Power Supply

5V−−−>3.3V

File: DCDC_12V_3.3V.kicad_sch

5V −−−> +15V_+15V

File: DCDC_3.3_+−15.kicad_sch

+15V
−15V
5V

are global labels

MCU

File: MCU.kicad_sch

TFT_LCD

File: TFT_LCD.kicad_sch

Accent

GPIO_ACCENT_DEFAULT
TIM3_CH2_ACCENT_TRIG
TIM3_CH1_ACCENT_LEVEL
ACCENT_DEFAULT
TRIG
TRIG_LEVEL_PWM
TRIGwACCENT

File: Accent.kicad_sch

Accent ima še en dodaten OP amp, uporabljen pri Cymbal_Cowbell PWM to +/−15V

BassDrum

GPIO_OUT_ENABLE5
TIM1_CH2_VCR
TIM1_CH1_VCR
BD_Enable
Trigger
VCR_LEVEL_PWM
VCR_DELAY_PWM
BD_OUT

File: BassDrum.kicad_sch

Claves

GPIO_OUT_ENABLE2
TIM2_CH3_VCR
Trigger
CL_Enable
VCR_LEVEL_PWM
CL_OUT

File: Claves.kicad_sch

RimShot

GPIO_OUT_ENABLE3
TIM2_CH4_VCR
Trigger
RS_Enable
VCR_LEVEL_PWM
RS_OUT

File: RimShot_sch.kicad_sch

Conga

GPIO_OUT_ENABLE4
TIM13_CH1_VCR
Trigger
CO_Enable
VCR_LEVEL_PWM
CO_OUT

File: Conga.kicad_sch

SnareDrum

GPIO_OUT_ENABLE1
TIM5_CH1_VCR
TIM2_CH2_VCR
Trigger
SD_Enable
VCR_SNAPPY_PWM
VCR_LEVEL_PWM
SD_OUT

File: SnareDrum.kicad_sch

NoiseGenerator

WHITE_NOISE

PINK_NOISE

File: NoiseGenerator.kicad_sch

Tom

GPIO_OUT_ENABLE6
TIM3_CH3_VCR
Trigger
TM_Enable
VCR_LEVEL_PWM
TM_OUT

File: Tom.kicad_sch

Cymbal&Cowbell

GPIO_OUT_ENABLE7
TIM12_CH1_VCR
GPIO_OUT_ENABLE8
TIM3_CH4_VCR
TIM12_CH2_VCR
Trigger
CB_Enable
VCR_LEVEL_PWM_CB
CY_Enable
VCR_LEVEL_PWM_CY
VCR_DECAY_PWM_CY
CB_OUT
CY_OUT

File: Cymbal_Cowbell_CloseHihat.kicad_sch

Output

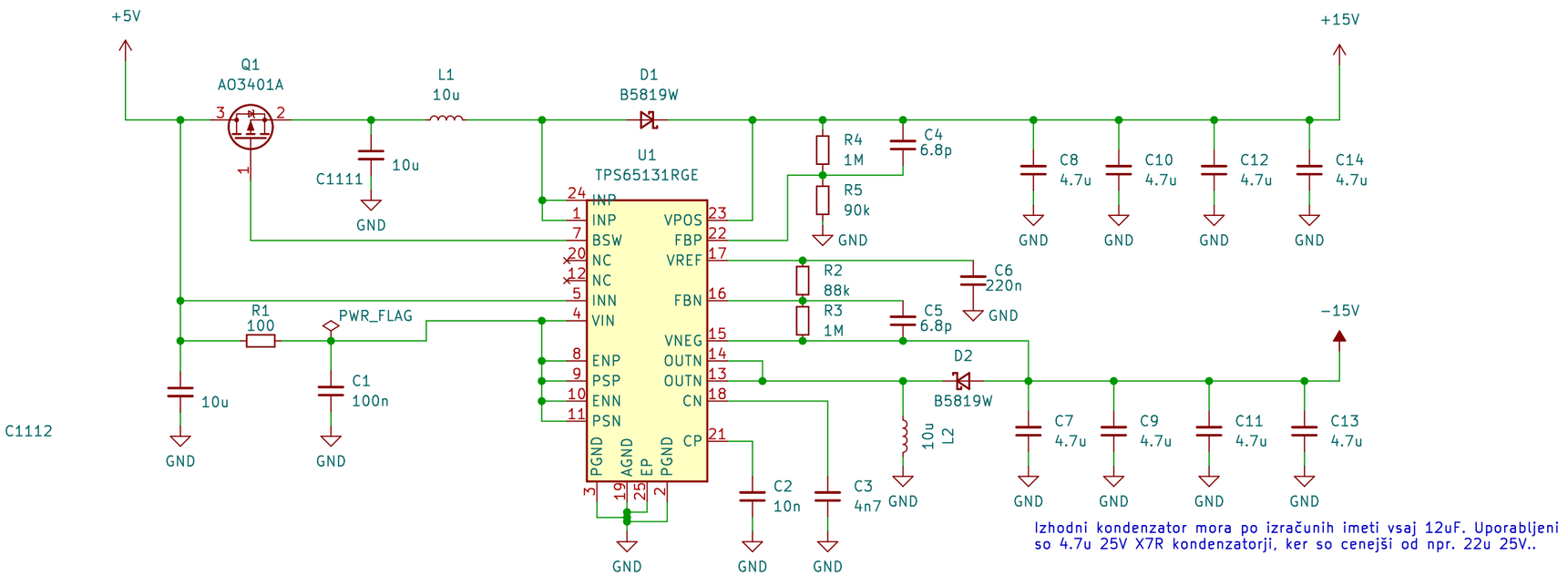
BD
CL
RS
CO
SD
TM
CB
CY

File: output.kicad_sch

Sheet: /
File: 3_12_2024_MainBoardMCUwInstruments.kicad_sch

Title: STM32_KickDrum

Size: A3	Date: 2023−06−03	**Rev: 0**
KiCad E.D.A. kicad (6.0.10)		Id: 1/15



Sheet: /5V −−−> +15V_+15V/
File: DCDC_3.3_+−15.kicad_sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.10)		Id: 2/15

S tema dvema vrednostima se bo potrebno igrati tako, da bo VCR večino časa deloval v linearnem področju in ne bo popačil signala.

