Bus

File: Bus.kicad_sch

CPU, FPGA, FRAM

File: CPU,_FPGA,_FRAM.kicad_sch

Power

File: Power.kicad_sch

A/V

File: A%2fV.kicad_sch

USB

File: USB.kicad_sch

VRAM, DAC

File: VRAM,_DAC.kicad_sch

PETIO

File: PETIO.kicad_sch

SID

File: SID.kicad_sch

SID Power

File: SID_Power.kicad_sch

Mixer

File: Mixer.kicad_sch

Keylock

File: Keylock.kicad_sch

Smallbus

File: Smallbus.kicad_sch

UART

File: UART.kicad_sch

Userport

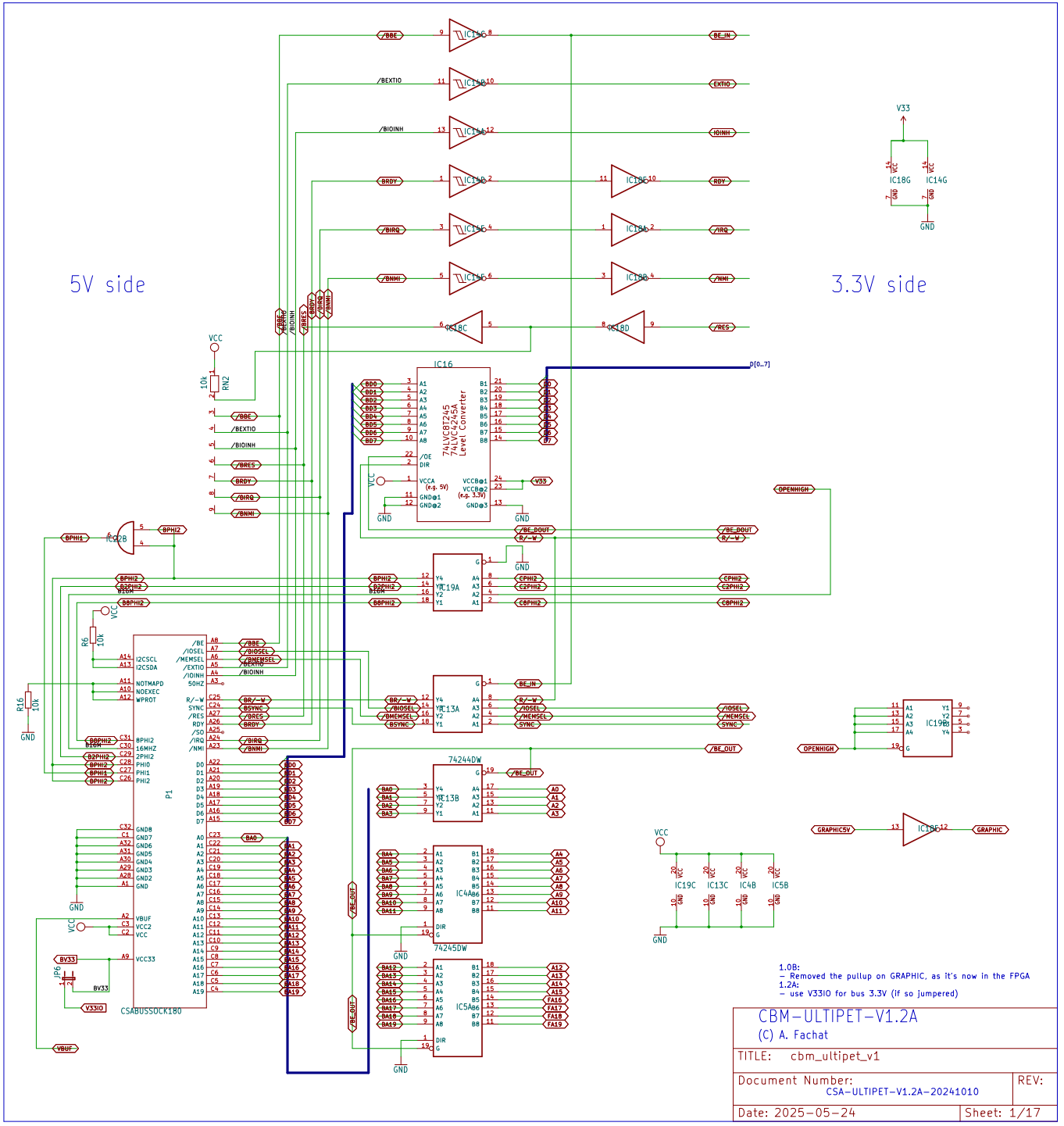
File: Userport.kicad_sch

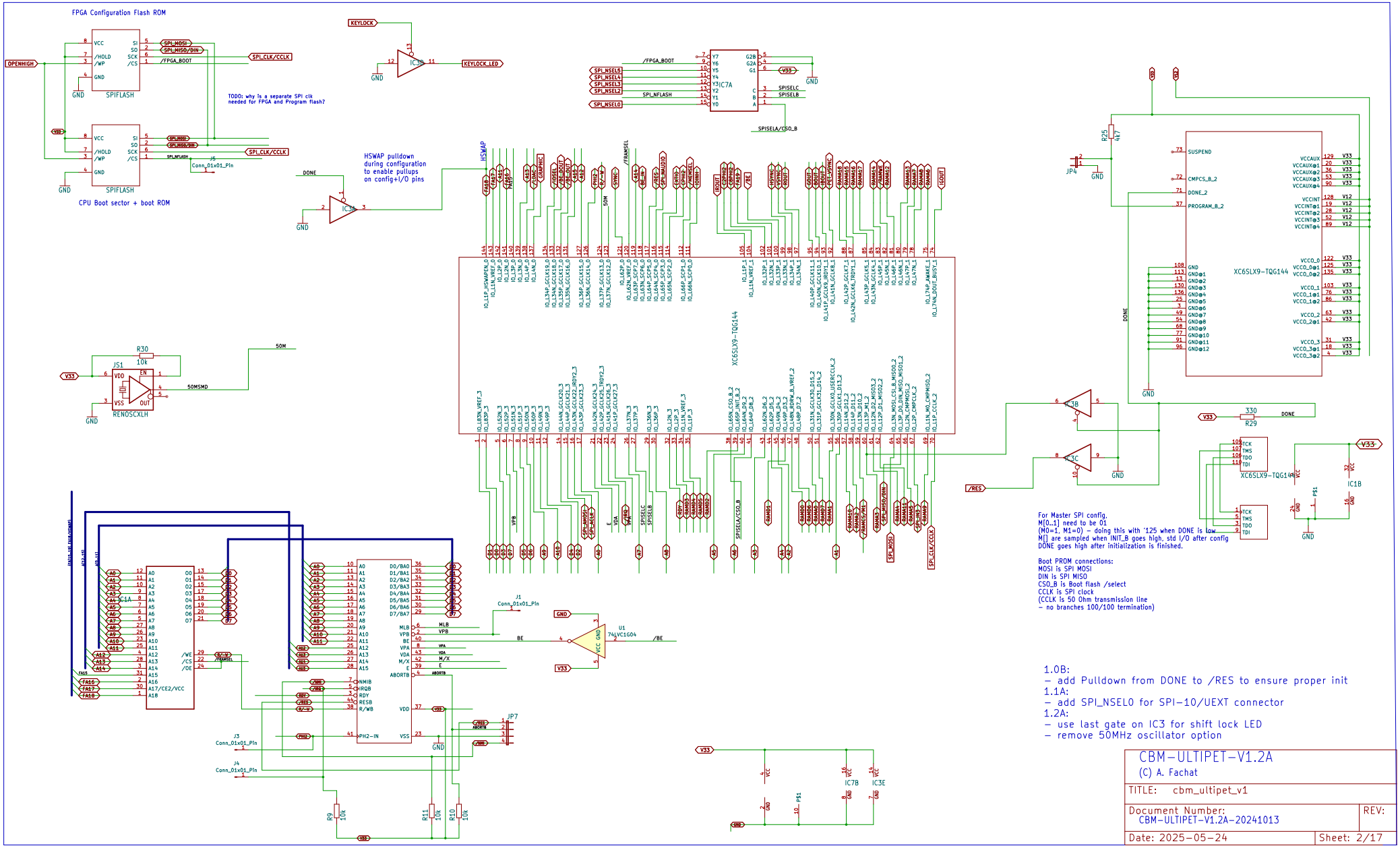
FastIEC

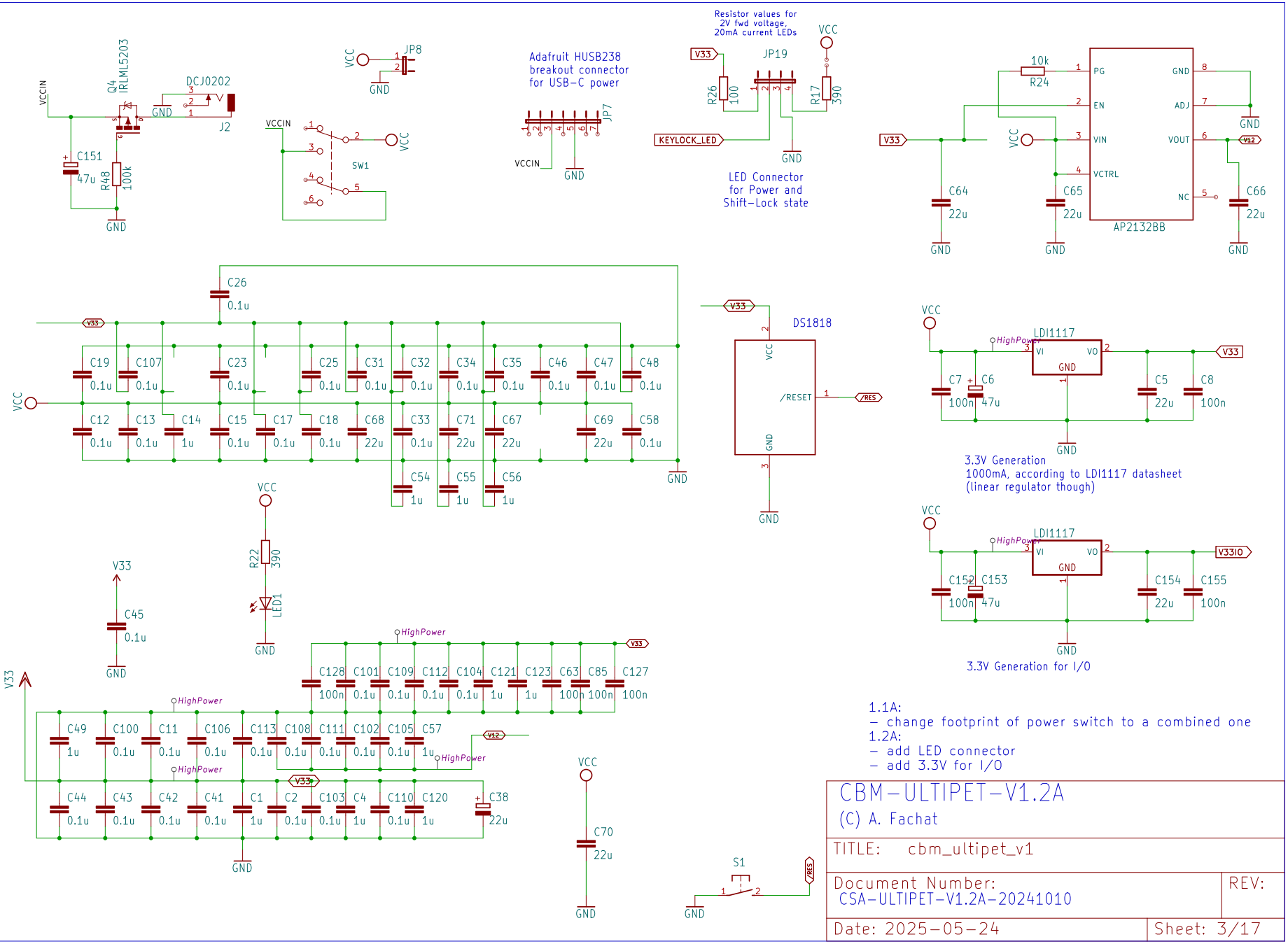
File: FastIEC.kicad_sch

