Video

U5
TVGA9000I
+5V
195ma
10–20ma
AVDD1 AVDD2
VDD VDD VDD VDD VDD VDD VDD VDD VDD VDD VDD VDD VDD VDD VDD VDD
DVDD1 DVDD2 AVDD1 AVDD2 AVDD2
DRAM interface
MD0 MD1 MD2 MD3 MD4 MD5 MD6 MD7 MD16 MD17 MD18 MD19 MD20 MD21 MD22 MD23
MA0 MA1 MA2 MA3 MA4 MA5 MA6 MA7 MA8 MA0 MA1 MA2 MA3 MA4 MA5 MA6 MA7 MA8
CAS RAS WE2 WE0 DMCLK
ROM
ROMCS ROMBA0 ROMCLK RMD0 RMD1 RMD2 RMD3 RMD4 RMD5 RMD6 RMD7
ISA Bus interface
SD0 SD1 SD2 SD3 SD4 SD5 SD6 SD7 SD8 SD9 SD10 SD11 SD12 SD13 SD14 SD15
SA0 SA1 SA2 SA3 SA4 SA5 SA6 SA7 SA8 SA9 SA10 SA11 SA12 SA13 SA14 SA15 SA16 SA17(LA17) SA18(LA18) SA19(LA19) LA20 LA21 LA22 LA23
IOR IOW MEMR MEMW IOCHRDY ALE AEN MCS16 IRQ NMI SBHE ENMEM RESET
MEMCS16 REFRESH
Feature connector
P0 P1 P2 P3 P4 P5 P6 P7 PCLK BLANK ESYNC ECLK EVIDEO
RESERVED MLF(RES) RESERVED RESERVED RESERVED
Video interface
R G B VSYNC HSYNC IRSET VREF
Etc
MONITOR VLF OUTP0
Xtal
XTL1 XTL2
VSS VSS VSS VSS VSS VSS VSS VSS VSS VSS VSS VSS VSS VSS VSS VSS
DVSS2 DVSS1 AVSS2 AVSS2
GND GNDA

FB1 FB2 FB3
R G B
VGA_R VGA_G VGA_B
R3 150 R4 150 R5 150
C7 47p C8 47p C9 47p
GNDA

+5V
R8 4.7k Monitor
FB4 FB5 FB6
HSYNC VSYNC
VGA_MON VGA_HS VGA_VS
C22 47p C23 47p C24 1u
GNDA

SW1
VGA Config
VGABIOS MD2
SW1_2 – Monitor H-Sync <48.7kHz
R21 4.7k
+5V GND

R20 100 IOW
C28 100p
MEMR
C29 47p
GND

RMD1 RMD3 RMD7 RMD4 RMD5 RMD6
4.7k
R19 R22 R24 R25 R23
GND

R32 33 OSC
C26 47p C27 47p
R17 33 CAS
R18 33 RAS
GND

U7
27C512
+5V 20mA
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15
VCC
O0 O1 O2 O3 O4 O5 O6 O7
RMD0 RMD1 RMD2 RMD3 RMD4 RMD5 RMD6 RMD7
ROMBA0 VGABIOS ROMCS
OE/VPP CE
GND
R28 10k

Y1 40 MHz
L6 2.7u
C32 100n
GND

U11 U12 U13 U14
MT4C4256
+5V 90mA
A0 A1 A2 A3 A4 A5 A6 A7 A8
DQ1 DQ2 DQ3 DQ4
CAS RAS OE WE
VCC GND
MAA0 MAA1 MAA2 MAA3 MAA4 MAA5 MAA6 MAA7 MAA8
MD0 MD1 MD2 MD3
MD4 MD5 MD6 MD7
MAB0 MAB1 MAB2 MAB3 MAB4 MAB5 MAB6 MAB7 MAB8
MD16 MD17 MD18 MD19
MD20 MD21 MD22 MD23