1

2

3

4

5

6

7

Converting PWM from MCU to +/−15 V

Voltage controlled resistor for delaying the output signal

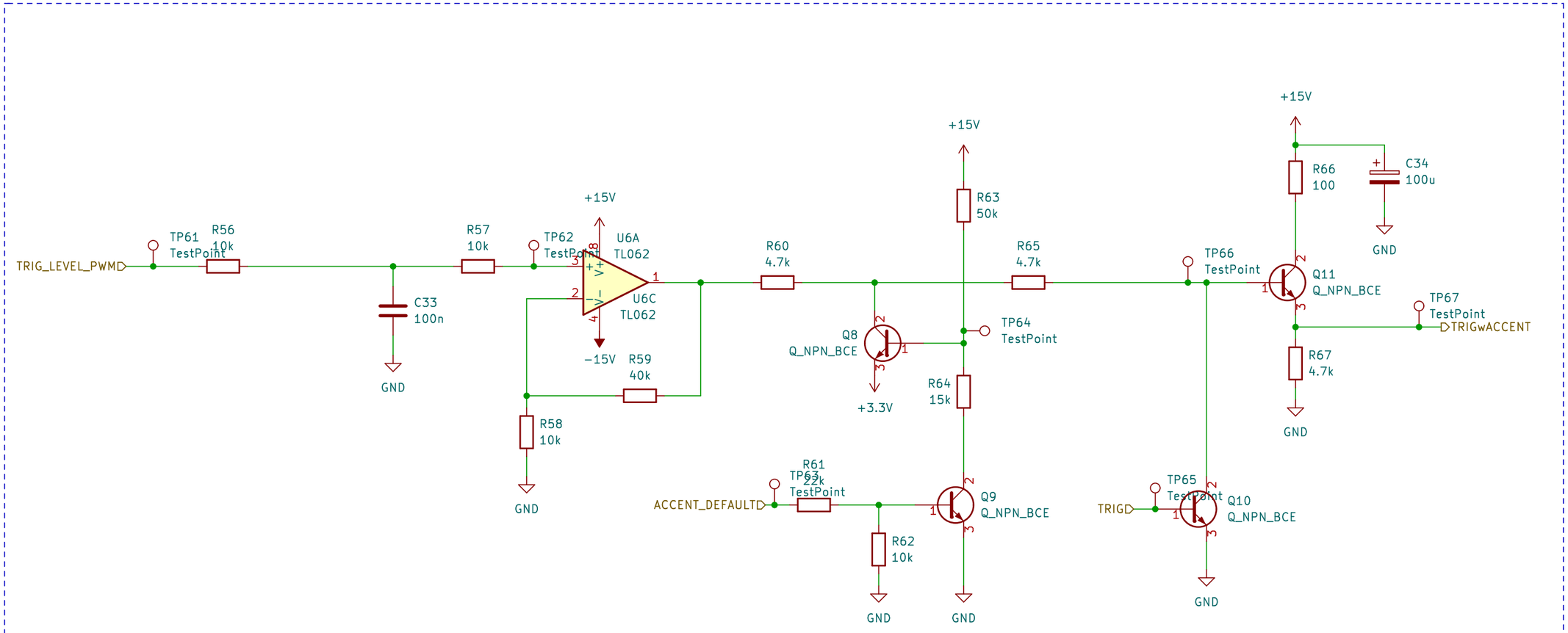
Voltage controlled resistor for adjusting output signal level

Predvidevam da so 0 ohm upori za namene izključitve VRCja

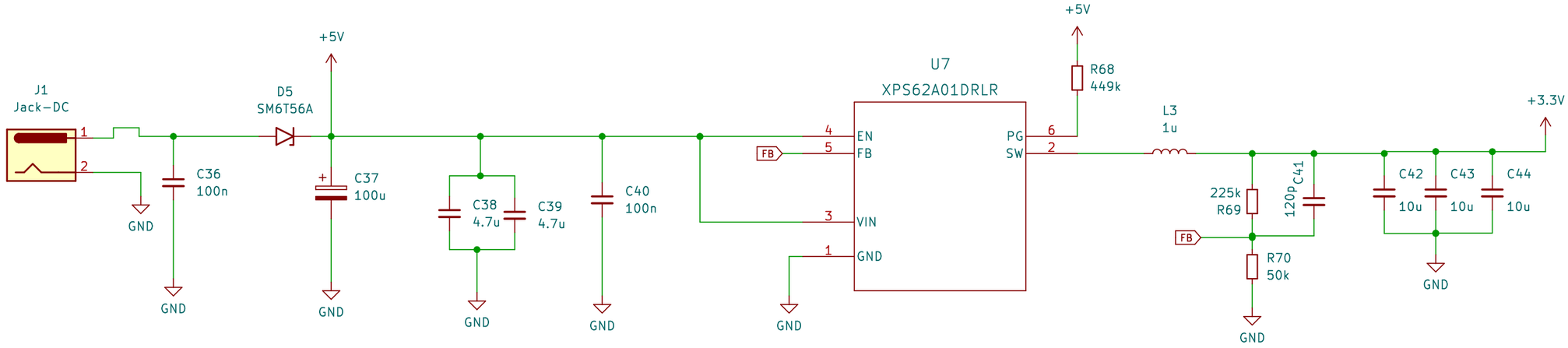
Sheet: /BassDrum/
File: BassDrum.kicad_sch

Title:

Size: A3 | Date: | Rev:
KiCad E.D.A. kicad (6.0.10) | Id: 3/15



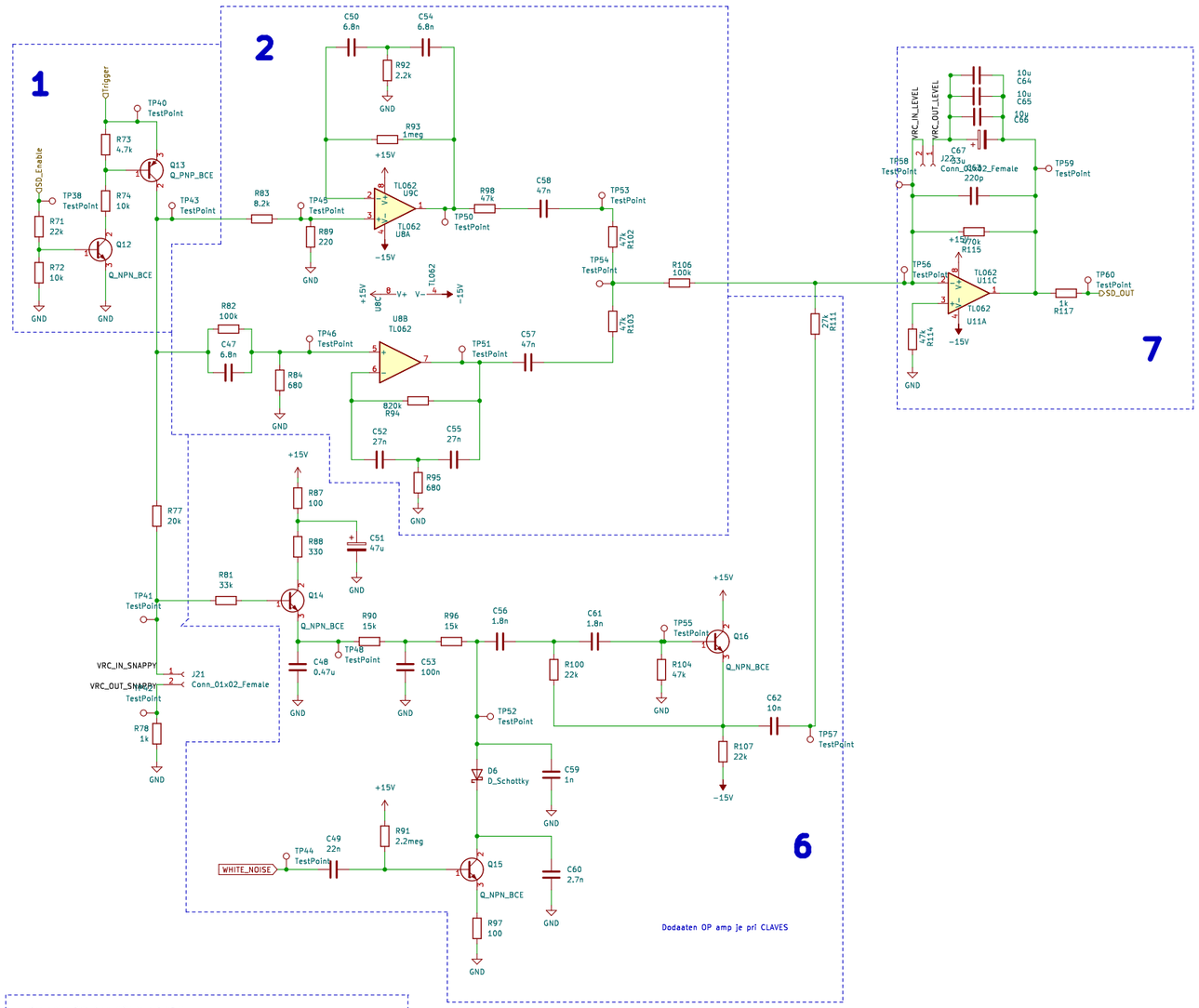
Sheet: /Accent/ File: Accent.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.10)		Id: 4/15