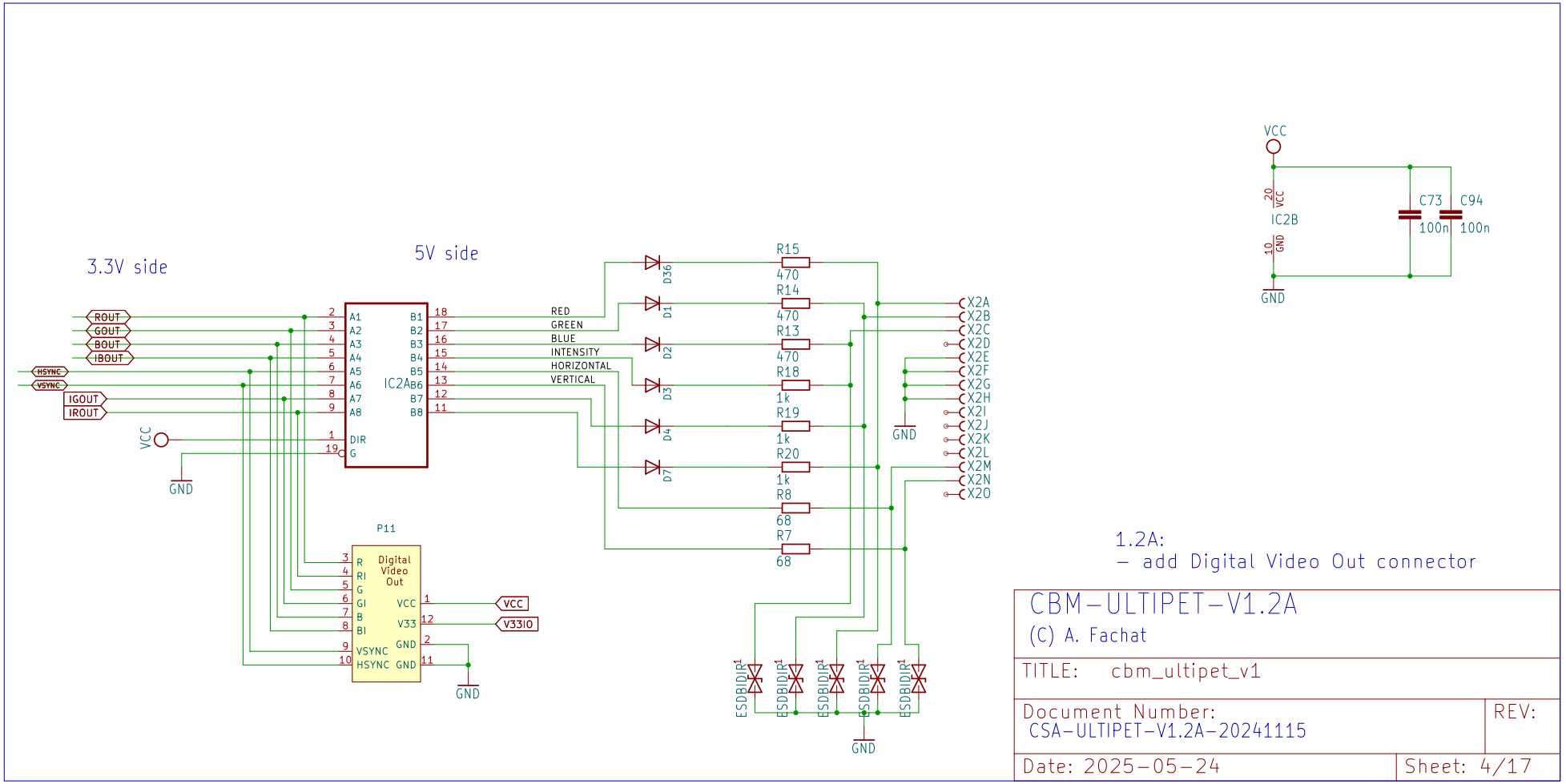
I2C,UEXT

File: I2C,UEXT.kicad_sch


5V side
3.3V side
/BBE
/BEXTIO
/BIOINH
/BRES
/BRDY
/BIRQ
/BNMI
BE_IN
EXTIO
IOINH
RDY
IRQ
NMI
RES
IC16
74LVC8T245
74LVC245A
Level Converter
P[0..7]
OPENHIGH
/BE_DOUT
R/~W
BPHI2
B2PHI2
B16M
B8PHI2
C2PHI2
C8PHI2
/IOSEL
/MEMSEL
SYNC
/BE_OUT
74244DW
74245DW
GRAPHIC5V
GRAPHIC
VCC
GND
V33
V33IO
VBUF
CSABUSSOCK180
P1
1.0B:
– Removed the pullup on GRAPHIC, as it's now in the FPGA
1.2A:
– use V33IO for bus 3.3V (if so jumpered)
CBM–ULTIPET–V1.2A
(C) A. Fachat
TITLE: cbm_ultipet_v1
Document Number: CSA–ULTIPET–V1.2A–20241010
REV:
Date: 2025–05–24
Sheet: 1/17

