CDJ-1000mk3 new life project

Self assembly manual

2018-2025

Important!
Everything you do with the equipment, you do at your own risk! I am not responsible for the damaged equipment, time and money you spent.
For a successful result, you need to have a basic knowledge of radio electronics.

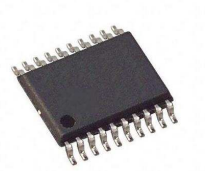
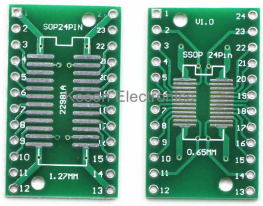
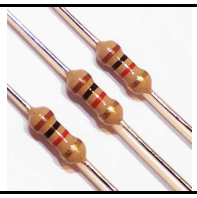
CDJ-1000mk3 new life - is a project to give new life to the Pioneer CDJ-1000mk3 dj player.

The CDJ-1000mk3 with faulty CD drive or main assy is suitable for the project. It is important that the power supply and control panel boards are in good working order.

The player is connected to the STM32F746G-DISCO board, for which firmware has been created that simulates the CDJ-2000nxs graphical interface, audio playback from micro SD cards, and playback control using the CDJ-1000mk3 control elements.

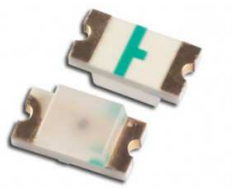
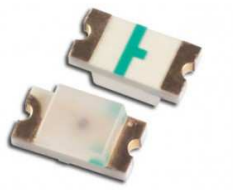
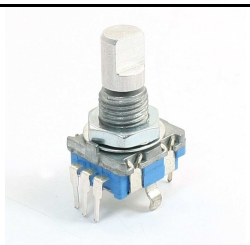
The current version of the project is developed and tested only for CDJ-1000mk3. Mk1 and MK2 are not supported, although theoretically it is possible, but requires code modification and testing with these players.

List of additional equipment (minimum kit for start project without buttons aka CDJ-2000)

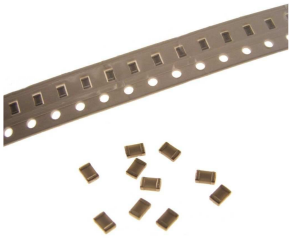
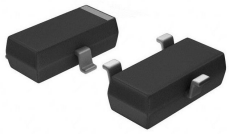
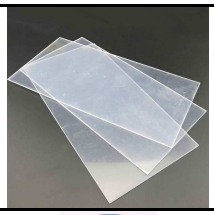
Pioneer CDJ-1000mk3. You can use the faulty (with problems in the main assy and/or CD-ROM) CDJ-1000mk1 and CDJ-1000mk2 not supported.	
STM32F746G-DISCO board Can be bought here: http://www.st.com/en/evaluation-tools/32f746gdiscovery.html#samplebuy-scroll or other online stores.	
USB-A to mini USB cable (for download firmware only)	
Circuit SN74HC245 (TSSOP or other) **1pcs** **p.n. SN74HC245PWR** Can be bought here: https://www.digikey.com/product-detail/en/texas-instruments/SN74HC245PWR/296-8279-2-ND/376997 or other online stores or radio market.	
TSSOP to DIP adapter board (if you have a circuit in another package, then you need an adapter for your circuit type package) **1pcs** Can be bought here: https://www.ebay.com/itm/5pcs-SOP-SSOP-TSSOP-SOIC24-to-DIP-Adapter-PCB-Board-Converter-Double-Sides-F06/171216713832?epid=752562730&hash=item27dd4fb868:g:iLIAAOxyUrZS1Blh or other online stores or radio market.	
Capacitors 220pf **3pcs** **p.n. PFR5221J63J11L4BULK** Can be bought here: https://www.digikey.com/product-detail/en/kemet/PFR5221J63J11L4BULK/399-7681-ND/3465848 or other online stores or radio market.	
Capacitor 1uF **1pcs** **p.n. R82DC4100DQ60J** Can be bought here: https://www.digikey.com/product-detail/en/kemet/R82DC4100DQ60J/399-5447-1-ND/1930840 or other online stores or radio market.	
Resistor 10 kohm **3pcs** **p.n. CF18JT10K0** Can be bought here: https://www.digikey.com/product-detail/en/stackpole-electronics-inc/CF18JT10K0/CF18JT10K0CT-ND/2022766 or other online stores or radio market.	

