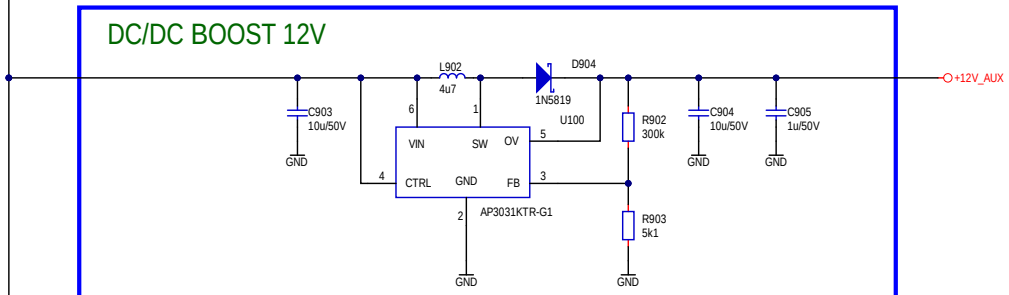
| | |
|---|---|
| Title | PCIe.SchDoc |
| Project: | CMRat Computer |
| Variant: | FULL |
| Version | V2.8 |

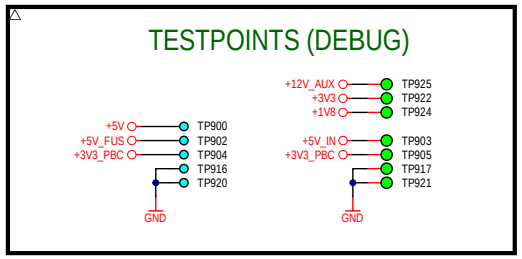


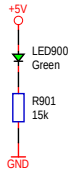



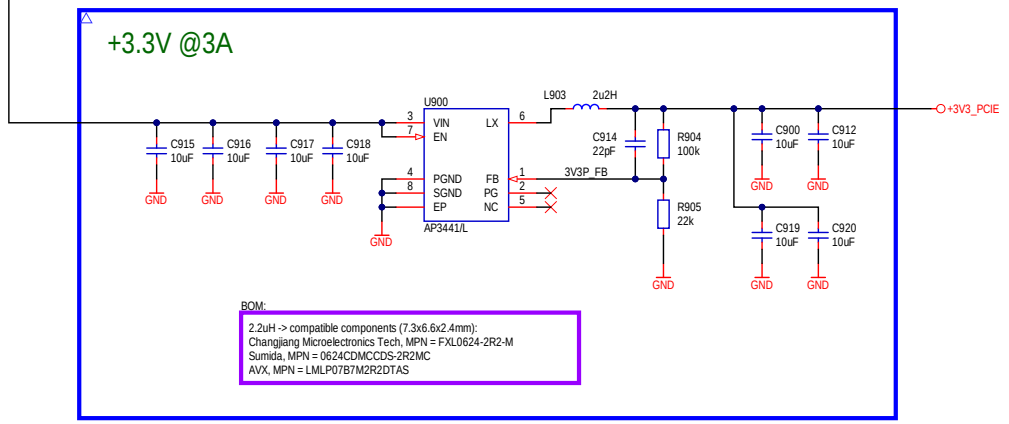

## PoE MODULE (12VDC, 13W)

802.3af (802.3at Type 1) "PoE"

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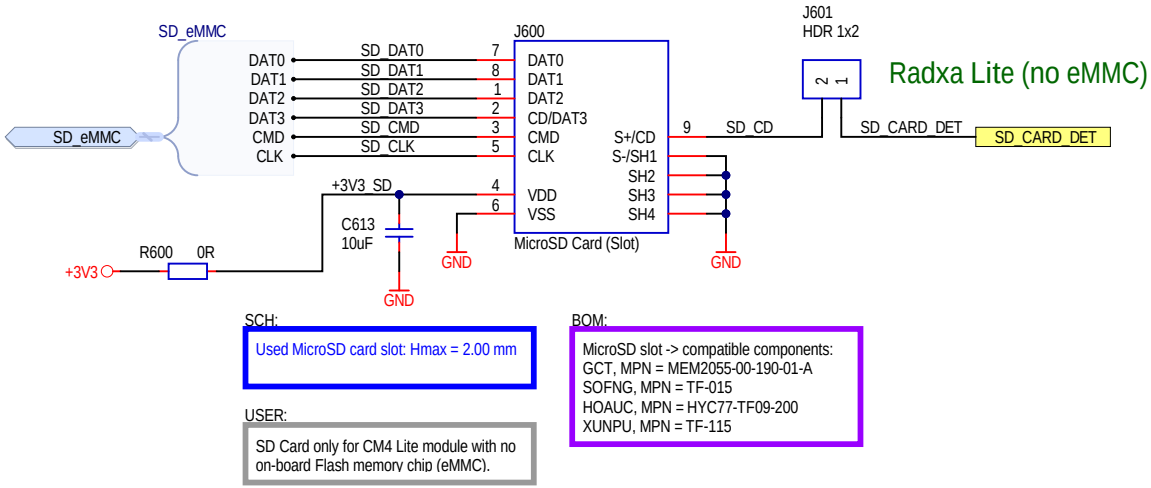
|---|---|
| Title | PWR.SchDoc |
| Project: | CMRat Computer |
| Variant: | FULL |
| Version | V2.8 |

# MICRO SD CARD




SCH:

Used MicroSD card slot: Hmax = 2.00 mm

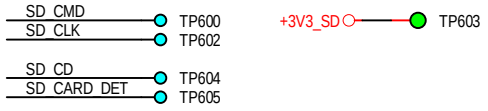
USER:

SD Card only for CM4 Lite module with no on-board Flash memory chip (eMMC).

BOM:

MicroSD slot -> compatible components:
GCT, MPN = MEM2055-00-190-01-A
SOFNG, MPN = TF-015
HOAUC, MPN = HYC77-TF09-200
XUNPU, MPN = TF-115

# TESTPOINTS (DEBUG)




| | |
|---|---|
| Title: SD.SchDoc | A |
| Project: CMRat Computer | Version: V2.8 |
| Variant: FULL | |