Sound

U4
ES1868F
+5V AVDD_ES
VAC VAC VAC VAC VAC VDDA
D0 D1 D2 D3 D4 D5 D6 D7 A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11
IOR IOW IRQ9 IRQ5 IRQ7 IRQ10 IRQ11 DRQ0 DRQ1 DRQ3 DRQ5 DACK0 DACK1 DACK5 RESET
IRQB IRQA IRQC IRQD IRQE IRQF DRQA DRQB DRQC DRQD DACKBA DACKBB DACKBC DACKBD
PSEL1 PSELO/SECS MUTE/SECLK VOLUP/SEDI VOLDN/SEDO
XI XO
AUXA_L AUXA_R AUXB_L AUXB_R LINE_L LINE_R MIC CMR VREF FOUT_L CIN_L FOUT_R CIN_R AOUT_L AOUT_R
MSD MCLK MSO MSI SWA SWB SWC SWD TA TB TC TD RSTB CDENBL CDCSB1 CDCSB0 CDIRQ SE DX DR DCLK FSX FSR MMCSB MMIRQ MMIEB GPCS/GPDO GPIRQ GPDACK
GND GNDA

C1 100n C2 4.7u R1 47k SPKR
GNDA
L1 BLM21PG331BH1D
C3 220n C4 220n C5 220n C6 220n MIDI_L MIDI_R LINE_L LINE_R
L2 L3 BLM21PG331BH1D
J4 PJ-320
C10 47u/6.3V C11 100n C14 100n C16 220n C17 1n C18 220n C19 1n
C20 1u C25 1u R11 10k R13 10k MSO
R33 10k RSTB
JP1 2 Vol. Btns
R30 10k R26 1k R27 1k R29 1k
OSC R31 33
U10 93C66 CS ORG SK DI DO
JP2 1-2: Internal ROM used
2-3: EEPROM used for PnP

AVDD_OP
R6 10k R7 10k R9 10k
C12 10u C13 10n
U2A U2B NE5532DR
C15 47u L4 BLM21PG331BH1D R10 47k ADUT_R
C21 47u L5 BLM21PG331BH1D R12 47k ADUT_L

Logo
J4 ESP
J3
ADUT_R ADUT_L VGA_MON VGA_R VGA_HS VGA_G VGA_VS VGA_B SPKR

MIDI

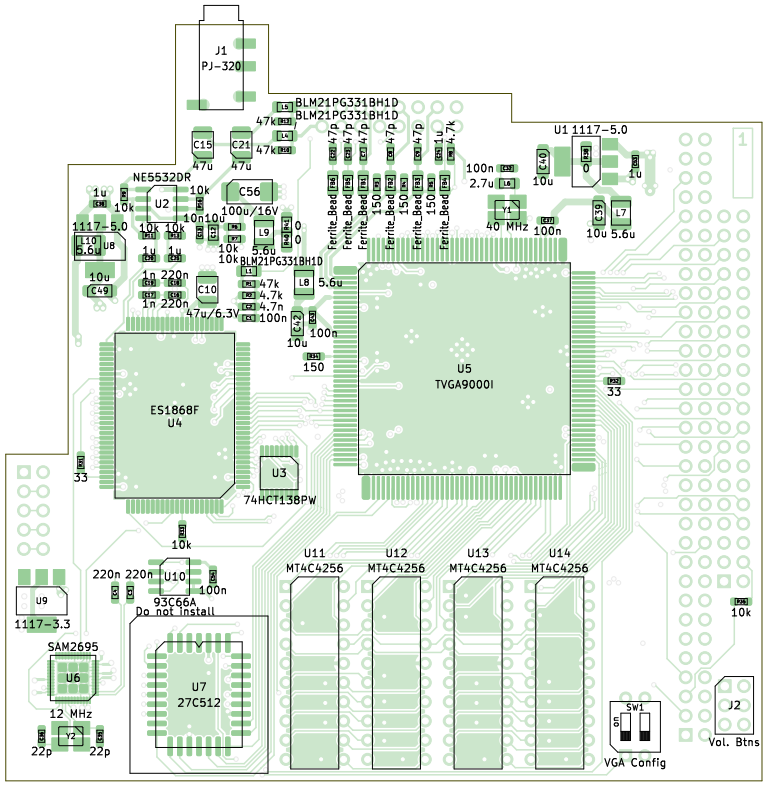
U6
SAM2695
+3V3 18mA
MICIN MIDI_IN RST/PD CS RD WR A0 D0 D1 D2 D3 D4 D5 D6 D7 IRQ TEST OUTVC12 X1 X2 XDIV VCM AOUTL AOUTR VCMHPOUT
AGND GND GND GND GND GND GND GND GND GND GND GND GND GND GND GND
MSO RSTB MIDI_L MIDI_R
C30 100n C31 10u
Y2 12 MHz
C33 100n C34 10u C35 22p C36 22p