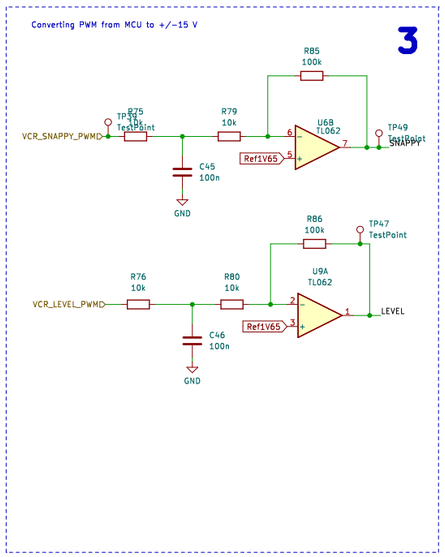


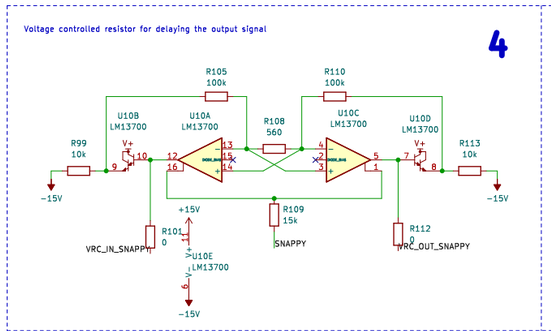
Sheet: /5V---->3.3V/
File: DCDC_12V_3.3V.kicad_sch

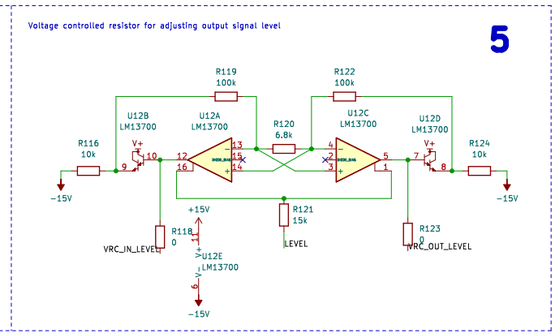
Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.10)		Id: 5/15