Resistor 470 ohm **1pcs** **p.n. CF18JT470R** Can be bought here: https://www.digikey.com/product-detail/en/stackpole-electronics-inc/CF18JT470R/CF18JT470RCT-ND/2022734 or other online stores or radio market.	
Resistor 36 ohm 5W **1pcs** **p.n. SQP500JB-36R** Can be bought here: https://www.digikey.com/product-detail/en/yageo/SQP500JB-36R/36W-5-ND/18668 or other online stores or radio market.	
Jack 3.5mm with a cable of 20cm long (can be used from damage headphones or buy a jack): https://www.ebay.com/itm/10Pcs-3-5mm-Male-Plug-3-Pole-Soldering-Earphone-Headphone-Audio-Jack-Gold-Newly/222596122063?epid=1469578278&hash=item33d3c345cf:g:pkgAAOSwek1Zeub7 or other online stores or radio market.	
Several thin wires for soldering (10-20cm long) Can be bought here: https://www.ebay.com/itm/30PCS-Double-Headed-Tin-Wire-31cm-7-Cores-Thin-Connecting-Line-Black-Cable/182382296939?epid=881803417&hash=item2a76d4ff6b:g:MjUAAOSwa~BYSJF6 or other online stores or radio market.	
Soldering iron (25-40W) and accessories for soldering. Ability to work with a soldering iron.	

List of additional equipment (for assembly of the display module completely):

SMD LEDs green **22pcs** **p.n. LTST-C191KGKT** Can be bought here: https://www.digikey.com/product-detail/en/lite-on-inc/LTST-C191KGKT/160-1446-1-ND/386834 or other online stores or radio market.	
SMD LEDs blue **3pcs** **p.n. LTST-C190TBKT** Can be bought here: https://www.digikey.com/product-detail/en/lite-on-inc/LTST-C190TBKT/160-1646-1-ND/573586 or other online stores or radio market.	
SMD LEDs 5730 white **6pcs** Can be bought here: https://www.ebay.com/itm/100PCS-SMD-5630-5730-Big-chip-0-5W-High-Power-White-LED-Light/291636097481?hash=item43e6ddb1c9:g:b9sAAOSwHQ9Wacvg or other online stores or radio market.	
LED 3mm for red (mounting type: through hole) **1pcs** **p.n. HLMP-1700-B0002** Can be bought here: https://www.digikey.com/product-detail/en/broadcom-limited/HLMP-1700-B0002/516-1791-2-ND/1234784 or other online stores or radio market. Also you can find in the old broken electronic technique.	
Encoder with push button **1pcs** Can be bought here: https://www.ebay.com/itm/Brand-New-Rotary-Encoder-EC11-Digital-Potentiometer-Handle-15mm-20mm-Kit-Set/222355519139?hash=item33c56bf6a3:m:mMKi-XWIttuvhMb6FlXcfCg or other online stores or radio market.	
Buttons 6x3x2.5mm **10pcs** Can be bought here: https://www.ebay.com/itm/100pcs-3X6X2-5mm-Tactile-Push-Button-Switch-Tact-Switch-Micro-Switch-2Pin-SMD-S2/261995936109?epid=1046591979&hash=item3d002cb96d:g:RSsAAOSwyQtVxKPd or other online stores or radio market.	
40Pin 2.54mm Single Row Straight Male Pin Header Strip 1*40P	

Resistors SMD 0805 75kohm **9pcs** Can be bought here: https://www.ebay.com/itm/100Pcs-0805-SMD-Resistor-Resistors-1K-910K-Ohm-1-Free-Shipping/192121945109?hash=item2cbb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.	
Resistors SMD 0805 47 ohm **9pcs** Can be bought here: https://www.ebay.com/itm/100Pcs-0805-SMD-Resistor-Resistors-1K-910K-Ohm-1-Free-Shipping/192121945109?hash=item2cbb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.	
Resistors SMD 0805 300 ohm **4pcs Can be bought here: https://www.ebay.com/itm/100Pcs-0805-SMD-Resistor-Resistors-1K-910K-Ohm-1-Free-Shipping/192121945109?hash=item2cbb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.	
Resistors SMD 0805 3,3kohm **4pcs Can be bought here: https://www.ebay.com/itm/100Pcs-0805-SMD-Resistor-Resistors-1K-910K-Ohm-1-Free-Shipping/192121945109?hash=item2cbb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.	
Resistors SMD 0805 1kohm **3pcs Can be bought here: https://www.ebay.com/itm/100Pcs-0805-SMD-Resistor-Resistors-1K-910K-Ohm-1-Free-Shipping/192121945109?hash=item2cbb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.	
Resistors SMD 0805 12kohm **3pcs Can be bought here: https://www.ebay.com/itm/100Pcs-0805-SMD-Resistor-Resistors-1K-910K-Ohm-1-Free-Shipping/192121945109?hash=item2cbb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.	
Resistors SMD 0805 10kohm **1pcs Can be bought here: https://www.ebay.com/itm/100Pcs-0805-SMD-Resistor-Resistors-1K-910K-Ohm-1-Free-Shipping/192121945109?hash=item2cbb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.	
Resistors SMD 0805 47kohm **1pcs Can be bought here: https://www.ebay.com/itm/100Pcs-0805-SMD-Resistor-Resistors-1K-910K-Ohm-1-Free-Shipping/192121945109?hash=item2cbb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.	
Resistors SMD 0805 5,2kohm **13pcs** Can be bought here: https://www.ebay.com/itm/100Pcs-0805-SMD-Resistor-Resistors-1K-910K-Ohm-1-Free-Shipping/192121945109?hash=item2cbb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.	