PC/104

J6 PC104
J5 PC104_16
R35 10k
R36 1k RESET
C41 470p
IRQ9 +12V
NMI D7 D6 D5 D4 D3 D2 D1 D0 IOCHRDY AEN
MEMW MEMR IOW IOR DACK3 DRQ3 DACK1 DRQ1 REFRESH IRQ7 IRQ5 ALE OSC
SBHE LA23 LA22 LA21 LA20 LA19 LA18 LA17 MEMCS16 IRQ10 IRQ11 DACK0 DRQ0 DACK5 DRQ5 D8 D9 D10 D11 D12 D13 D14 D15

Install U1 or R38 R38 recommended
Install U8 or L10 U8 recommended
Install R40 or R41 R41 recommended
U1 U8 1117-5.0
U9 1117-3.3
+12V +5V +3V3
L7 5.6u L8 5.6u L10 5.6u L9 5.6u
R38 0 R40 0 R41 0
AVDD1 AVDD2 AVDD_ES AVDD_OP
C38 1u C40 10u C39 10u C42 10u C43 100n C53 1u C49 10u C55 100n C44 10u C45 10u C56 100u/16V C57 100n
C46 1u C47 100n C48 100n C74 100u C50 1u C51 1u C52 1u C66 100n C67 100n C68 100n C69 100n C70 100n C71 100n C72 100n C73 100n C58 100n C59 100n C60 100n C61 100n C62 100n C63 100n C64 100n C65 100n C54 100n

VGA & Sound board for Kharon-386
Eugene Lozovoy
Sheet: /
File: kharon386_top.kicad_sch
Title: PC-KHARON-386-TOP
Size: User | Date: 2023-02-22 | **Rev: A1**
KiCad E.D.A. kicad-cli 7.0.7 | Id: 1/1



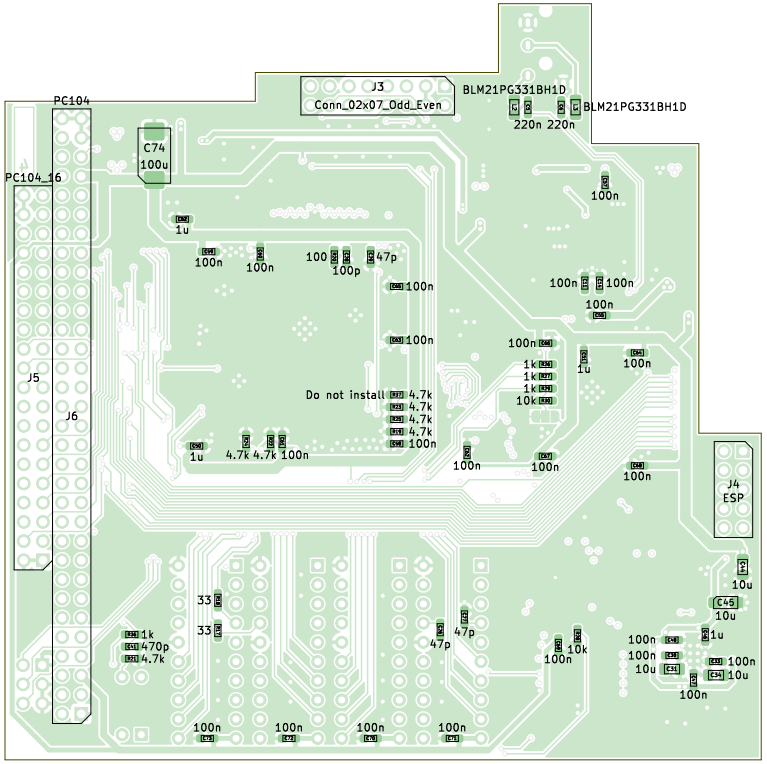
Layers: 4	Min clearance: 0.2mm
Dimensions: 100x100mm	Min track: 0.2mm
Thickness: 1.6mm	Min hole: 0.3mm
	Min annular ring: 0.15mm