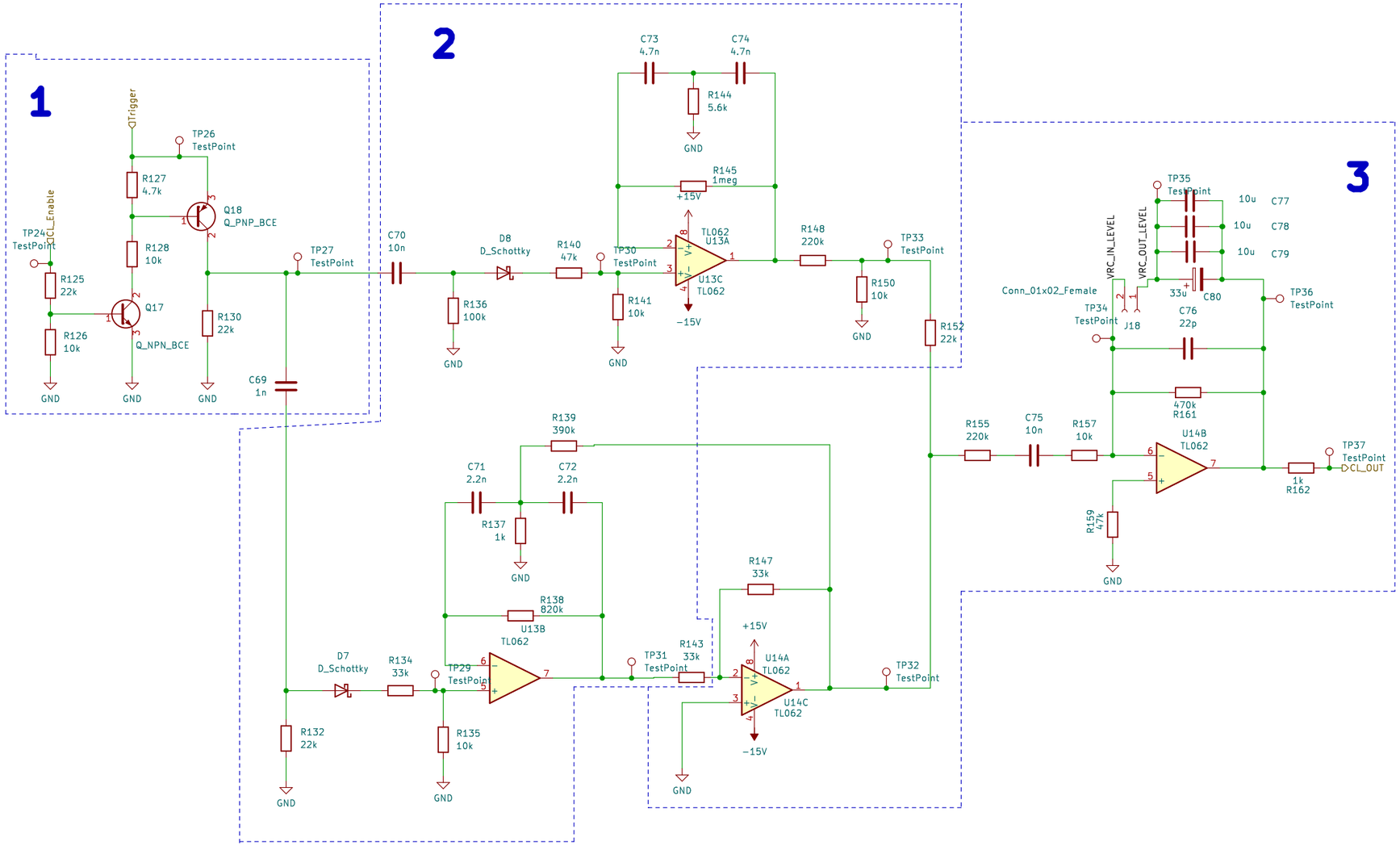


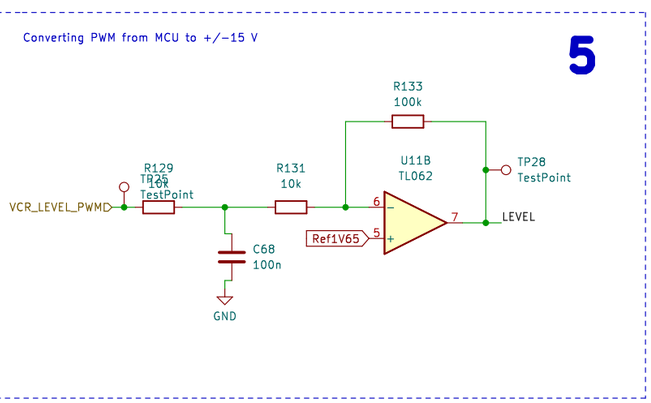


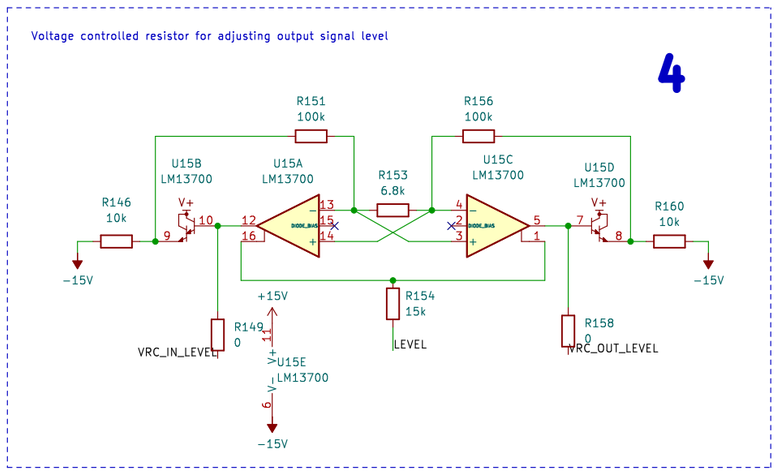
Sheet: /SnareDrum/
File: SnareDrum.kicad_sch

Title:

Size: A2	Date:	Rev:
KiCad E.D.A. kicad (6.0.10)		Id: 6/15





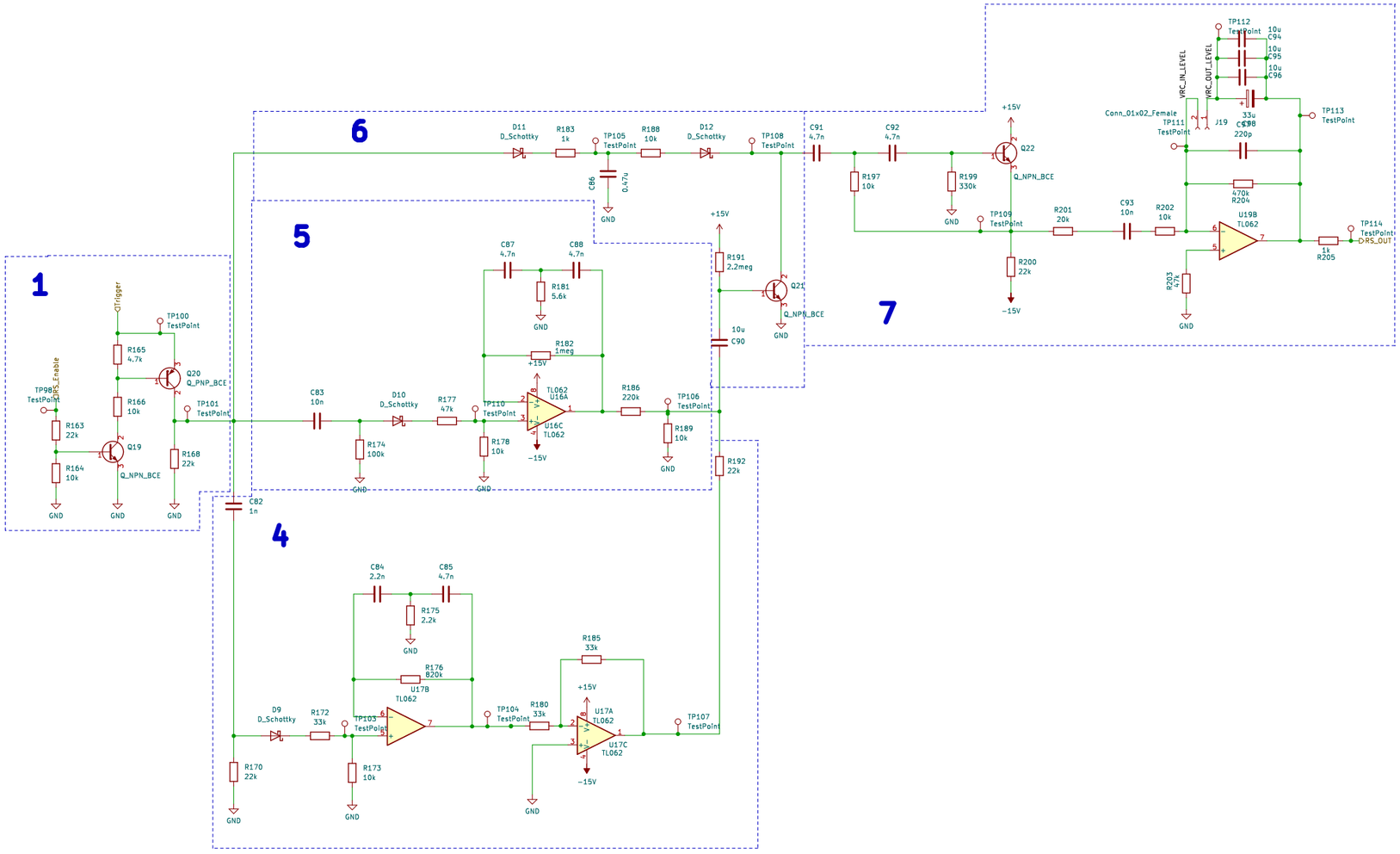


Sheet: /Claves/
File: Claves.kicad_sch

Title:

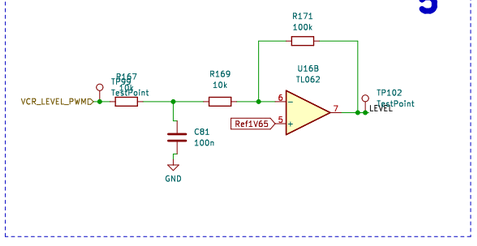
Size: A3 | Date: | **Rev:**

KiCad E.D.A. kicad (6.0.10) | Id: 7/15

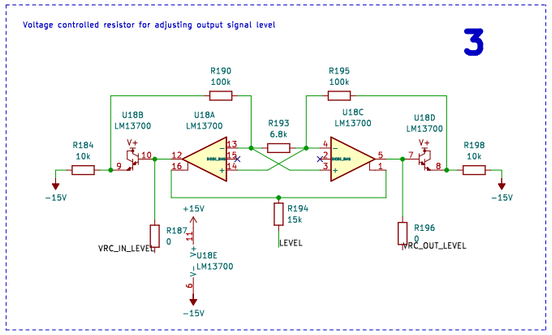


PWM converter je skupaj s zgornjim op-ampom

Converting PWM from MCU to +/-15 V



Voltage controlled resistor for adjusting output signal level



Sheet: /RimShot/		
File: RimShot_sch.kicad_sch		
Title:		
Size: A2	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.10)		Id: 8/15

1 2 3 4 5 6 7 8

A B C D E F

1

TM_Enable
Trigger
TP68 TestPoint
TP69 TestPoint
R206 22k
R207 10k
R208 4.7k
R209 10k
R210 4.7k
Q23 Q_NPN_BCE
Q24 Q_PNP_BCE
GND
TP71 TestPoint
C99 2.7n
D13 D_Schottky
R215 22k
TP73 TestPoint
R216 5.6k

2

TP77 TestPoint
C101 27n
C103 5.6n
C104 22n
TP80 TestPoint
R219 1k
D15
D16
R222 250
R223 250
R231 820k
R228 33k
U20B TL062
R221 820k
+15V
U20A TL062
U20C TL062
−15V
TP78 TestPoint
R226 33k
R233 100k

6

TP81 TestPoint
C107 33n
U22A TL062
TP84 TestPoint
TM_OUT
1k R243
R238 47k
470k R240
TP82 TestPoint
TP83 TestPoint
C108 1n
J23 Conn_01x02_Female
VRC_IN_LEVEL
VRC_OUT_LEVEL
C112 33u
10u C110
10u C109
10u C111
U22C TL062

3

R213 4.7k
D14 D_Schottky
TP72 TestPoint
R217 2.2meg
TP76 TestPoint
R224 33k
C100 27n
C102 47n
R225 4.7k
C105 27n
TP79 TestPoint
R232 22k
Q25 Q_NPN_BCE
R229 22k
22k R235
C106 10n
TP75 TestPoint
PINK_NOISE
R218 15k
R220 3.3k

4

Converting PWM from MCU to +/−15 V

R214 100k
R211 10k
R212 10k
U22B TL062
TP74 TestPoint
LEVEL
VCR_LEVEL_PWMD
Ref1V65
C35 100n

5

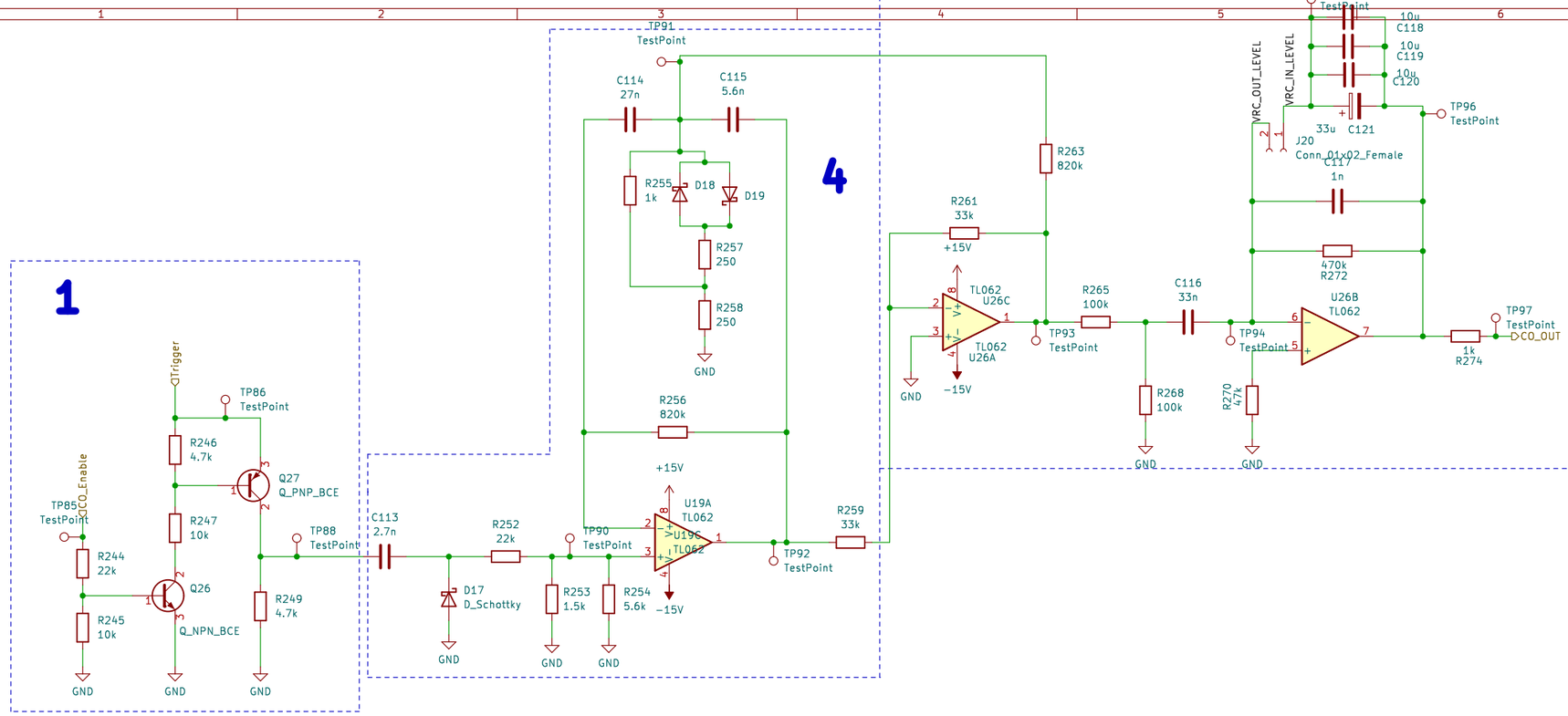
Voltage controlled resistor for adjusting output signal level

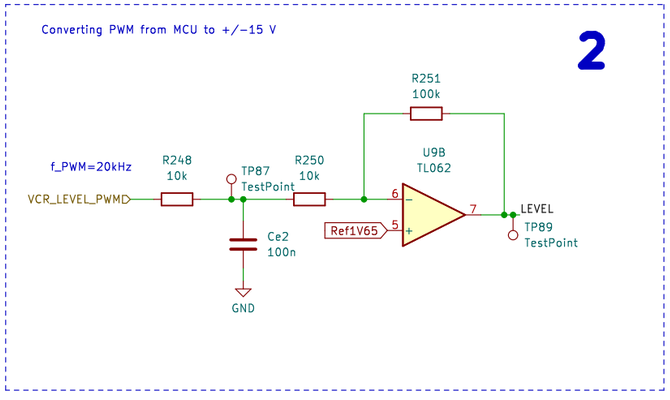
R234 100k
R239 100k
U21B LM13700
U21A LM13700
U21C LM13700
U21D LM13700
R236 6.8k
R227 10k
R242 10k
R230 0
R237 15k
R241 0
U21E LM13700
VRC_IN_LEVEL
LEVEL
VRC_OUT_LEVEL