Resistors SMD 0805 2,2kohm **2pcs** Can be bought here: https://www.ebay.com/itm/100Pcs-0805-SMD-Resistor-Resistors-1K-910K-Ohm-1-Free-Shipping/192121945109?hash=item2cbb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.	
Capacitors SMD 0805 0,047uf **13pcs** Can be bought here: https://www.ebay.com/itm/100-SMD-Kondensatoren-Ceramic-Capacitors-Chip-0805-X7R-47nF-0-047uF-50V-063747/361524717119?hash=item542c8d663f:g:9scAAMXQleBTlygT or other online stores or radio market.	
Transistor PMBF170 **9pcs** **p.n. PMBF170,215** Can be bought here: https://www.digikey.com/product-detail/en/nexperia-usa-inc/PMBF170215/1727-5173-1-ND/2531764 or other online stores or radio market.	
Single PCB Copper Clad Laminate Board for create of a PCB with buttons and LEDs (or manufacture of the board in the factory)	
Black plastic of 3mm thickness and transparent plexiglas of 3mm and 6mm thickness to create a display case. Perhaps later there will be 3D models for printing the case on a 3D printer.	
Super clue (Cyanoacrylate)	

**The number of components in the table is given to upgrade one CDJ.*
**Some components, such as LEDs, resistors, capacitors and wires, you can buy or can be found in old broken electronic technique.*
***Perhaps these elements will have to choose other values, to obtain the desired brightness of LEDs.*

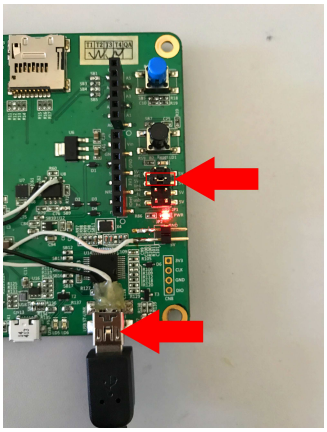
The STM32F746DISCO board has weaker MCU than the CDJ-2000s or XDJ-1000s, so the project has some hardware and software limitations of functions, in comparison with the original CDJs. Don't expect too much from the project, it won't have the functionality of a full-fledged CDJ-2000nxs. Otherwise, it would be necessary to use a more expensive development board in the project, which would complicate the project and increase its cost, and would reduce the feasibility of the project to zero.Therefore, before you start modding the CDJ-1000mk3, read the main features of this project.

Parameter	Description	Note
Supported audio formats	44,1kHz 16Bit stereo, .wav only Files must be analyzed in Rekordbox on PC, added to playlists, imported to micro SD card. File names and tags must contain Latin characters.	expansion is possible, but it is not in the basic plans

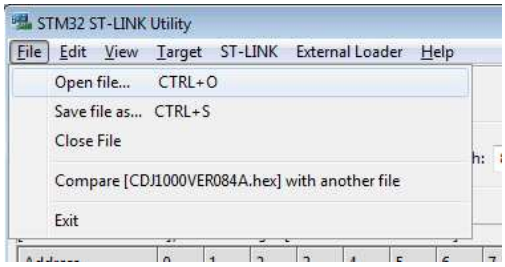
Supported media	Micro SD card only (FAT16, FAT32). Tested support for different cards up to 64GB.	no plans to add USB flash drive support
Rekordbox database support	Playback of the analyzed database of tracks, drawing static and dynamic waveforms (blue and RGB), drawing beat grid, reading of hot CUEs, memory CUEs (but for now, without loading into audio RAM (firmware ver.1.17). Support up to 20 playlists, 512 tracks. Tested on Rekordbox 5.x.x.	plan work with playlists, as well as add a loading hot CUEs, memory CUEs
Quantize	Support for quantized loops, CUE settings. Beat grid and phase meter.	
Supported MIDI	Not supported.	expansion is possible, but it is not in the basic plans. There is a separate project that combines 2 CDJ-1000mk3 into one midi device.
PRO DJ Link	Not supported.	not in the basic plans
Needle search	Supported. The STM32F746DICSO board has a touch screen.	
SLIP MODE	Supported.	the master tempo button is used to activate the slip mode
MASTER TEMPO	Not supported. MCU is too weak for such realtime algorithms of high quality of sound.	the master tempo button is used to activate the slip mode
Resampling algorithms	Interpolator 4-point, 3rd-order optimal 2x, floating-point calculation. Output stream 44,1k 16Bit Stereo.	

Step 1: prepare STM32F746G-DISCO

1. Set the jumper on the STM32F746G-DISCO board to "5V link USB" and connect the board to the computer using the mini USB cable.

