```
Time Base,
                                         Spec & Overview
                                                                                                                                        Keyboard, Latch
                                                                                      CPU, ROM, RAM and
                                              (this sheet)
                                                                                                                                       and Tape Interface
                                                                                            Expansion Bus
                                                                       04
                                                                                                                      05
                                                                                                                                                                    06
                                       Video ROM, shift-out
                                                                                                                                         Audio Interface
                                                                                        SD Card Interface
                                    register and CVBS output
                                                                                                                                        and Parallel I/O
                                      SPECIFICATIONS
                                       - Z80A CPU at 3.072 MHz, 32 kB ROM (16k used), 32 kB static RAM
                                      - ZeoA CFO at 3.072 MAZ, 32 kB ROM (10k used), 32 kB static RAM

- Text mode 32x16 characters, monochrome

- Graphics mode: 256x208 pixels

- Storage: cassette tape (280 or 1200 bit/s)

MicroSD card (up to 4 GB) with SDOS

- Sound: 3 channels + white noise provided by AY-3-8910 or YM2149F
                                      - I/O ports: two 8-bit parallel ports
- USB HID keyboard/mouse interface (as add-on)
                                      - Power consumption: less than 250mA at 5V
                                      This Galaksija Plus mod is based on PVV's clone from 2017 with the following modifications:

    stable composite video (no need to reduce the power in voltage)
    address decoder with ATF16V8B (or some older GAL16V8 equivalent),

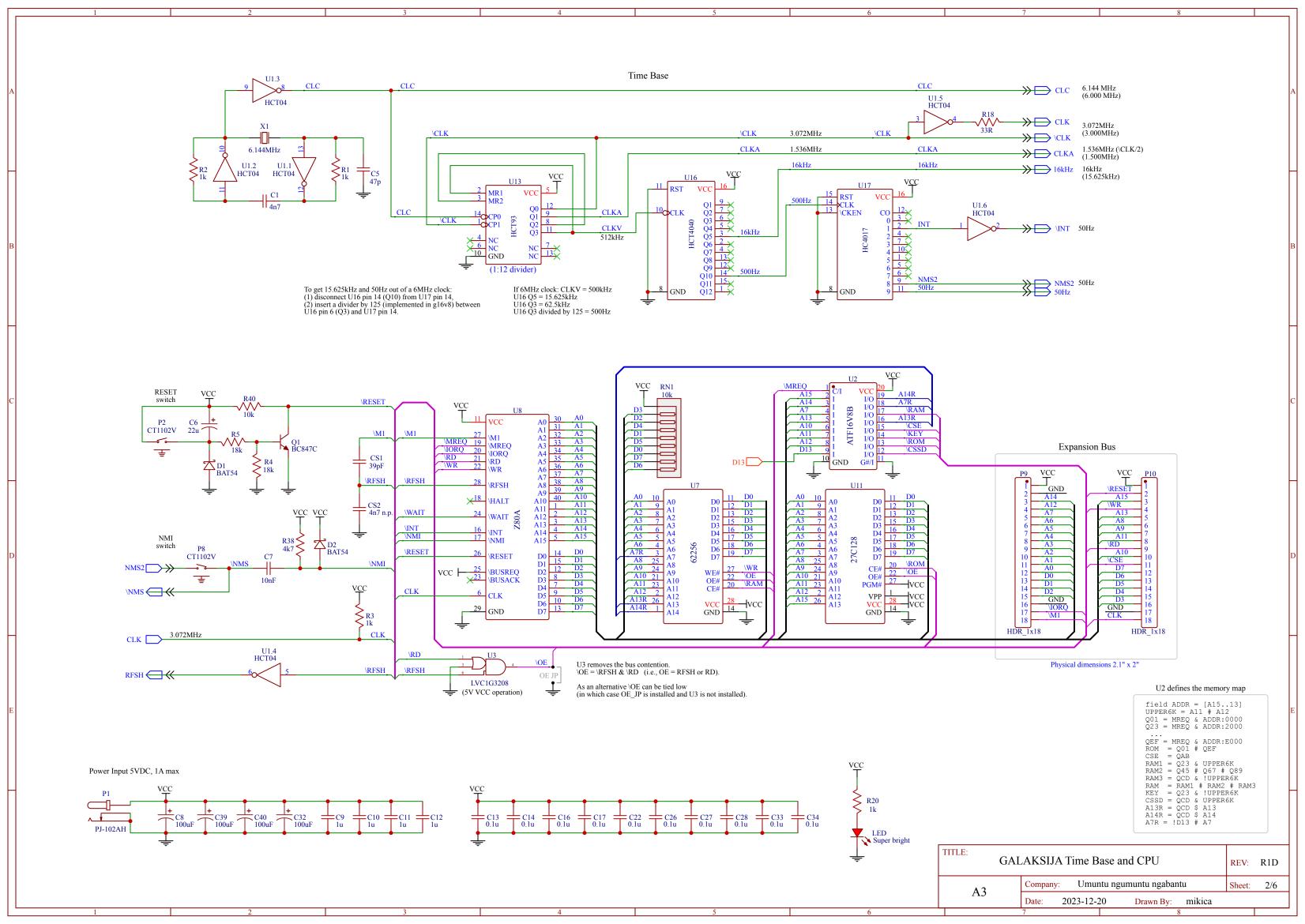
                                      which provides a configurable memory map with 1 kB granularity - improved PVV SD hardware (SD now runs on the CPU clock)
                                         integrated micro SD socket with LVTTL level shifters
                                         integrated audio interface
                                          two I/O ports connected to the audio interface
                                      - NMI reset circuit

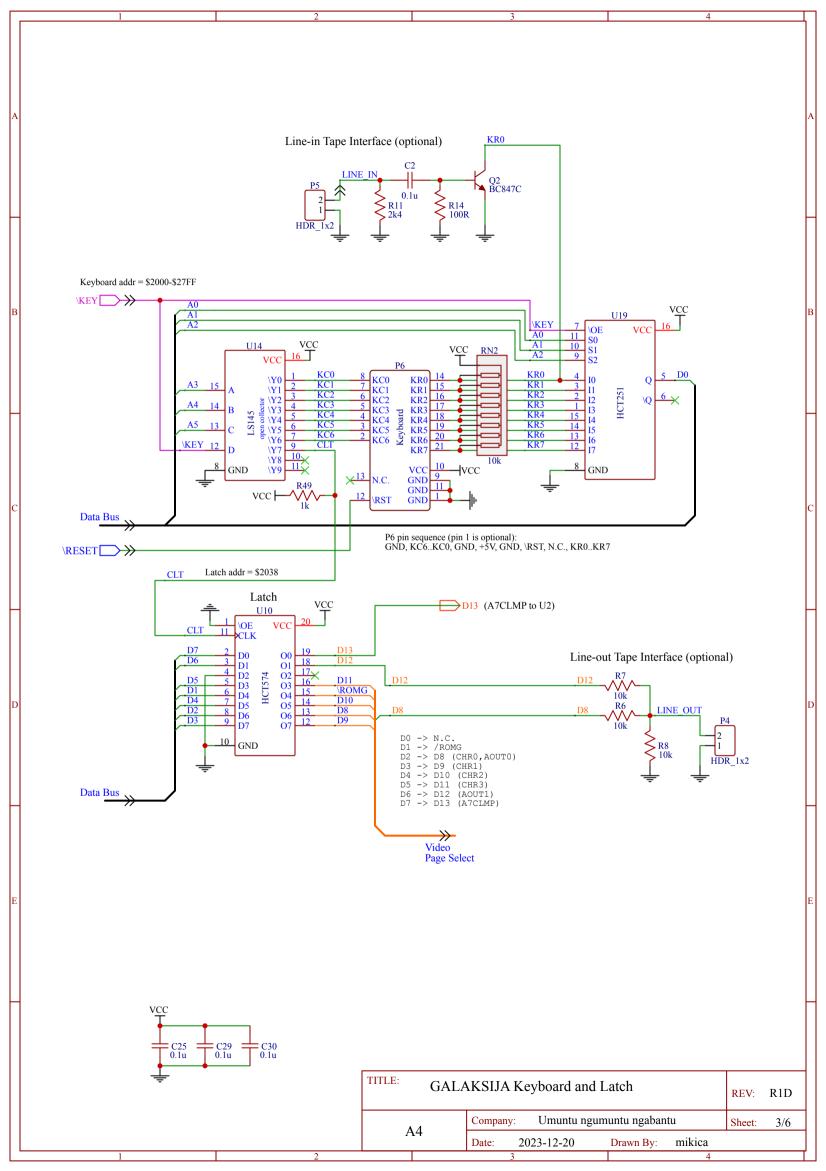
- hybrid TH/SMD PCB (SMD discrete components on the bottom side)

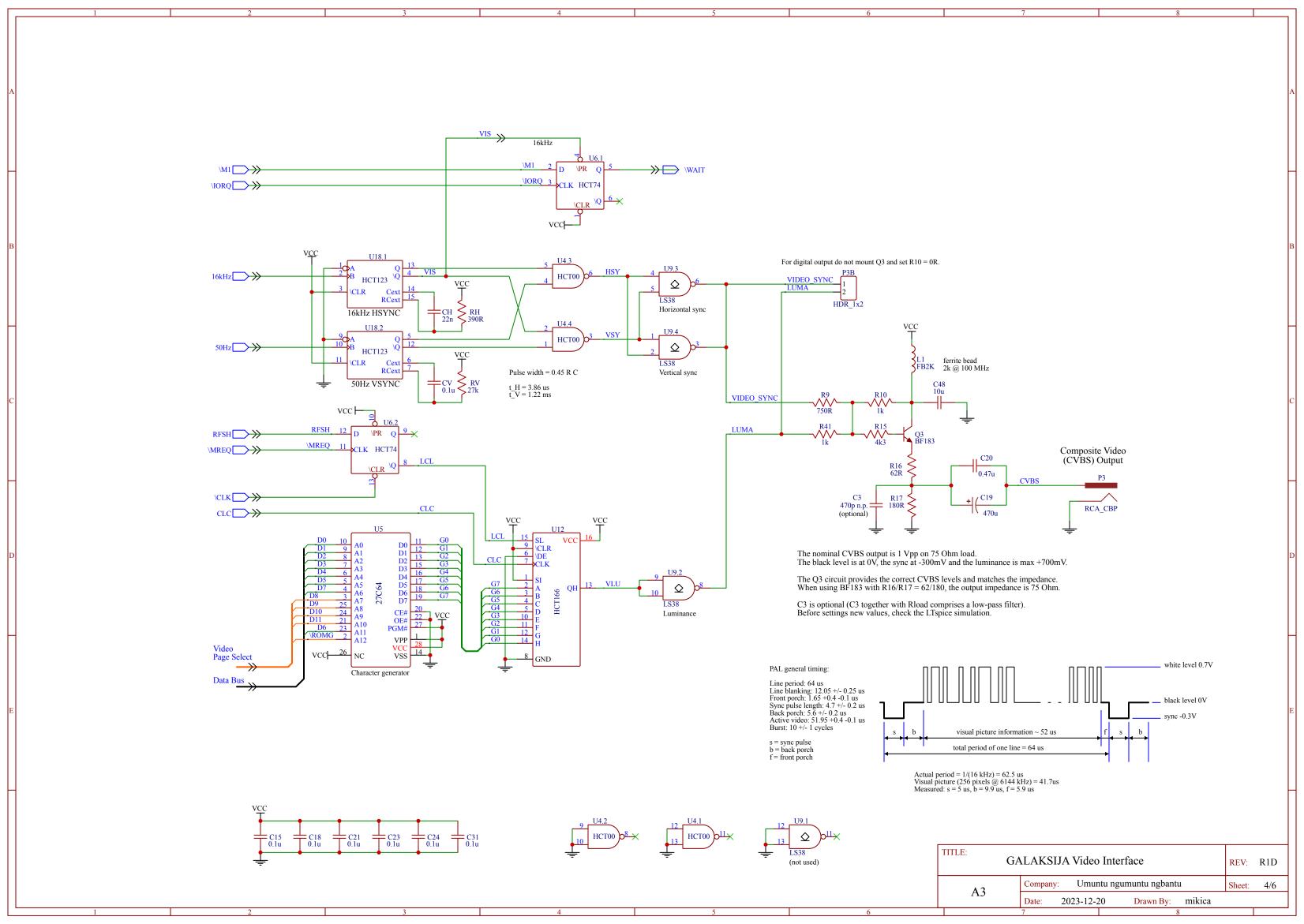
- board dimensions 100x190 mm
                                      - a keyboard stackable either on the upper or the bottom side
                                      Distributed with the following ROM images:
                                      - GP40 V8C.BIN with SDOS v8.12 (fits an EPROM 16k-64k)
                                      - GP40_CHRGEN.BIN (fits an EPROM 8k-64k)
                                      Hardware memory map:
                                                                     ROM A or 1: 4 kB (bootstrap and BASIC) ROM B or 2: 4 kB (math functions, etc.)
                                          $0000...$0FFF
                                          $1000...$1FFF
                                          $2000...$27FF
                                                                      Keyboard and latch