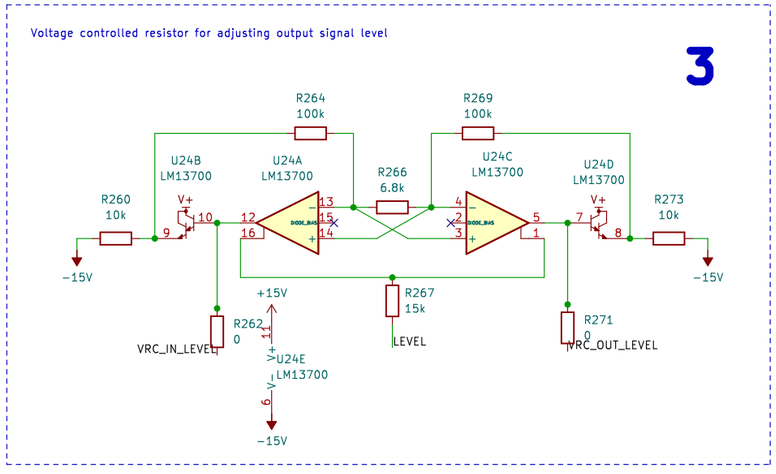
Sheet: /Tom/
File: Tom.kicad_sch

Title:

Size: A3 | Date: | **Rev:**
KiCad E.D.A. kicad (6.0.10) | Id: 9/15







Sheet: /Conga/		
File: Conga.kicad_sch		
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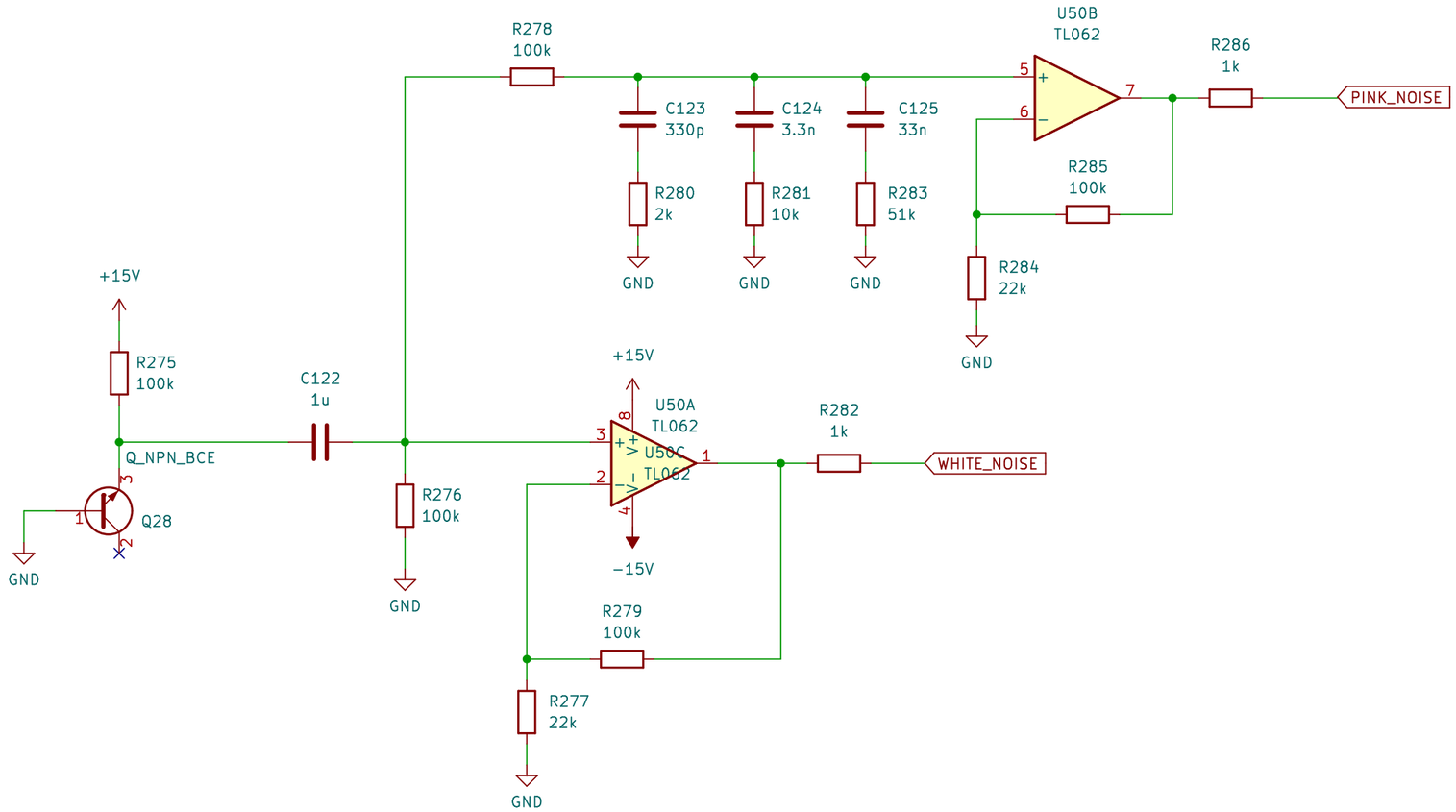
Size: A3	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.10)		Id: 10/15