Eugene Lozovoy

Sheet:
File: kharon386_top.kicad_pcb

Title: PC-KHARON-386-TOP

Size: A4	Date: 2023-02-22	**Rev: A1**
${KICAD_VERSION}		Id: 1/1



Eugene Lozovoy		
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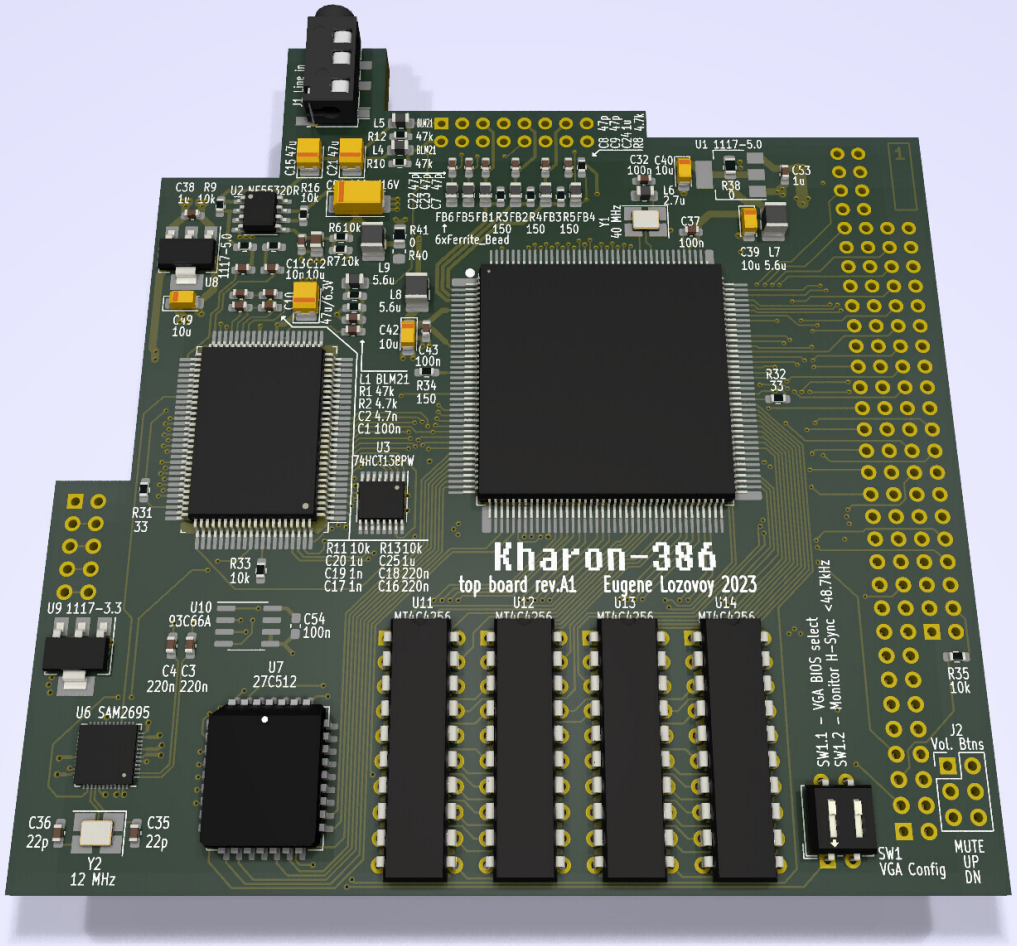
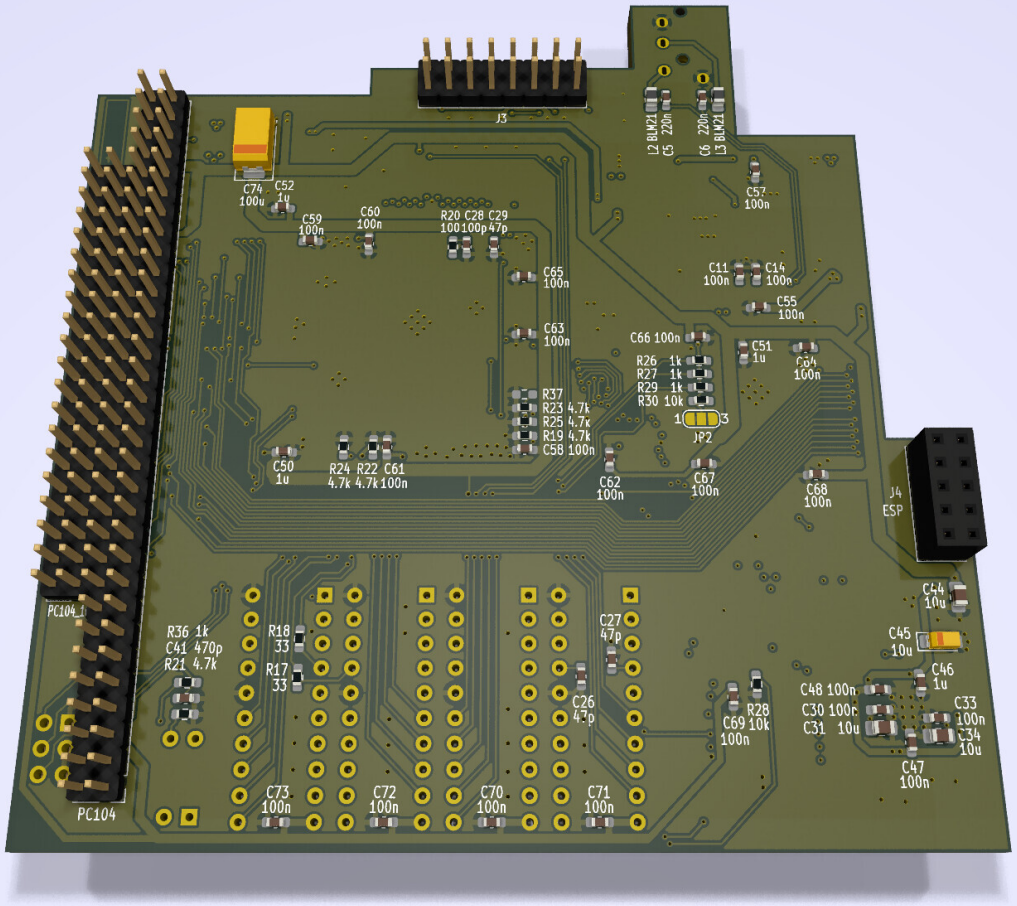
Title: PC-KHARON-386-TOP		
Size: A4	Date: 2023-02-22	**Rev: A1**
${KICAD_VERSION}		Id: 1/1