                                         $2000...$2/FF Keyboard and latch
$2800...$BFFF RAM: 30 kB ($2800...$2BFF Video RAM)
$C000...$C7FF RAM: 2 kB (used by SDOS)
$C800...$CFFF PVV HW SD interface: 2 kB
$D000...$DFFF Unused, 4 kB (routed to CS on the expansion bus)
$E000...$EFFF ROM 3: 4 KB (Galaksija Plus, graphics)
$F000...$FFFF ROM 3: 4 KB (SDOS)
                                      Credits:

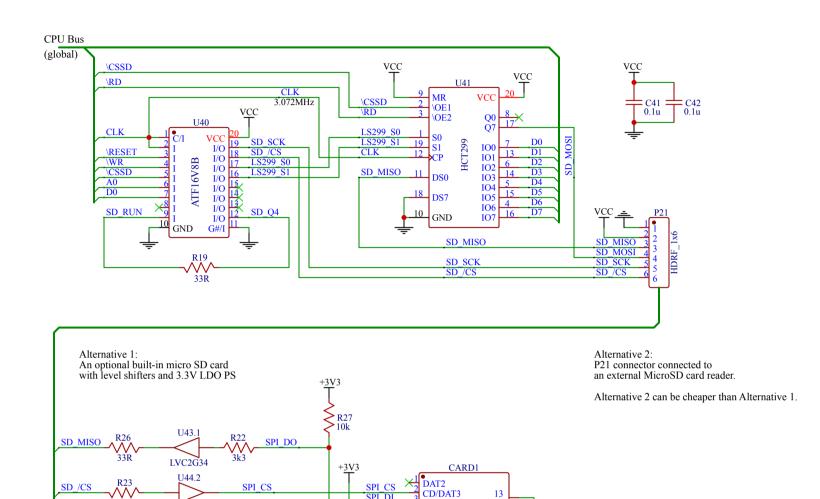
Voja Antonic: Galaksija (1983)
Nenad Dunjic and Milan Tadic: Galaksija Plus mod (1985)
PVV and Fifan: Galaksija Plus clone with SD card (2016)

                                      http://www.nedopc.org/forum/viewtopic.php?p=87313
Goran Stankovic (YT2FSG): Retro Computers web page https://www.qsl.net/yt2fsg/galaksija/galaksija_clone.html
Retro Bertie (@MacBerti28): YouTube guide
                                      Soldering sequence:
                                         1. start with the SMD components on the bottom side (the SMD components are 0805+ and easy to solder)
                                          2. solder the SMD components on the top side
                                          3. solder the IC sockets
                                          4. solder the rest of the components
                                                                                                                                                   Note:
- NMI switch is very close to U6 so U6 must be in a socket.
Changelog
RIC -> RID:
1) connected \RESET to kbd P6 pin 12 (for ctrl-alt-del)
2) disconnected kbd P6 pin 13 from ground
3) connected A10 to U2 pin 6 (yields 1k granularity)
4) \NMS & \RESET for audio (logical or using diodes)
5) accommodated USB HID add-on
RIA -> RIC:
1) redesigned SD interface to use 2 ICs
2) added RESET and NMI buttons
3) added two 8-bit I/O ports
4) kbd P6 pins 11-13 connected to GND
                                                                                        TITLE:
                                                                                                         GALAKSIJA 40th Anniversary Tribute
                                                                                                                                                                                                   REV:
                                                                                                                                                                                                             R1D
                                                                                                                                          Umuntu ngumuntu ngabantu
                                                                                                                       Company:
                                                                                                                                                                                                  Sheet:
                                                                                                                                                                                                               1/6
                                                                                                   A4
                                                                                                                       Date:
                                                                                                                                    2024-02-04
                                                                                                                                                               Drawn By:
                                                                                                                                                                                  mikica
```