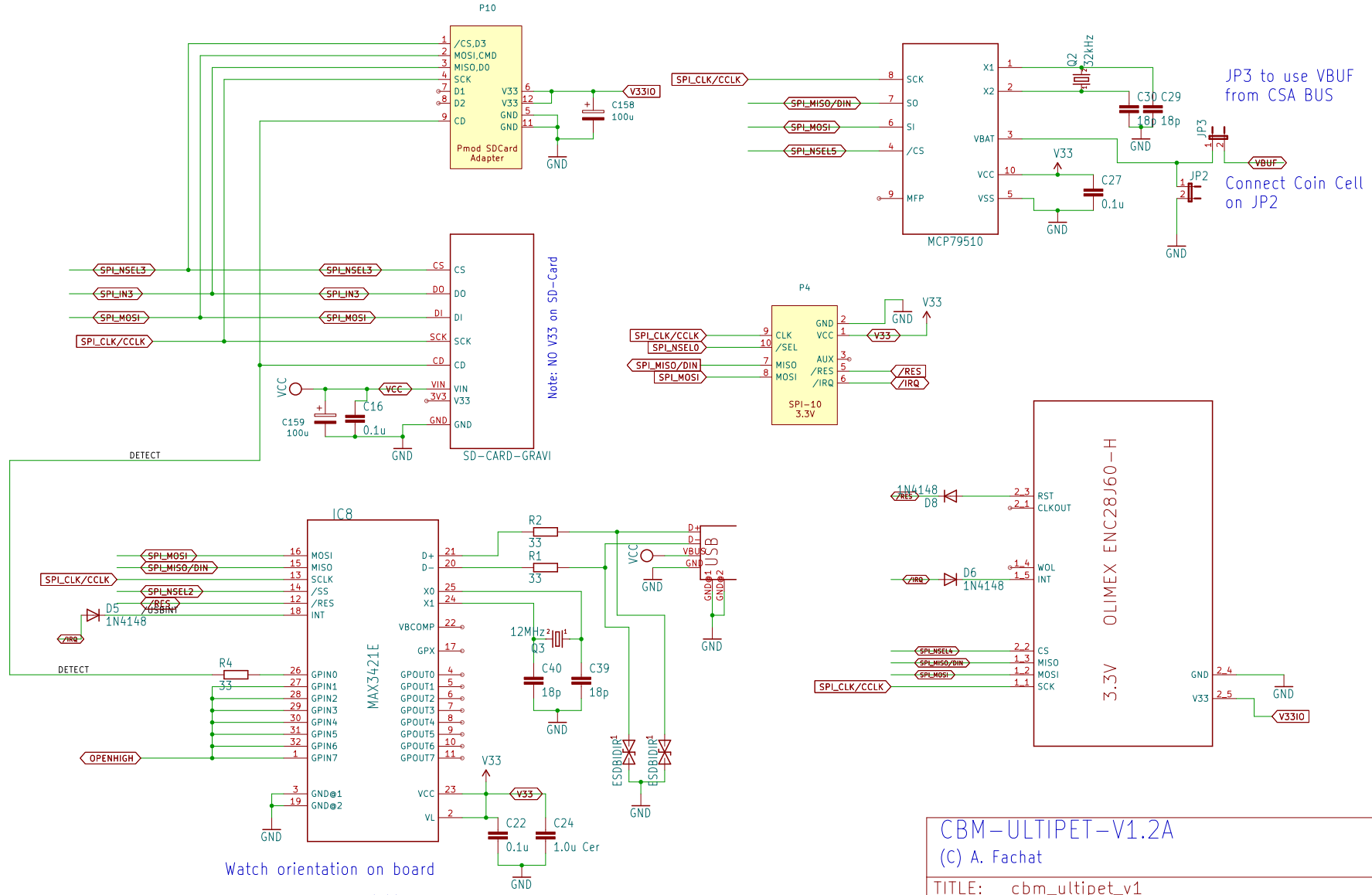

FPGA Configuration Flash ROM
SPIFLASH
CPU Boot sector + boot ROM
TODO: why is a separate SPI clk needed for FPGA and Program flash?
HSWAP pulldown during configuration to enable pullups on config+I/O pins
XC6SLX9-TQG144
RENOSCXLH
For Master SPI config,
M[0..1] need to be 01
(M0=1, M1=0) - doing this with '125 when DONE is low
M[] are sampled when INIT_B goes high, std I/O after config
DONE goes high after initialization is finished.
Boot PROM connections:
MOSI is SPI MOSI
DIN is SPI MISO
CSO_B is Boot flash /select
CCLK is SPI clock
(CCLK is 50 Ohm transmission line
- no branches 100/100 termination)
1.0B:
- add Pulldown from DONE to /RES to ensure proper init
1.1A:
- add SPI_NSEL0 for SPI-10/UEXT connector
1.2A:
- use last gate on IC3 for shift lock LED
- remove 50MHz oscillator option
CBM-ULTIPET-V1.2A
(C) A. Fachat
TITLE: cbm_ultipet_v1
Document Number: CBM-ULTIPET-V1.2A-20241013
REV:
Date: 2025-05-24
Sheet: 2/17


VCCIN
Q4
IRLML5203
DCJ0202
J2
GND
C151
47u
R48
100k
VCC
JP8
SW1
Adafruit HUSB238
breakout connector
for USB-C power
JP7
Resistor values for
2V fwd voltage,
20mA current LEDs
V33
JP19
R26
100
R17
390
KEYLOCK_LED
LED Connector
for Power and
Shift-Lock state
10k
R24
PG
EN
VIN
VCTRL
GND
ADJ
VOUT
NC
AP2132BB
V12
C64
22u
C65
22u
C66
22u
C26
0.1u
C19
C107
C23
C25
C31
C32
C34
C35
C46
C47
C48
C12
C13
C14
C15
C17
C18
C68
C33
C71
C67
C69
C58
C54
C55
C56
1u
DS1818
/RESET
/RES
LDI1117
HighPower
VI
VO
C7
C6
100n
47u
C5
C8
3.3V Generation
1000mA, according to LDI1117 datasheet
(linear regulator though)
V3310
C152
C153
C154
C155
3.3V Generation for I/O
R22
390
LED1
C45
C128
C101
C109
C112
C104
C121
C123
C63
C85
C127
C49
C100
C11
C106
C113
C108
C111
C102
C105
C57
C44
C43
C42
C41
C1
C2
C103
C4
C110
C120
C38
22u
C70
S1
1.1A:
- change footprint of power switch to a combined one
1.2A:
- add LED connector
- add 3.3V for I/O
CBM-ULTIPET-V1.2A
(C) A. Fachat
TITLE: cbm_ultipet_v1
Document Number:
CSA-ULTIPET-V1.2A-20241010
REV:
Date: 2025-05-24
Sheet: 3/17



1.2A:
– add Digital Video Out connector

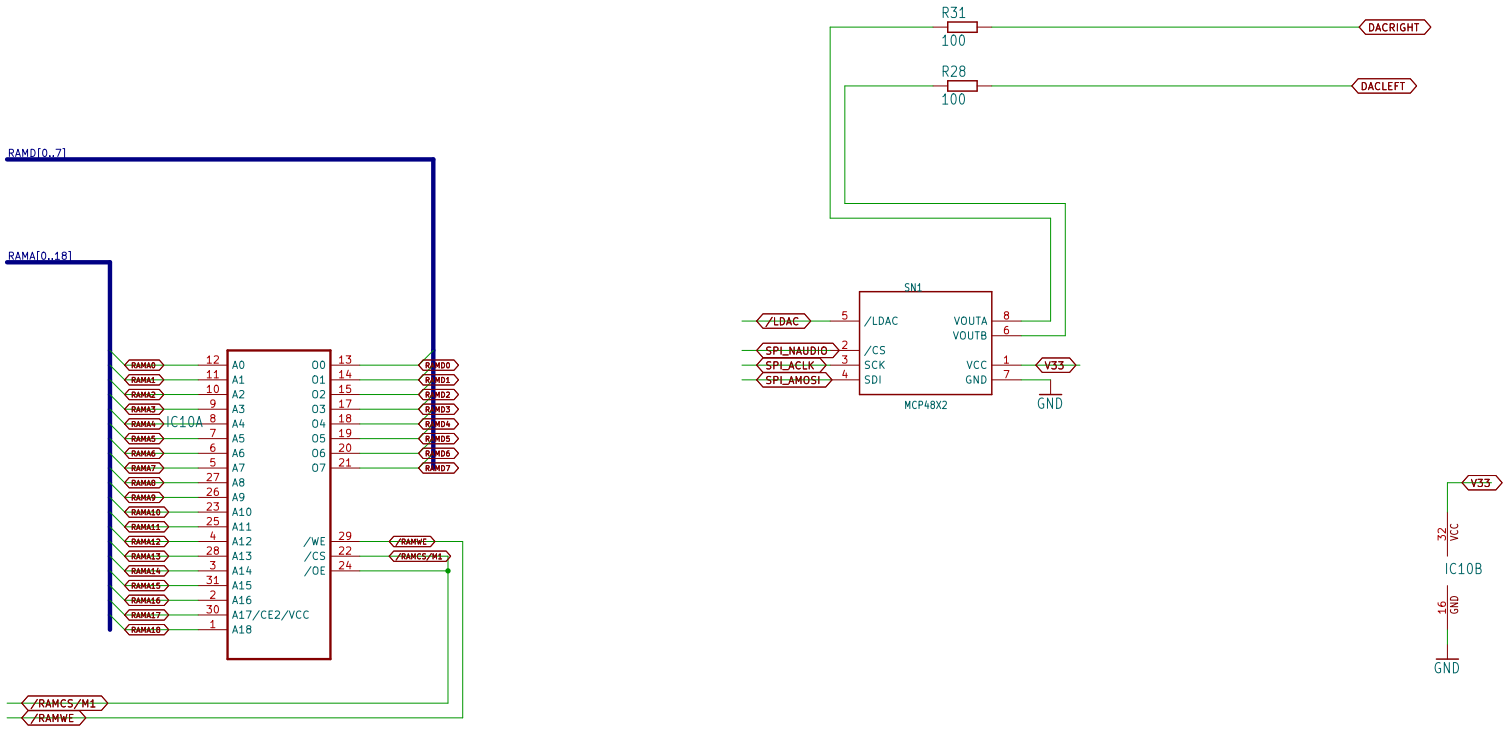
CBM–ULTIPET–V1.2A (C) A. Fachat	
TITLE: cbm_ultipet_v1	
Document Number: CSA–ULTIPET–V1.2A–20241115	REV:
Date: 2025–05–24	Sheet: 4/17