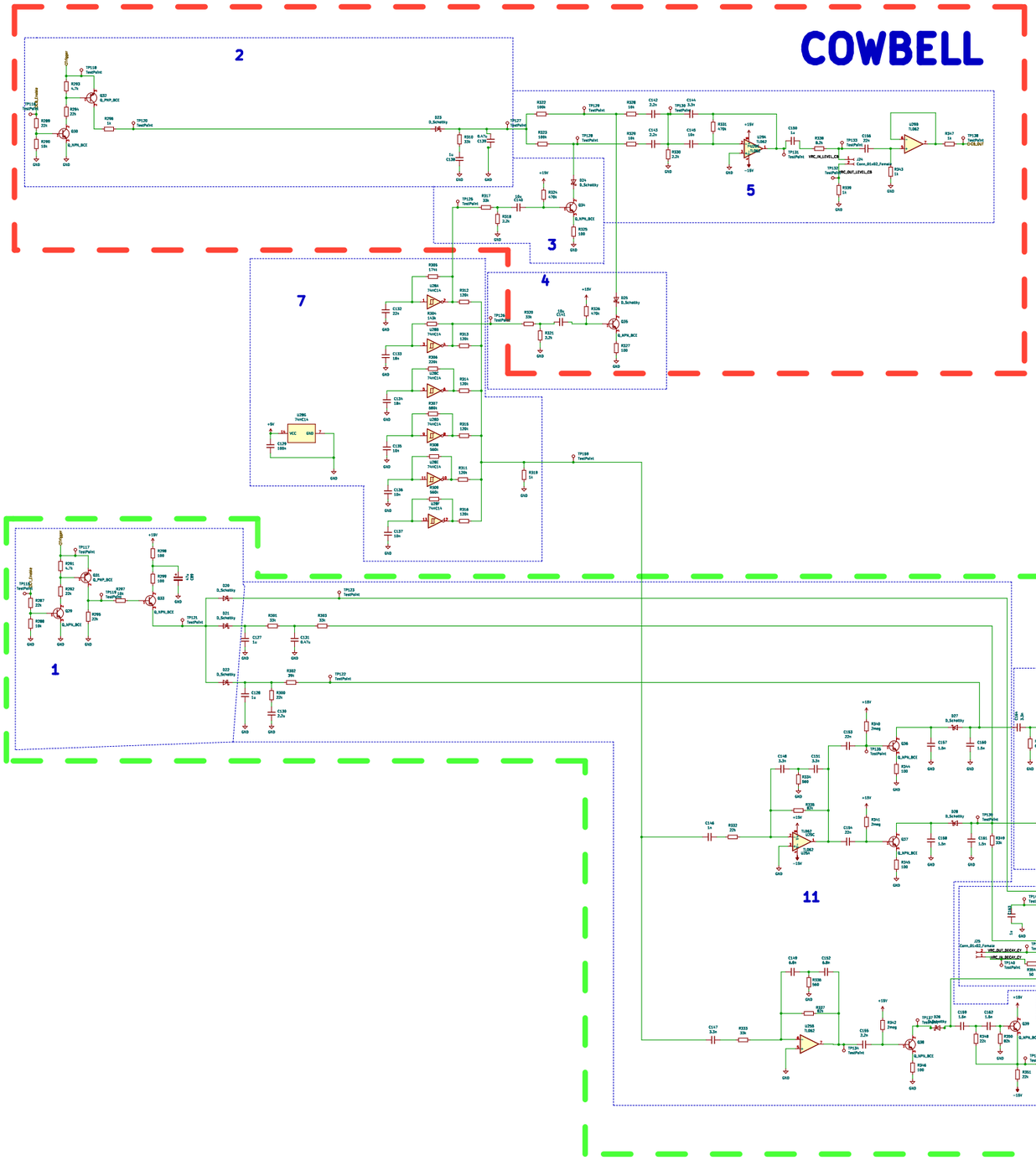


Sheet: /NoiseGenerator/
File: NoiseGenerator.kicad_sch

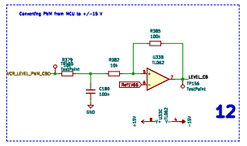
Title:

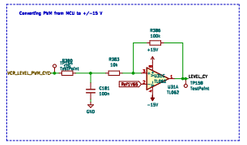
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.10)		Id: 11/15

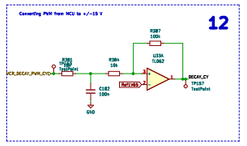
COWBELL

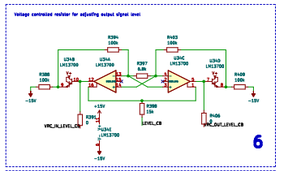


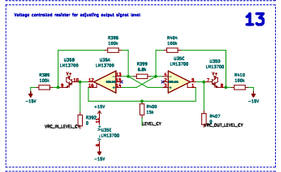
CYMBAL

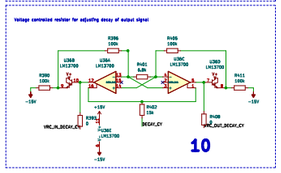












Sheets: /Cymbal&Cowbell/		
Files: Cymbal_Cowbell_ClosedHatLit.sch		
Title:		
Size: A0	Date:	Rev:
KiCad E.D.A. kicad (6.0.10)		Id: 12/19

vsak VDD potrebuje vsaj en 100nF kondenzator in en bulk C

+3.3V

C185 100n
C186 100n
C187 100n
C188 100n
C189 100n
C190 4u7

GND

Hard reset
NRST–>low
interno ima NRST weak pullup, zagotovi da ni reset–a
NRST bomo uporabili za debagiranje

BOOT pin ne sme plavati, obvezno mora biti low ali high,
LOW–>Run state, izvaja program iz flash–a
HICH 3.3V –> chip je v PROGRAM mode

Decoupling capacitors
for internal regulators

low ESR C

C183 2u2
C184 2u2

PWR_FLAG
+3.3V
+3.3VA

U37
STM32F405RGTx

NRST
BOOT0
VCAP_1
VCAP_2
PH0
PH1
PD2
PC0 PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13 PC14 PC15
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7 PA8 PA9 PA10 PA11 PA12 PA13 PA14 PA15
PB0 PB1 PB2 PB3 PB4 PB5 PB6 PB7 PB8 PB9 PB10 PB11 PB12 PB13 PB14 PB15
VBAT VDD VDD VDD VDD VDDA
VSS VSS VSSA

TIM5_CH1_VCR
TIM2_CH2_VCR
TIM2_CH3_VCR
TIM2_CH4_VCR
GPIO_OUT_ENABLE1
SPI1_SCK — TFT screen
TIM13_CH1_VCR
SPI1_SDIO — TFT screen
TIM1_CH1_VCR
TIM1_CH2_VCR
USB_D–
USB_D+
SWDIO — serial wire debugger data pin
SWCLK — serial wire debugg clock
TIM3_CH3_VCR
GPIO_OUT_ENABLE2
GPIO_OUT_ENABLE3
SWO — for printf via debugger
GPIO_ACCENT_DEFAULT
GPIO_OUT_RSTB1 — Front panel 1 touch reset
I2C1_SCL
I2C1_SDA
GPIO_INPUT_INTB1
GPIO_INPUT_INTB2 — Front panel 1&2 touch interrupt
I2C2_SCL
I2C2_SDA
GPIO_OUT_ENABLE4
GPIO_OUT_ENABLE5
TIM12_CH1_VCR
TIM12_CH2_VCR

Front panel 2 touch reset — GPIO_OUT_RSTB2
TFT screen — GPIO_RS_SCREEN, GPIO_RESET_SCREEN
Front panel 1&2 shutdown LED driver — GPIO_OUT_SDB2, GPIO_OUT_SDB1
TIM3_CH1_ACCENT_LEVEL
TIM3_CH2_ACCENT_TRIG
TIM3_CH4_VCR
GPIO_OUT_ENABLE8
GPIO_OUT_ENABLE7
GPIO_OUT_ENABLE6

HSE_IN
HSE_OUT

SYS_JTCK-SWCLK
PA14
VDD
VCA..
PA13 SYS_JTMS-SWDIO
PA12 USB_OTG_FS_DP
PA11 USB_OTG_FS_DM
PA10 GPIO_Output
PA9 TIM1_CH2
PA8 TIM1_CH1
PC9 TIM3_CH4
PC8 TIM8_CH3
PC7 TIM3_CH2
PC6 TIM3_CH1
PB15 TIM12_CH2
PB14 TIM12_CH1
PB13 GPIO_Output
PB12 GPIO_Output
VDD