VDD.

VSS

DAT0

CD_SW (NO)

Pin

2

3

4

5

6

7

8

SD

DAT2

CD/DAT3

CMD

VDD

CLK

VSS

DAT0

DAT1

SPI

Х

CS

DI

VDD

SCLK

VSS

DO

Х

SPI_CS << SD_\CS

SPI_DI << SD_MOSI

SPI SCK << SD SCK

SPI DO >> SD MISO

MEM2075-00-140-01-A

micro

SD

LVC2G34

LVC2G34

LVC2G34

U42

TLV1117-33

OUT

SPI DI

+<u>3V</u>3

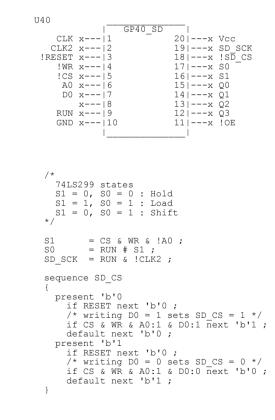
C44 0.1u

C45 0.1u

SD MOSI

C43 0.1u





```
field shift_counter = [Q0..3];

$define C0 'b'0000
$define C1 'b'1000
$define C2 'b'1001
$define C3 'b'1010
$define C5 'b'1101
$define C5 'b'1100
$define C6 'b'1101
$define C7 'b'1110
$define C8 'b'1111

sequence shift_counter
{
   present C0
     if RESET next C0;
     /* writing D0-D7 to LS299 starts serial IO */
   if CS & WR & A0:0 next C1;
     default next C0;
   present C1 if RESET next C0; default next C2;
   present C3 if RESET next C0; default next C4;
   present C4 if RESET next C0; default next C4;
   present C5 if RESET next C0; default next C6;
   present C6 if RESET next C0; default next C7;
   present C7 if RESET next C0; default next C6;
   present C7 if RESET next C0; default next C6;
   present C7 if RESET next C0; default next C7;
   present C8 if RESET next C0; default next C8;
   present C8 if RESET next C0; default next C8;
   present C8 if RESET next C0; default next C8;
}
```

	TITLE: GALAKSIJA SD Card Interface Credits: PVV				REV:	R1D	
	A3	Company	Company: Umuntu ngumuntu ngabantu			Sheet:	5/6
		Date:	2024-01-22	Drawn By:	mikica		