1.1A:
- Add second (option for) SD-Card adapter
- replace non-commercial use TQFP32 footprint with default kicad one

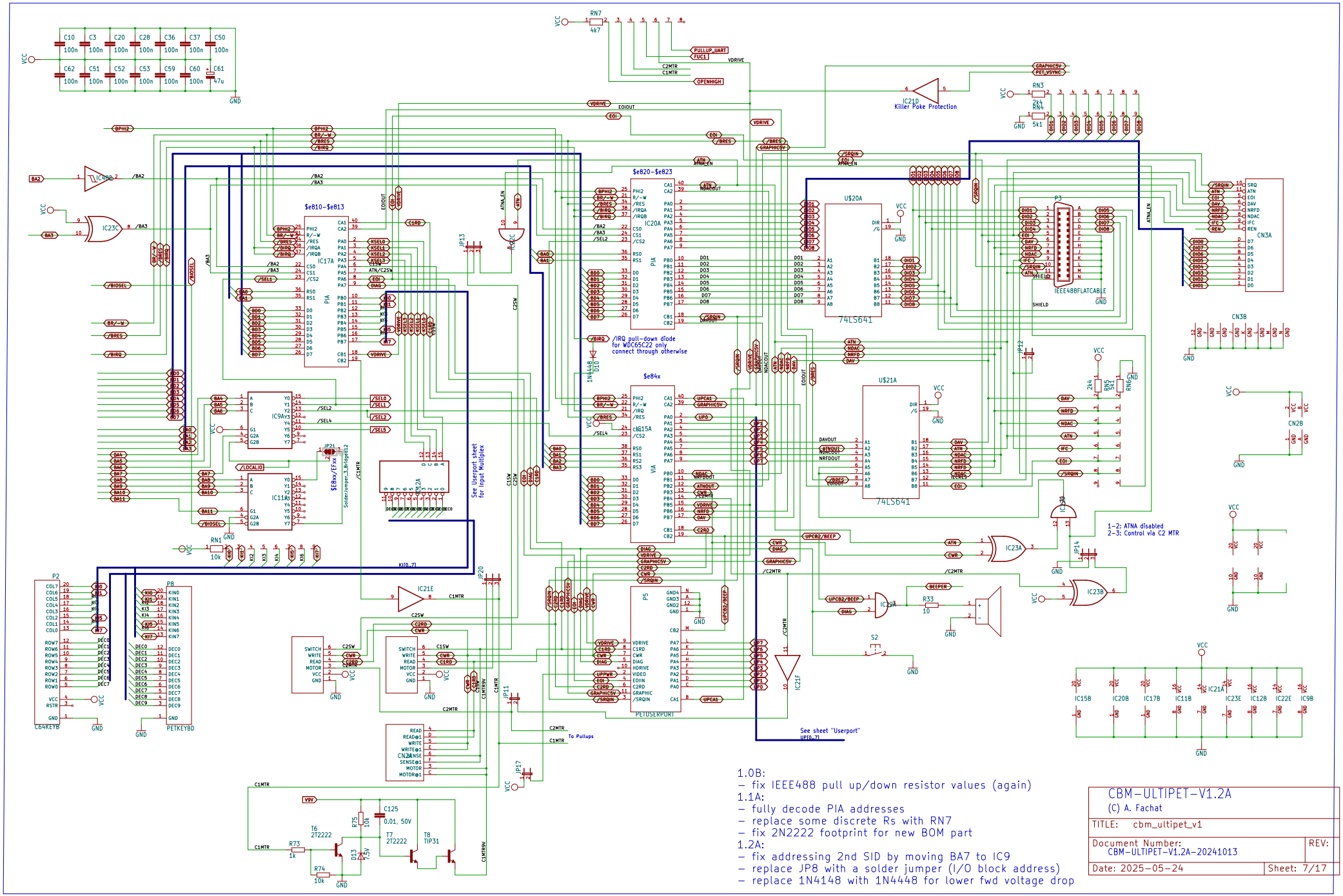
1.2A:
- use V33IO for Net and SD-Card
- added bypass caps for (large) SD-Card

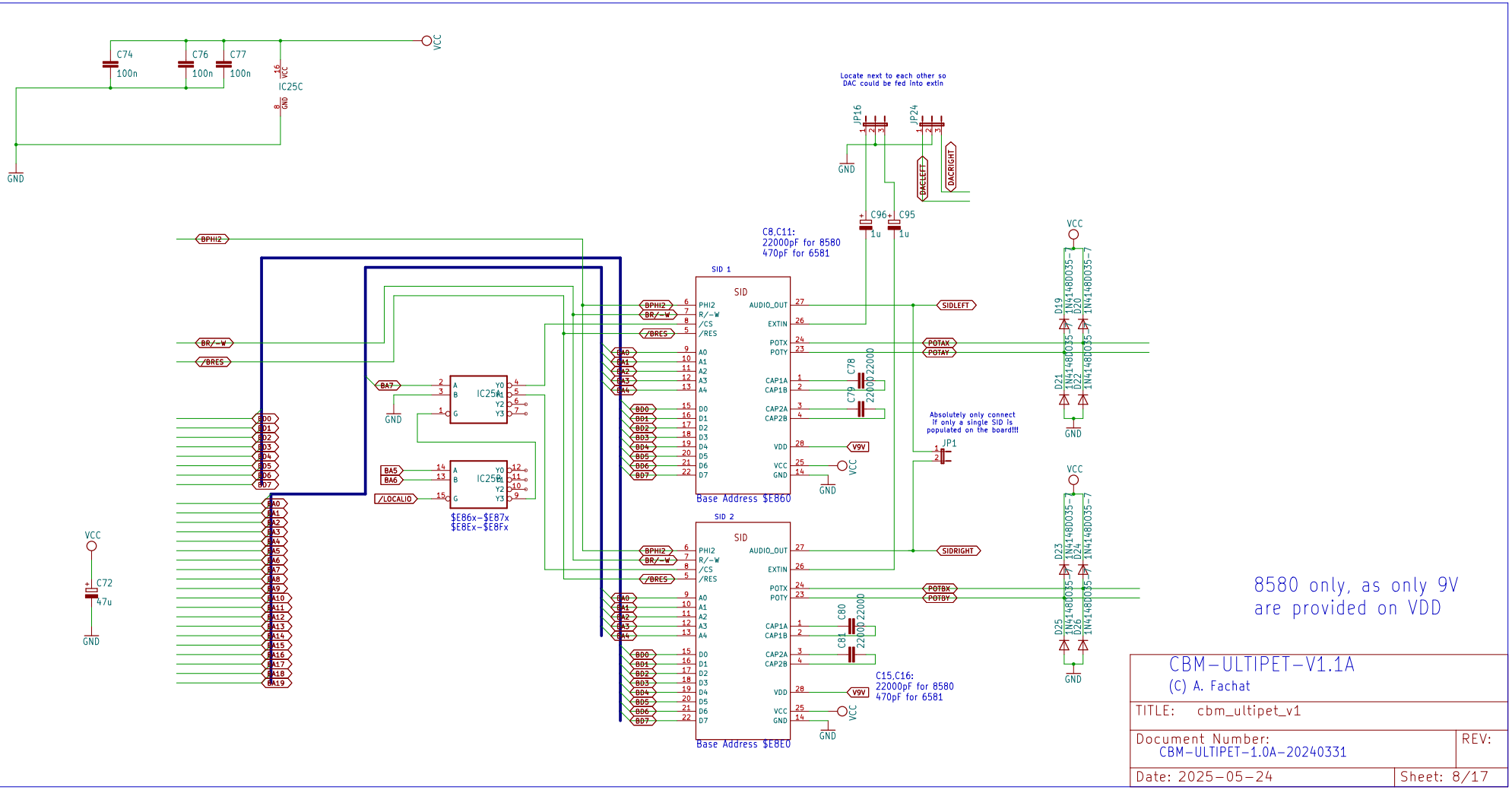
CBM-ULTIPET-V1.2A (C) A. Fachat	
TITLE: cbm_ultipet_v1	
Document Number: CSA-ULTIPET-V1.1A-20241117	REV:
Date: 2025-05-24	Sheet: 5/17