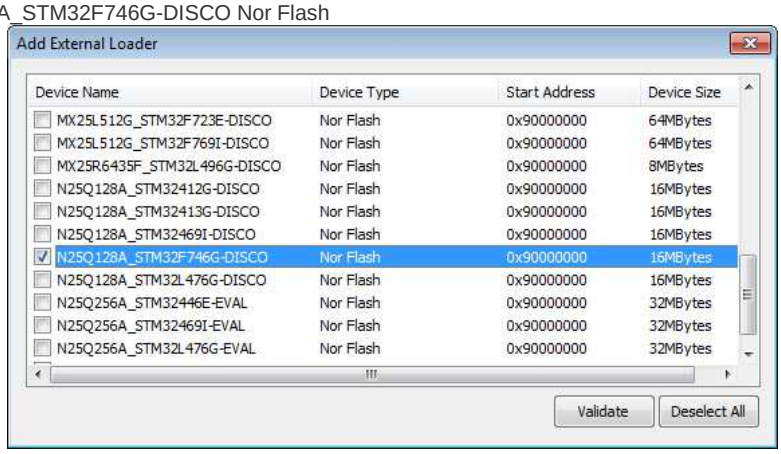


2. Download STM32 ST-LINK Utility from the official web page http://www.st.com/en/development-tools/stsw-link004.html or take it in my archive CDJ1000_new_life_project.rar:
https://drive.google.com/open?id=1TosmzRpz8K_REsWoLKB8q8zJHkgPR6lb
3. Download the latest firmware file CDJ1000VERxxxx.hex on my github: https://github.com/djgreeb/CDJ-1000mk3_new_life_project (CDJ1000VERxxxx.hex where xxxx - firmware version).
4. Unzip the archive with the STM32 ST-LINK Utility and install the utility on the PC. During the installation of the utility, drivers for usb-cable will be installed. It is necessary to agree with the installation.
5. Launch STM32 ST-LINK Utility.
6. File->Open file. Open file CDJ1000VERxxxx.hex on your computer.



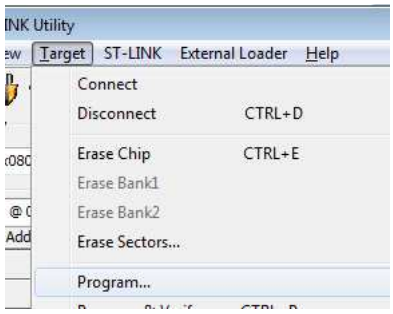
7. External Loader->Add External Loader.

8. Select N25Q128A_STM32F746G-DISCO Nor Flash

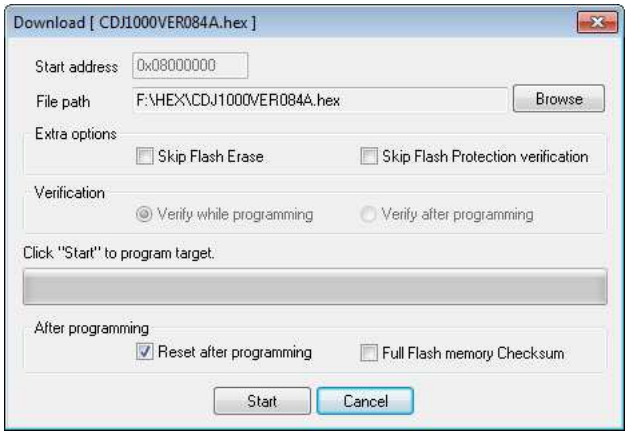


9. Target->Connect

10. Target->Program…



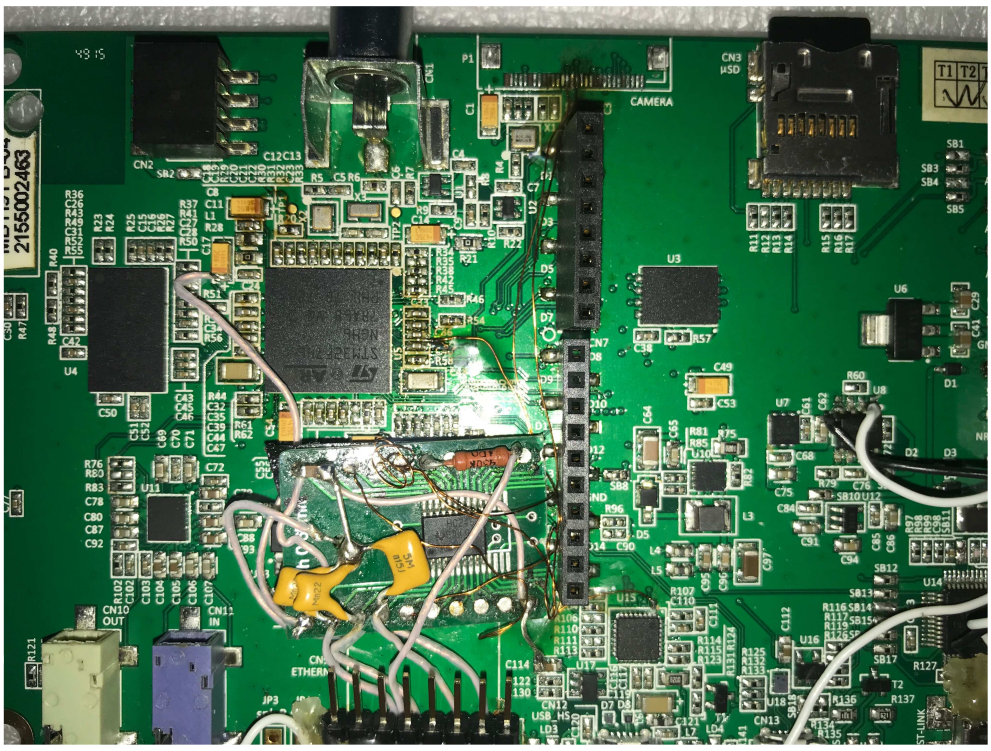
11. Push Start and wait for programming to finish:



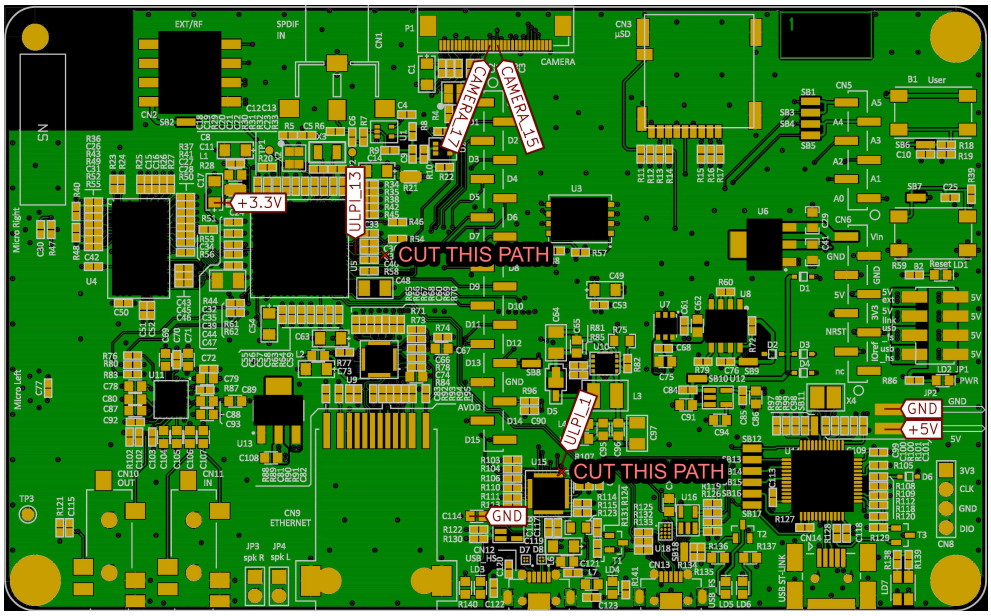
12. Close the utility. After downloading the firmware.

13. Now we need to assemble the scheme using the TSSOP to DIP adapter board and the components from the first table.

I soldered this scheme and glued this mini-pcb on the back side of the STM32F746G-DISCO board. On the STM32F746G-DISCO board I was hindered by the RJ45 connector and I had to remove it.

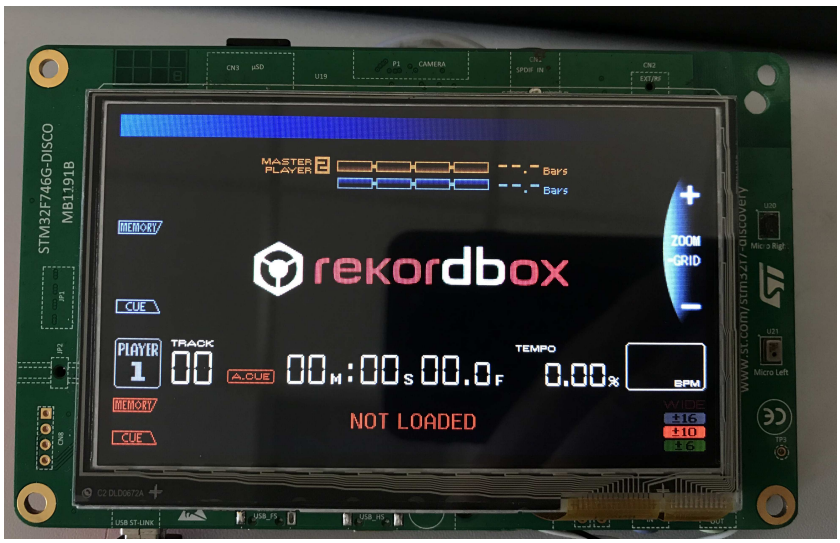


Here are the places to connect TSSOP to DIP adapter board. You also need to cut 2 paths.