Bill Of Materials

References	Value	Footprint	Qty
C1 C11 C14 C30 C32 C33 C37 C43 C47 C48 C54 C55 C57 C58 C59 C60 C61 C62 C63 C64 C65 C66 C67 C68 C69 C70 C71 C72 C73	100n	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	29
C10	47u/6.3V	Capacitor_Tantalum_SMD:CP_EIA-3528-21_Kemet-B_Pad1.50x2.35mm_HandSolder	1
C12 C31 C34 C44	10u	Capacitor_SMD:C_0805_2012Metric_Pad1.18x1.45mm_HandSolder	4
C13	10n	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	1
C15 C21	47u	Capacitor_Tantalum_SMD:CP_EIA-3528-21_Kemet-B_Pad1.50x2.35mm_HandSolder	2
C17 C19	1n	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	2
C2	4.7n	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	1
C20 C24 C25 C38 C46 C50 C51 C52 C53	1u	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	9
C28	100p	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	1
C16 C18 C3 C4 C5 C6	220n	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	6
C35 C36	22p	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	2
C39 C40 C42 C45 C49	10u	Capacitor_Tantalum_SMD:CP_EIA-3216-18_Kemet-A_Pad1.58x1.35mm_HandSolder	5
C41	470p	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	1
C56	100u/16V	Capacitor_Tantalum_SMD:CP_EIA-6032-28_Kemet-C_Pad2.25x2.35mm_HandSolder	1
C22 C23 C26 C27 C29 C7 C8 C9	47p	Capacitor_SMD:C_0603_1608Metric_Pad1.08x0.95mm_HandSolder	8
C74	100u	Capacitor_Tantalum_SMD:CP_EIA-7343-31_Kemet-D_Pad2.25x2.55mm_HandSolder	1
FB1 FB2 FB3 FB4 FB5 FB6	Ferrite_Bead	Inductor_SMD:L_0805_2012Metric_Pad1.15x1.40mm_HandSolder	6
J1	PJ-320	my:PJ-320A_D	1
J2	Vol. Btns	Connector_PinHeader_2.54mm:PinHeader_2x03_P2.54mm_Vertical	1
J3	Conn_02x07_Odd_Even	Connector_PinHeader_2.54mm:PinHeader_2x08_P2.54mm_Vertical	1
J4	ESP	Connector_PinSocket_2.54mm:PinSocket_2x05_P2.54mm_Vertical	1
J5	PC104_16	Connector_PinHeader_2.54mm:PinHeader_2x20_P2.54mm_Vertical	1
J6	PC104	Connector_PinHeader_2.54mm:PinHeader_2x32_P2.54mm_Vertical	1