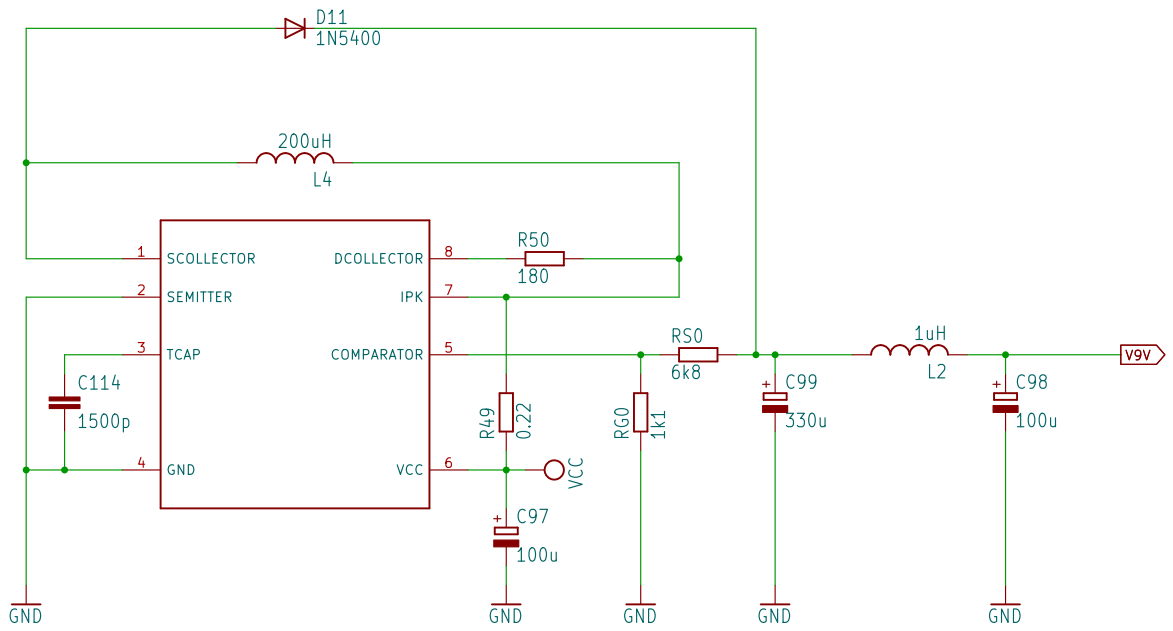


1.2A:
– removed DAC output connector pins (already on SID page)

CBM-ULTIPET-V1.2A (C) A. Fachat	
TITLE: cbm_ultipet_v1	
Document Number: CBM-ULTIPET-V1.2A-20241010	REV:
Date: 2025-05-24	Sheet: 6/17


$e810–$e813
$e820–$e823
$e84x
/IRQ pull-down diode for WDC65C22 only connect through otherwise
1N4148
1N4448
See Userport sheet for Input Multiplex
See sheet "Userport" UP[0..7]
To Pullups
Killer Poke Protection
74LS641
IEEE488FLATCABLE
SHIELD
1–2: ATNA disabled
2–3: Control via C2 MTR
PETUSERPORT
C64KEYB
PETKEYBD
1.0B:
– fix IEEE488 pull up/down resistor values (again)
1.1A:
– fully decode PIA addresses
– replace some discrete Rs with RN7
– fix 2N2222 footprint for new BOM part
1.2A:
– fix addressing 2nd SID by moving BA7 to IC9
– replace JP8 with a solder jumper (I/O block address)
– replace 1N4148 with 1N4448 for lower fwd voltage drop
CBM–ULTIPET–V1.2A
(C) A. Fachat
TITLE: cbm_ultipet_v1
Document Number: CBM–ULTIPET–V1.2A–20241013
REV:
Date: 2025–05–24
Sheet: 7/17


C74
100n
C76
100n
C77
100n
IC25C
VCC
GND
Locate next to each other so
DAC could be fed into extin
JP16
JP24
DACLEFT
DACRIGHT
C96
1u
C95
1u
C8,C11:
22000pF for 8580
470pF for 6581
SID 1
SID
PHI2
R/-W
/CS
/RES
AUDIO_OUT
EXTIN
POTX
POTY
CAP1A
CAP1B
CAP2A
CAP2B
VDD
VCC
GND
A0
A1
A2
A3
A4
D0
D1
D2
D3
D4
D5
D6
D7
Base Address $E860
SID 2
Base Address $E8E0
C78
22000
C79
22000
C80
22000
C81
22000
C15,C16:
22000pF for 8580
470pF for 6581
Absolutely only connect
if only a single SID is
populated on the board!!!
JP1
SIDLEFT
SIDRIGHT
POTAX
POTAY
POTBX
POTBY
V9V
D19
D20
D21
D22
D23
D24
D25
D26
1N4148D035-7
IC25A
IC25B
$E86x-$E87x
$E8Ex-$E8Fx
/LOCALIO
C72
47u
8580 only, as only 9V
are provided on VDD
CBM-ULTIPET-V1.1A
(C) A. Fachat
TITLE: cbm_ultipet_v1
Document Number:
CBM-ULTIPET-1.0A-20240331
REV:
Date: 2025-05-24
Sheet: 8/17



V1.0B:
- Fix parts footprint for L4, D2 and some caps

Vout=1.25 x (1 + RS/RG)

RS/RG = (Vout / 1.25) - 1

Vout = 9V -> RS/RG = 6.2
-> RG=1.1k, RS=6.8k

Vout = 12V -> ~~RS/RG = 8.6~~
-> ~~RG=1.2k~~, RS=10k

9V is not only used by SID
but also by Tape

CBM-ULTIPET-V1.1A

(C) A. Fachat

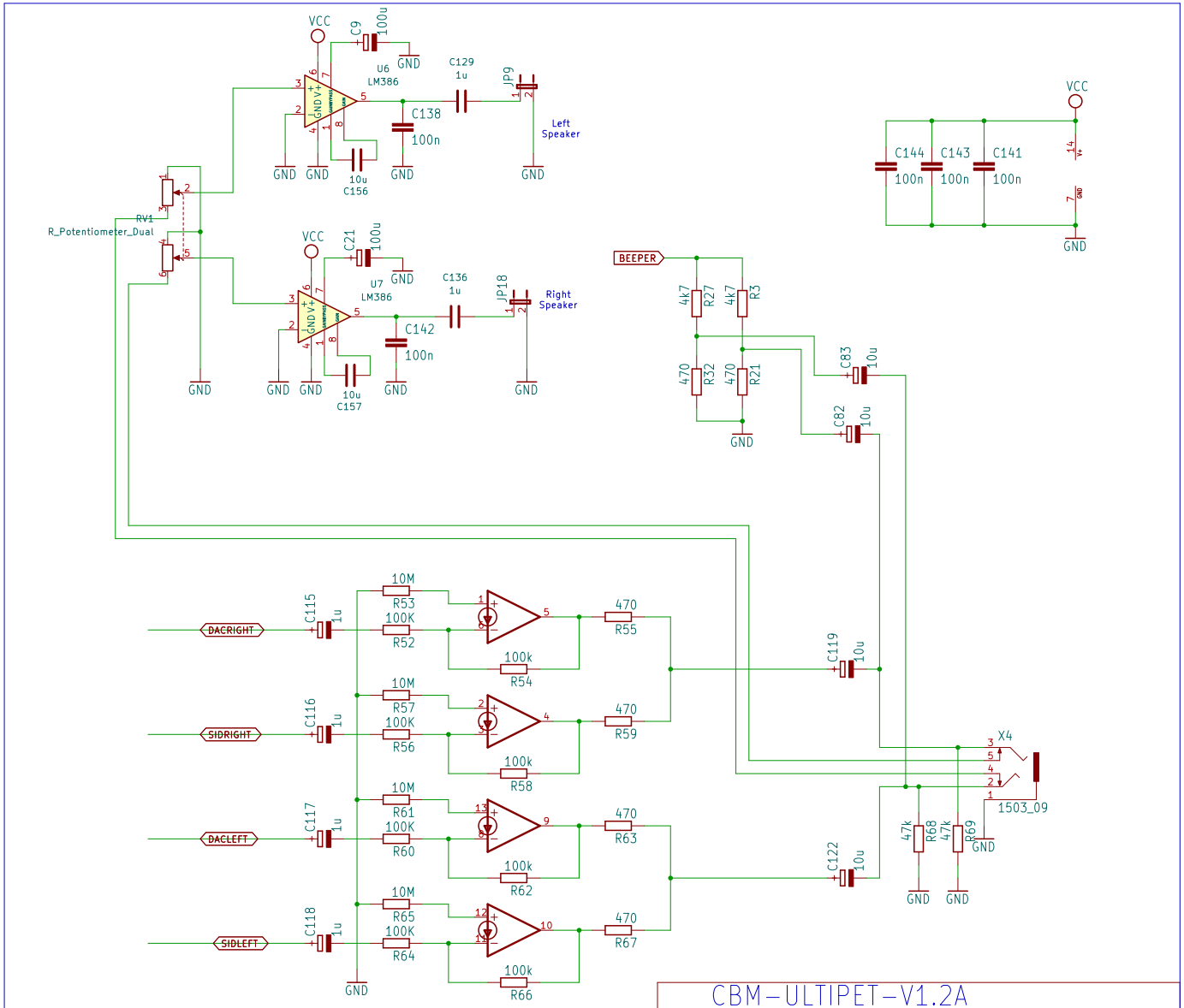
TITLE: cbm_ultipet_v1

Document Number:
CSA-DUALSID-1.0B-20231212

REV:

Date: 2025-05-24

Sheet: 9/17



1.0B: add voltage divider to reduce beeper
volume on mixer output
1.2A:
- duplicate beeper voltage divider to reduce L/R crosstalk
- adjust beeper voltage divider resistor values
- add bypass / gain caps on audio amp

CBM-ULTIPET-V1.2A

(C) A. Fachat

TITLE: cbm_ultipet_v1

Document Number: CBM-ULTIPET-1.2A-20241117

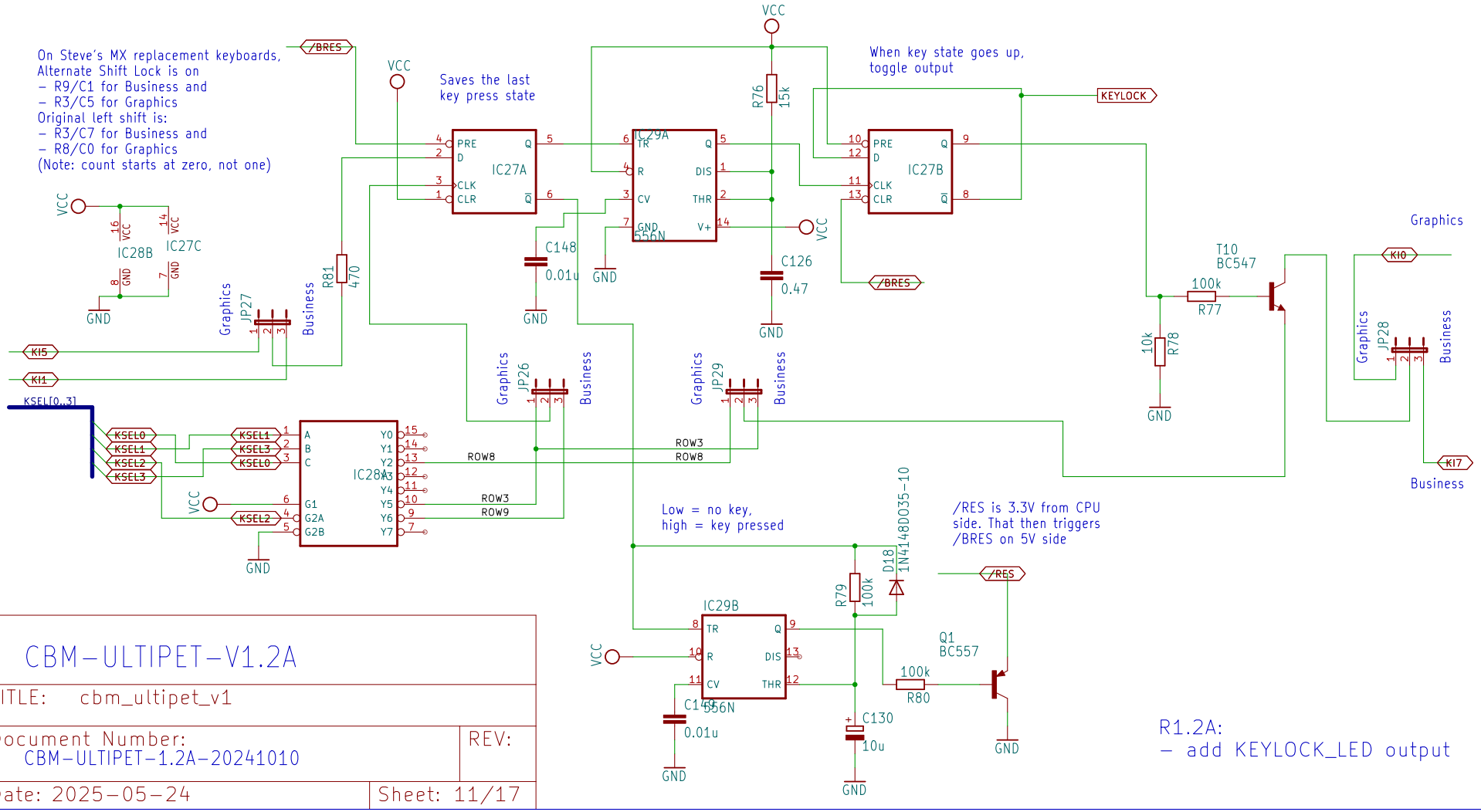
REV:

Date: 2025-05-24

Sheet: 10/17

Commodore PET SHIFT-LOCK simulator + RESET on long push

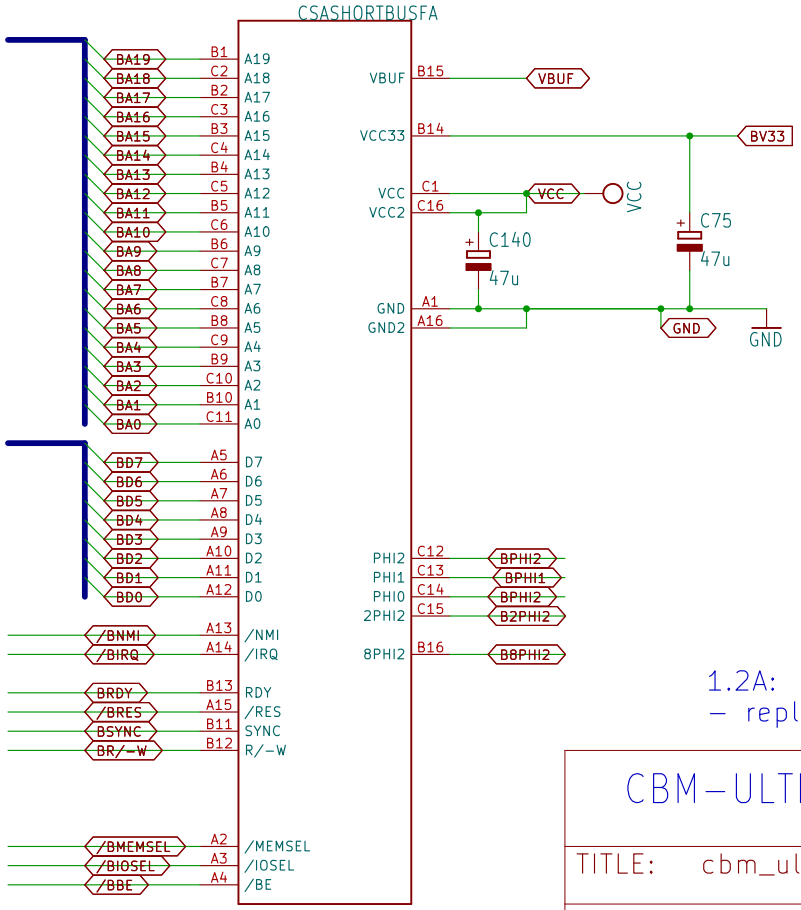
Inspired by SX64 keyboard and discussions
with Steve Gray and Mike Naberezny



CBM-ULTIPET-V1.2A

TITLE: cbm_ultipet_v1	
Document Number: CBM-ULTIPET-1.2A-20241010	REV:
Date: 2025-05-24	Sheet: 11/17