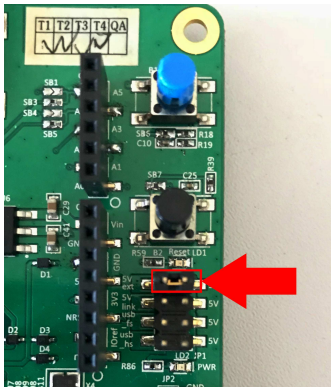


14. Now the board can be reconnected to the PC using a USB-A - mini USB cable. The display will show the Pioneer DJ logo and the firmware version.

15. Insert the Micro SD card with the Rekordbox music library on the back of the board and reconnect the board to the PC using the mini cable. This will display the:



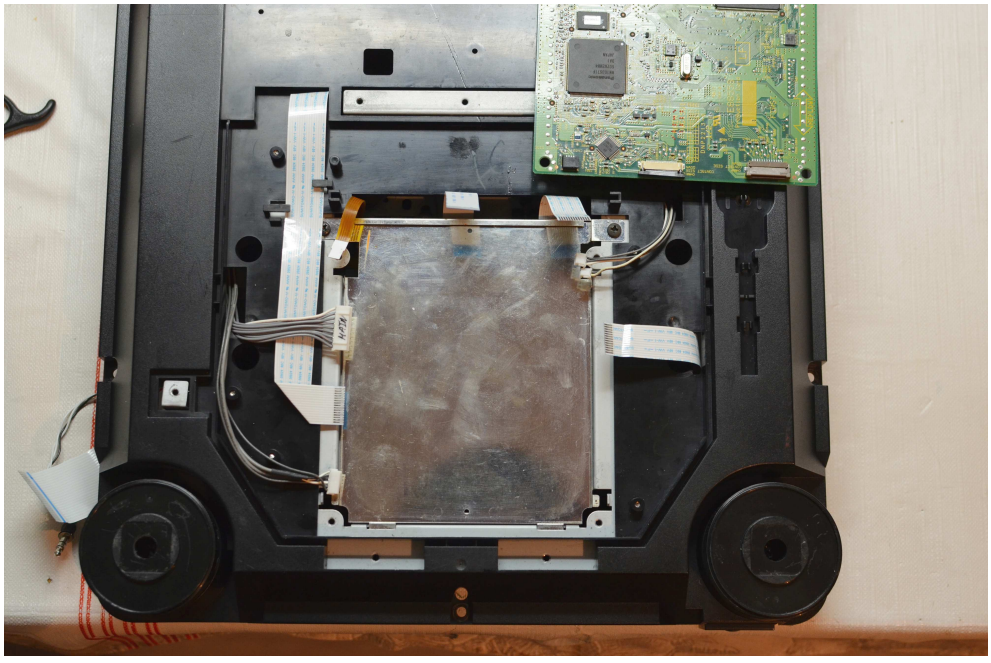
16. Disconnect mini USB cable and set the jumper on the STM32F746G-DISCO board to "5V ext".



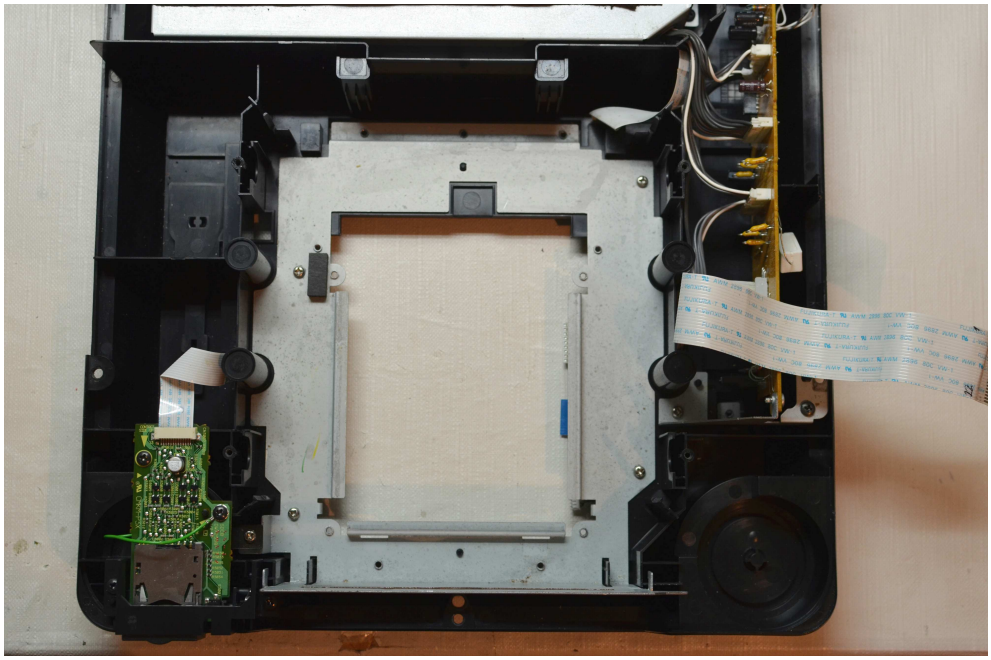
Step 2: prepare CDJ-1000mk3

Important! In the CDJ should be in working condition: power supply, all buttons, LEDs, jog and pitch.