Analog voltage

+3.3V
L4 39n
+3.3VA
C192 1u
C194 10n
GND

Boot switch

+3.3V
R412 10k
BOOT0
J15 Conn_01x03_Male
GND

High speed external crystal

Y1 16 Mhz
HSE_IN
HSE_OUT
R413 47
C191 8p
C193 8p
GND

Cload = 2*(CL–Cstray)

CL...loar capacitance of the crystal..12pF
Cstray...cca. 6pF

Feed resistor ni nujno potreben,
omejuje driver znotraj MCUja, ki
driva kristal. Če je drive level
prevelik, se na kristalu pojavijo
višji harmoniki

AN2867 application note

Connectors

Debug

J4
Conn_02x05_Odd_Even
+3.3V
SWDIO
SWCLK
SWO
NRST
GND

Front Panel 1

+3.3V
I2C1_SDA
I2C1_SCL
GPIO_INPUT_INTB1
GPIO_OUT_RSTB1
GPIO_OUT_SDB1
J3
Conn_01x07
GND

Front Panel 2

+3.3V
I2C2_SDA
I2C2_SCL
GPIO_INPUT_INTB2
GPIO_OUT_RSTB2
GPIO_OUT_SDB2
J5
Conn_01x07
GND

USB

zakaj je potreben za 5V net?? napajenje se dobi iz DCDCja

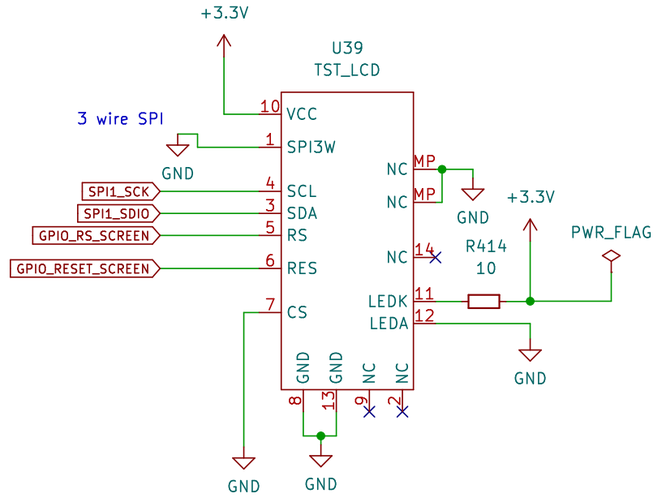
+5V je uporabljen samo na tem mestu,
ta globalni simbol je uporabljen samo tu

J2
USB_B_Micro
ESD connection
VBUS
D+
D–
ID
Shield
GND
USB_CONN_D+
USB_CONN_D–
ID ni potreben, saj je ta
MCU device, ni host
GND

ESD connection
U38
USBLC6–2SC6
USB_D–
USB_D+
USB_CONN_D–
USB_CONN_D+
GND

MCU ima interno pull–up upore za USB

Sheet: /MCU/
File: MCU.kicad_sch
Title:
Size: A3 | Date:
KiCad E.D.A. kicad (6.0.10)
Rev:
Id: 13/15



Sheet: /TFT_LCD/
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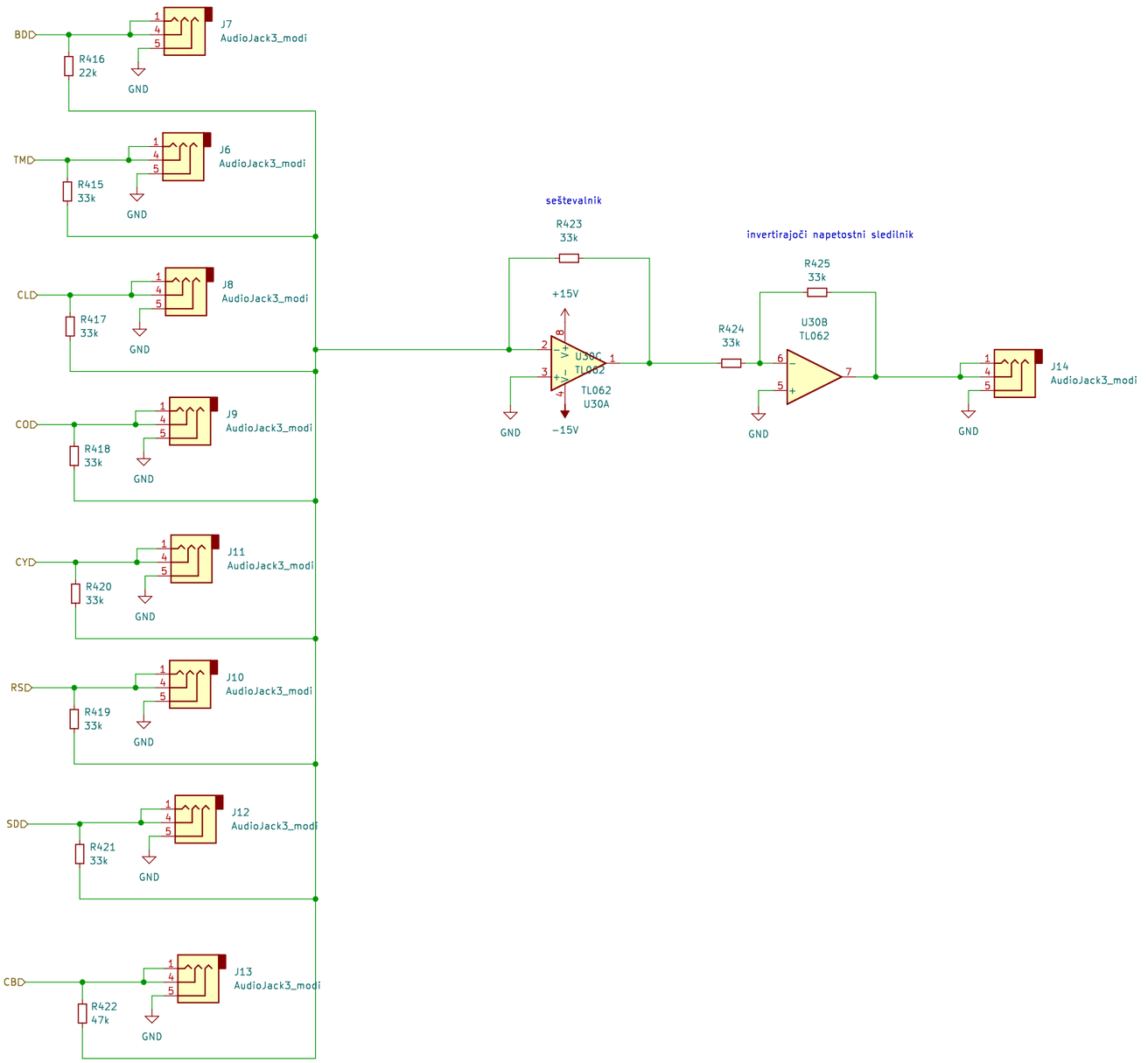
Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.10)		Id: 14/15



Sheet: /Output/		
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Title:		
Size: A3	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.10)		Id: 15/15