R1.2A:
– add KEYLOCK_LED output



1.2A:
– replace V33 with V33IO

CBM-ULTIPET-V1.2A

TITLE: cbm_ultipet_v1	
Document Number: CBM-ULTIPET-V1.2A-20241017	REV:
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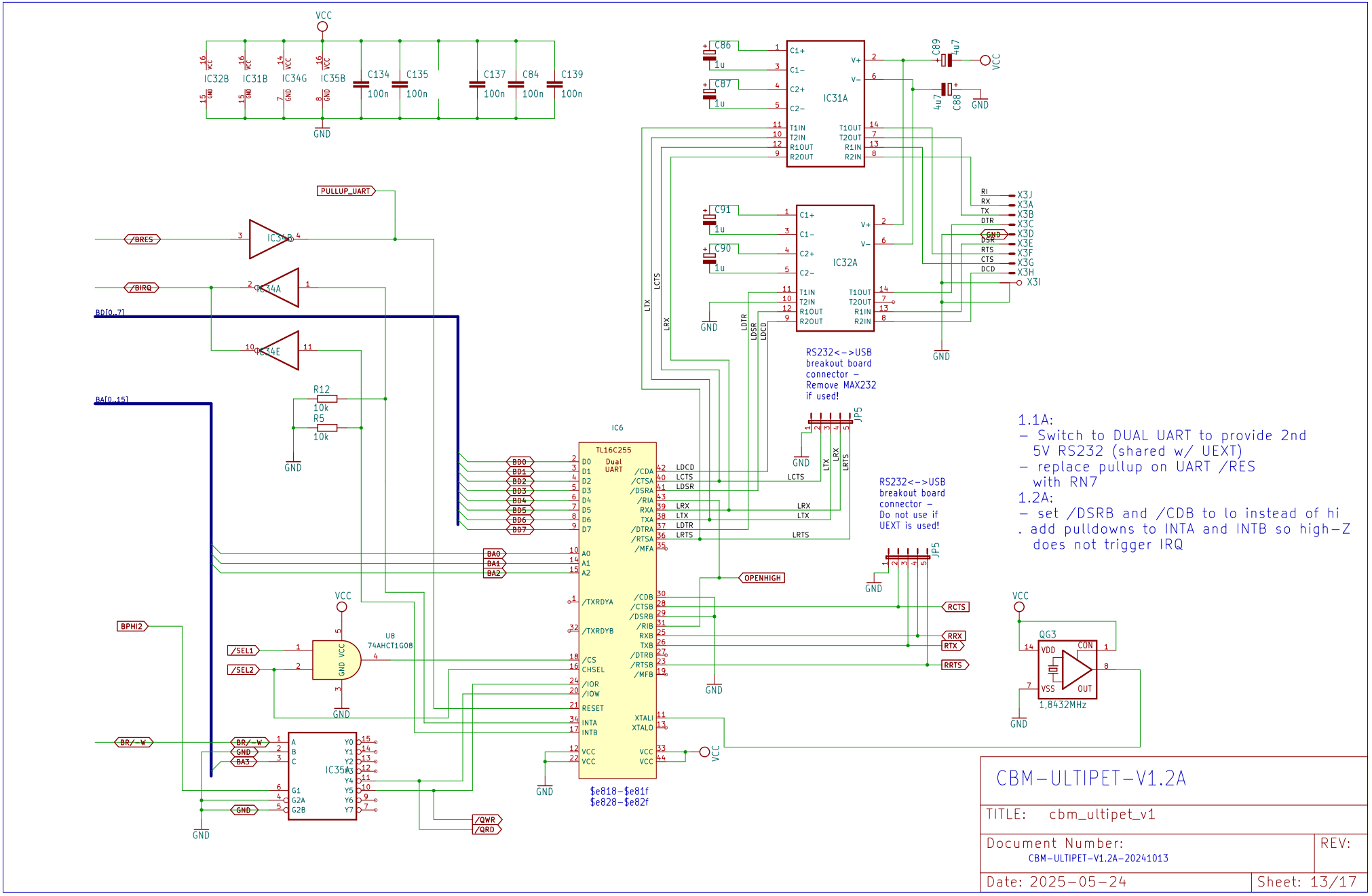
VCC
IC32B
IC31B
IC34G
IC35B
C134
C135
C137
C84
C139
100n
GND
C86
C87
1u
IC31A
C89
4u7
C88
C91
C90
IC32A
RI
RX
TX
DTR
DSR
RTS
CTS
DCD
X3J
X3A
X3B
X3C
X3D
X3E
X3F
X3G
X3H
X3I
RS232<->USB breakout board connector – Remove MAX232 if used!
RS232<->USB breakout board connector – Do not use if UEXT is used!
JP5
PULLUP_UART
/BRES
/BIRQ
BD[0..7]
BA[0..15]
IC34B
IC34A
IC34E
R12
10k
R5
10k
IC6
TL16C255
Dual UART
D0
D1
D2
D3
D4
D5
D6
D7
A0
A1
A2
/TXRDYA
/TXRDYB
/CS
CHSEL
/IOR
/IOW
RESET
INTA
INTB
/CDA
/CTSA
/DSRA
/RIA
RXA
TXA
/DTRA
/RTSA
/MFA
/CDB
/CTSB
/DSRB
/RIB
RXB
TXB
/DTRB
/RTSB
/MFB
XTALI
XTALO
LDCD
LCTS
LDSR
LRX
LTX
LDTR
LRTS
OPENHIGH
RCTS
RRX
RTX
RRTS
BPHI2
/SEL1
/SEL2
U8
74AHCT1G08
BR/-W
BA3
IC35A
/QWR
/QRD
$e818–$e81f
$e828–$e82f
QG3
VDD
CON
VSS
OUT
1,8432MHz
1.1A:
– Switch to DUAL UART to provide 2nd 5V RS232 (shared w/ UEXT)
– replace pullup on UART /RES with RN7
1.2A:
– set /DSRB and /CDB to lo instead of hi
. add pulldowns to INTA and INTB so high–Z does not trigger IRQ
CBM–ULTIPET–V1.2A
TITLE: cbm_ultipet_v1
Document Number: CBM–ULTIPET–V1.2A–20241013
REV:
Date: 2025–05–24
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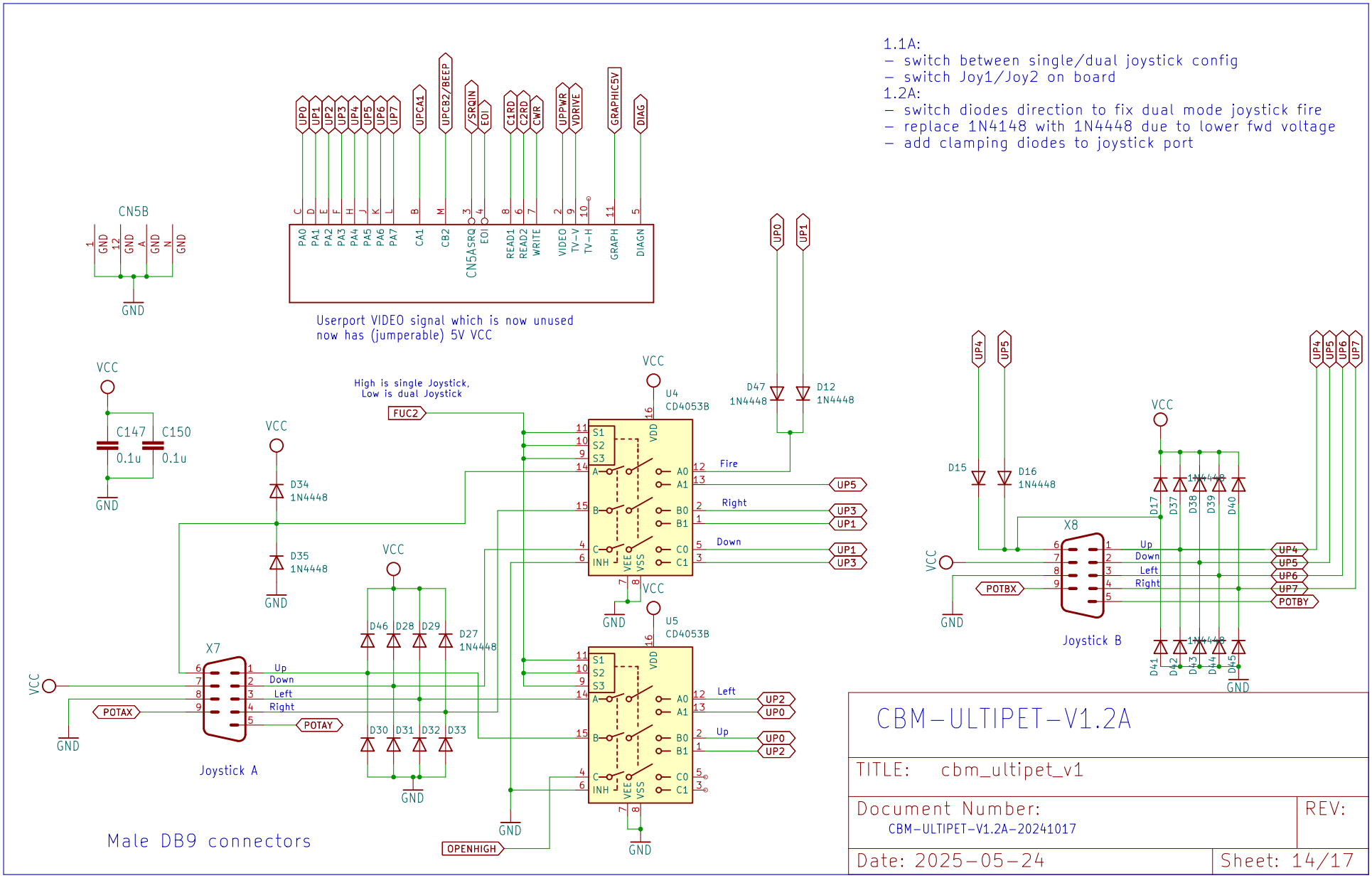
1.1A:
– switch between single/dual joystick config
– switch Joy1/Joy2 on board
1.2A:
– switch diodes direction to fix dual mode joystick fire
– replace 1N4148 with 1N4448 due to lower fwd voltage
– add clamping diodes to joystick port
CN5B
GND
UP0 UP1 UP2 UP3 UP4 UP5 UP6 UP7
UPCA1
UPCB2/BEEP
/SRQIN
EOI
C1RD C2RD CWR
UPPWR VDRIVE
GRAPHIC5V
DIAG
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7
CA1
CB2
CN5ASRQ
EOI
READ1 READ2 WRITE
VIDEO TV-V TV-H
GRAPH
DIAGN
Userport VIDEO signal which is now unused
now has (jumperable) 5V VCC
VCC
C147 0.1u
C150 0.1u
High is single Joystick,
Low is dual Joystick
FUC2
U4 CD4053B
U5 CD4053B
S1 S2 S3