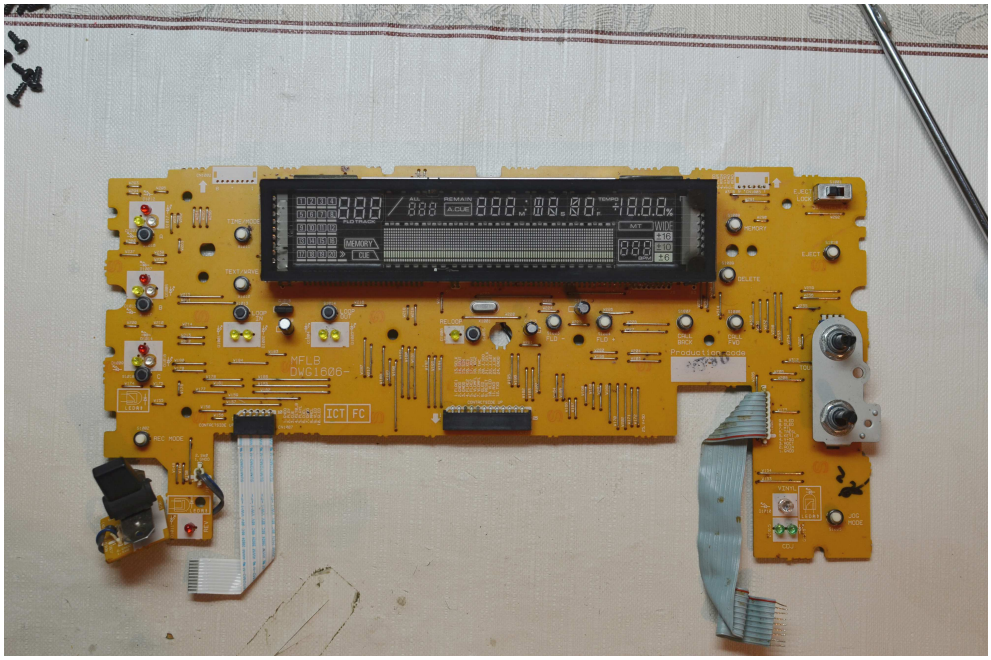
1. Unscrew the bottom cover and remove the main board (main assy).



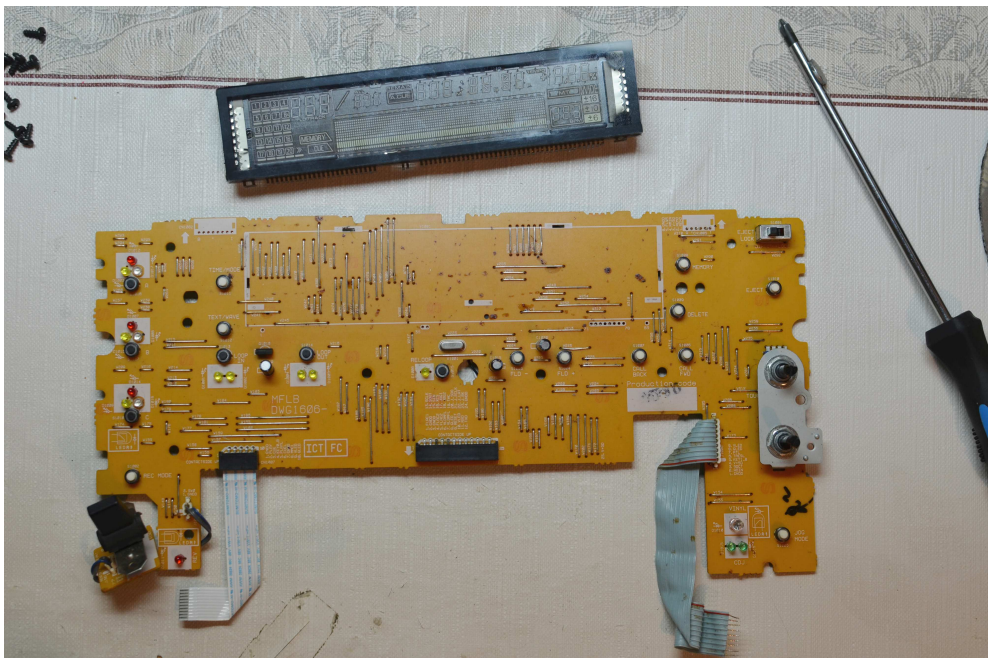
2. Remove the top cover, unscrew and remove the CD-ROM. It will not be used in the project.