L1 L2 L3 L4 L5	BLM21PG331BH1D	Inductor_SMD:L_0805_2012Metric_Pad1.15x1.40mm_HandSolder	5
L6	2.7u	Inductor_SMD:L_0805_2012Metric_Pad1.15x1.40mm_HandSolder	1
L10 L7 L8 L9	5.6u	Inductor_SMD:L_1210_3225Metric_Pad1.42x2.65mm_HandSolder	4
R1 R10 R12	47k	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	3
R17 R18 R31 R32	33	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	4
R19 R2 R21 R22 R23 R24 R25 R8	4.7k	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	8
R20	100	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	1
R26 R27 R29 R36	1k	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	4
R3 R34 R4 R5	150	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	4
R38 R40 R41	0	Resistor_SMD:R_0805_2012Metric_Pad1.20x1.40mm_HandSolder	3
R11 R13 R16 R28 R30 R33 R35 R6 R7 R9	10k	Resistor_SMD:R_0603_1608Metric_Pad0.98x0.95mm_HandSolder	10
SW1	VGA Config	Button_Switch_THT:SW_DIP_SPSTx02_Slide_6.7x6.64mm_W7.62mm_P2.54mm_LowProfile	1
U1 U8	1117-5.0	Package_TO_SOT_SMD:SOT-223-3_TabPin2	2
U11 U12 U13 U14	MT4C4256	Package_DIP:DIP-20_W7.62mm	4
U2	NE5532DR	Package_SO:SOIC-8_3.9x4.9mm_P1.27mm	1
U3	74HCT138PW	Package_SO:TSSOP-16_4.4x5mm_P0.65mm	1
U4	ES1868F	my:PQFP-100_14x20mm_P0.65mm_ESxxx	1
U5	TVGA9000I	my:PQFP-160_28x28mm_P0.65mm_LongPads	1
U6	SAM2695	Package_DFN_QFN:QFN-48-1EP_6x6mm_P0.4mm_EP4.2x4.2mm	1
U7	27C512	my:PLCC-32_11.4x14.0mm_P1.27mm-longpads	1
U9	1117-3.3	Package_TO_SOT_SMD:SOT-223-3_TabPin2	1
Y1	40 MHz	Crystal:Crystal_SMD_SeikoEpson_TSX3225-4Pin_3.2x2.5mm_HandSoldering	1
Y2	12 MHz	Crystal:Crystal_SMD_SeikoEpson_TSX3225-4Pin_3.2x2.5mm_HandSoldering	1


Kharon-386
top board rev.A1 Eugene Lozovoy 2023
J1 Line in
U1 1117-5.0
U2 NE5532DR
U3 74HC153PW
U6 SAM2695
U7 27C512
U8 1117-5.0
U9 1117-3.3
U10 93C66A
U11 MT4C4256
U12 MT4C4256
U13 MT4C4256
U14 MT4C4256
Y1 40 MHz
Y2 12 MHz
J2 Vol. Btns
SW1 VGA Config
SW1.1 - VGA BIOS select
SW1.2 - Monitor H-Sync <48.7kHz
MUTE
UP
DN


J3
L2 BLM21
C5 220n
C6 220n
L3 BLM21
C74 100u
C52 1u
C59 100n
C60 100n
R20 100
C28 100p
C29 47p
C65 100n
C63 100n
C57 100n
C11 100n
C14 100n
C55 100n
C66 100n
C51 1u
C64 100n
R26 1k
R27 1k
R29 1k
R30 10k
JP2
R37
R23 4.7k
R25 4.7k
R19 4.7k
C58 100n
C50 1u
R24 4.7k
R22 4.7k
C61 100n
C62 100n
C67 100n
C68 100n
J4
ESP
PC104_1
PC104
R36 1k
C41 470p
R21 4.7k
R18 33
R17 33
C27 47p
C26 47p
C73 100n
C72 100n
C70 100n
C71 100n
R28 10k
C69 100n
C48 100n
C30 100n
C31 10u
C44 10u
C45 10u
C46 1u
C33 100n
C34 10u
C47 100n