A B C INH
VDD VEE VSS
A0 A1 B0 B1 C0 C1
Fire
Right
Down
Left
Up
UP5
UP3
UP1
UP2
UP0
D34 1N4448
D35 1N4448
D46 D28 D29 D27 1N4448
D30 D31 D32 D33
D47 1N4448
D12 1N4448
X7
Up
Down
Left
Right
POTAX
POTAY
Joystick A
Male DB9 connectors
OPENHIGH
D15 D16 1N4448
X8
POTBX
POTBY
Joystick B
D17 D37 D38 D39 D40
D41 D42 D43 D44 D45
CBM–ULTIPET–V1.2A
TITLE: cbm_ultipet_v1
Document Number:
CBM–ULTIPET–V1.2A–20241017
REV:
Date: 2025–05–24
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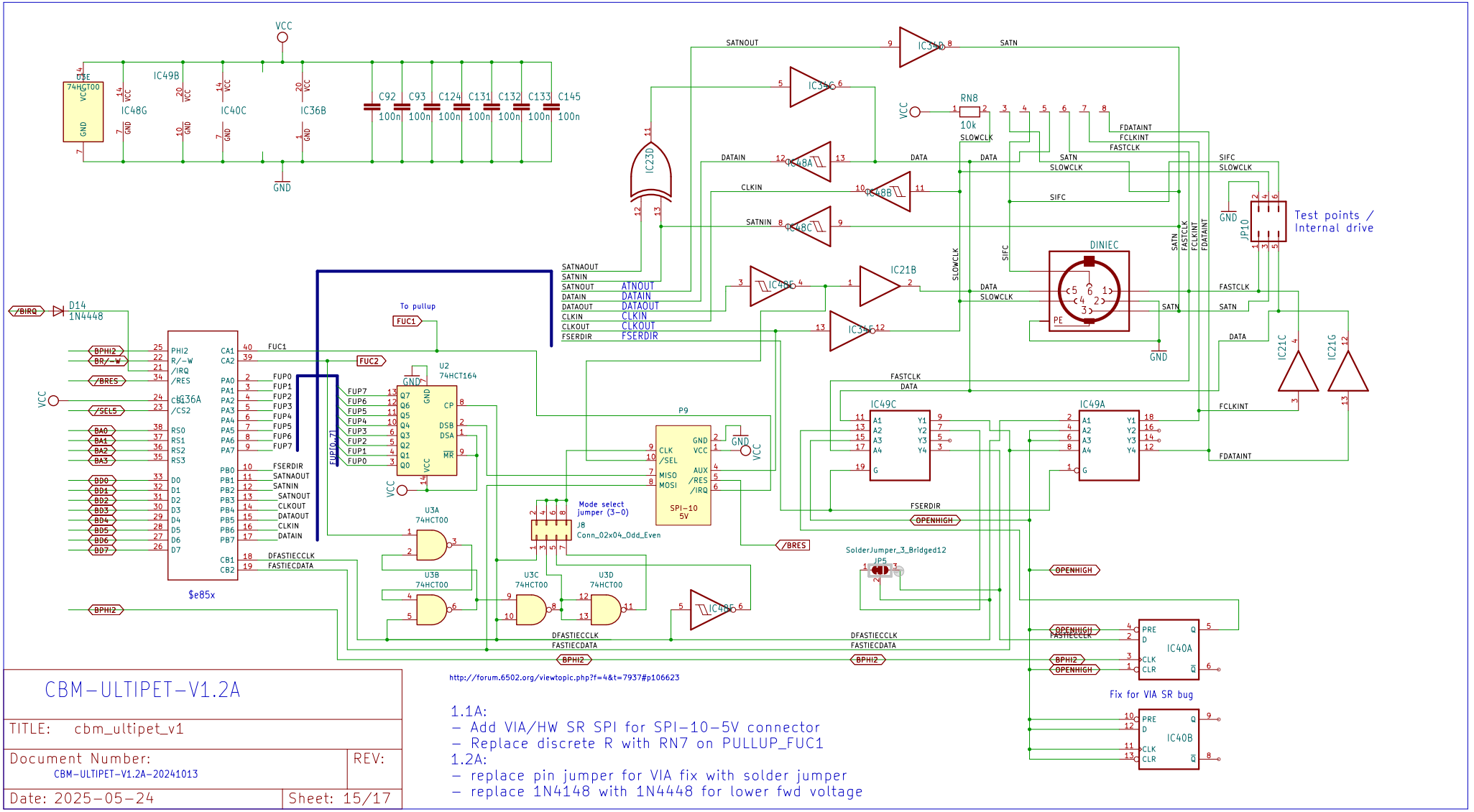
VCC
GND
IC49B
IC48G
IC40C
IC36B
C92 100n
C93 100n
C124 100n
C131 100n
C132 100n
C133 100n
C145 100n
SATNOUT
SATN
DATAIN
DATA
CLKIN
SATNIN
SATNAOUT
SATNIN
SATNOUT
DATAIN
DATAOUT
CLKIN
CLKOUT
FSERDIR
ATNOUT
DATAIN
DATAOUT
CLKIN
CLKOUT
FSERDIR
RN8
10k
SLOWCLK
FDATAINT
FCLKINT
FASTCLK
SIFC
DINIEC
PE
JP10
Test points / Internal drive
IC21B
IC21C
IC21G
/BIRQ
D14
1N4448
To pullup
FUC1
FUC2
$e85x
PHI2
R/-W
/IRQ
/RES
/CS1
/CS2
RS0
RS1
RS2
RS3
D0
D1
D2
D3
D4
D5
D6
D7
CA1
CA2
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
CB1
CB2
FUP0
FUP1
FUP2
FUP3
FUP4
FUP5
FUP6
FUP7
FSERDIR
SATNAOUT
SATNIN
SATNOUT
CLKOUT
DATAOUT
CLKIN
DATAIN
DFASTIECCLK
FASTIECDATA
BPHI2
BR/-W
/RES
/SEL5
BA0
BA1
BA2
BA3
BD0
BD1
BD2
BD3
BD4
BD5
BD6
BD7
U2
74HCT164
FUP(0..7)
U3A
74HCT00
U3B
74HCT00
U3C
74HCT00
U3D
74HCT00
P9
SPI-10
5V
Mode select jumper (3-0)
J8
Conn_02x04_Odd_Even
/BRES
SolderJumper_3_Bridged12
JP5
OPENHIGH
IC49C
IC49A
IC40A
IC40B
Fix for VIA SR bug
http://forum.6502.org/viewtopic.php?f=4&t=7937#p106623
CBM-ULTIPET-V1.2A
TITLE: cbm_ultipet_v1
Document Number:
CBM-ULTIPET-V1.2A-20241013
REV:
Date: 2025-05-24
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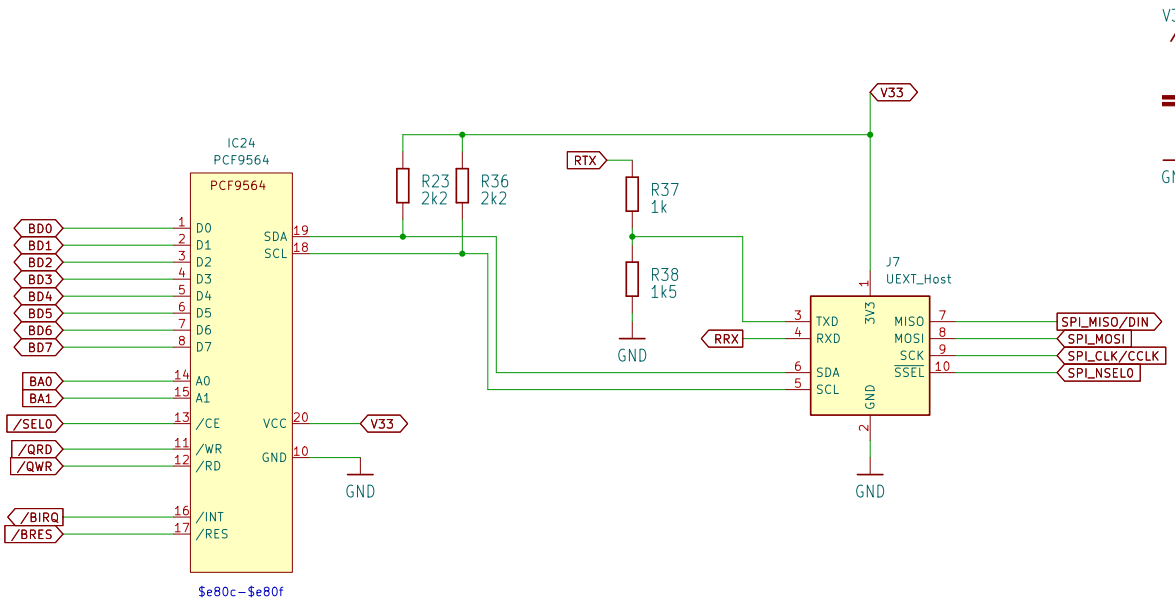
1.1A:
- Add VIA/HW SR SPI for SPI-10-5V connector
- Replace discrete R with RN7 on PULLUP_FUC1
1.2A:
- replace pin jumper for VIA fix with solder jumper
- replace 1N4148 with 1N4448 for lower fwd voltage



1.1A:
– this page is new

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TITLE: cbm_ultipet_v1	
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