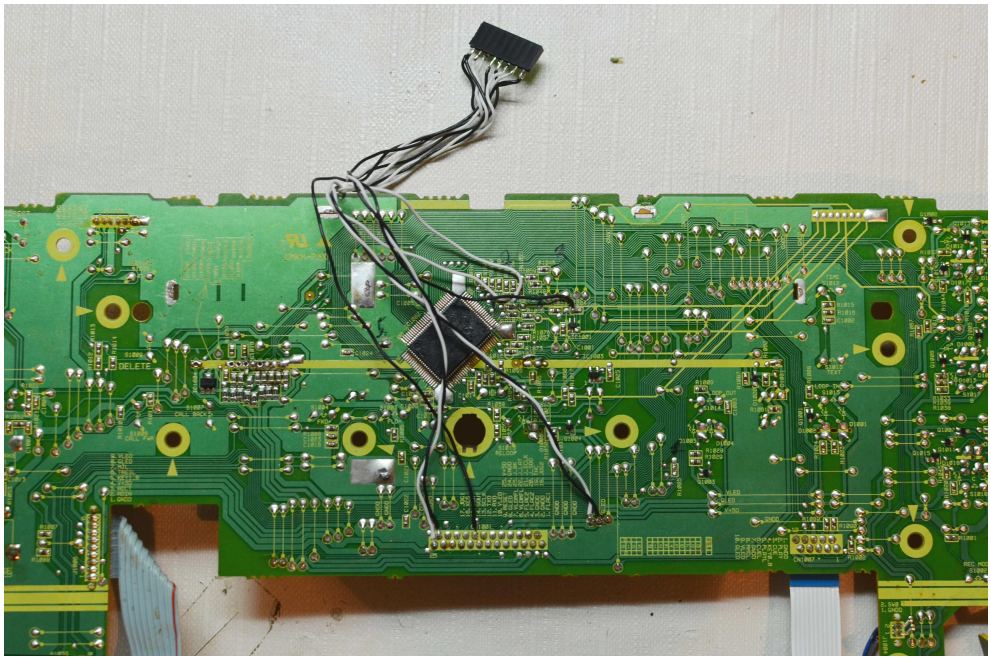
3. From the top, unscrew and remove the board with the display (MFLB assy).

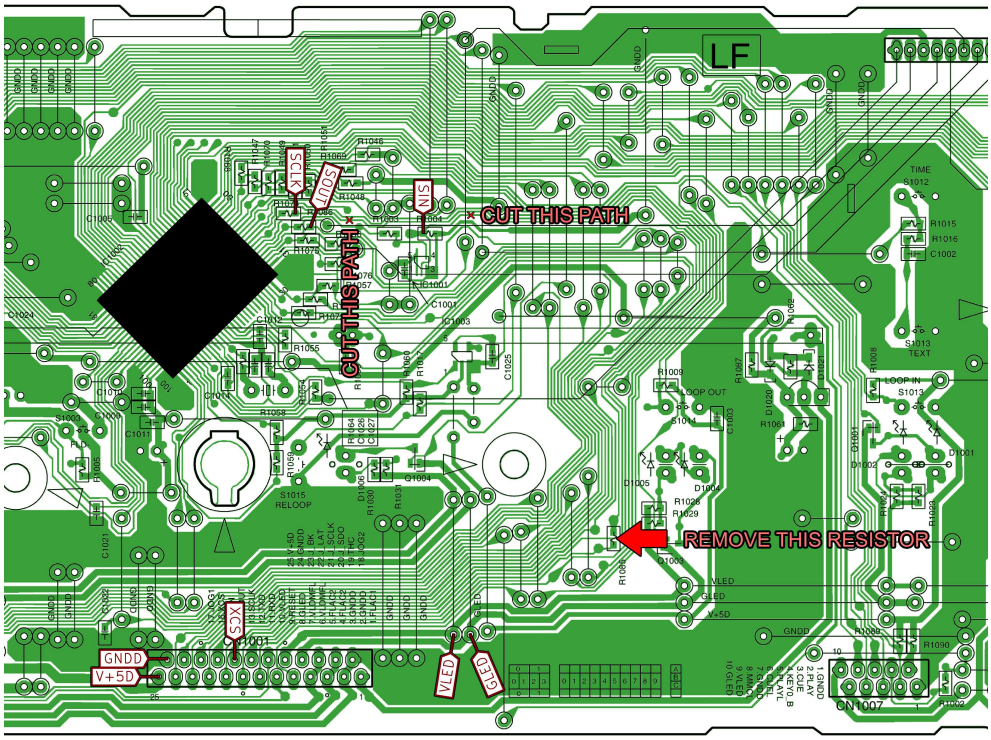


4. Unmount the display from the board. Need to solder.

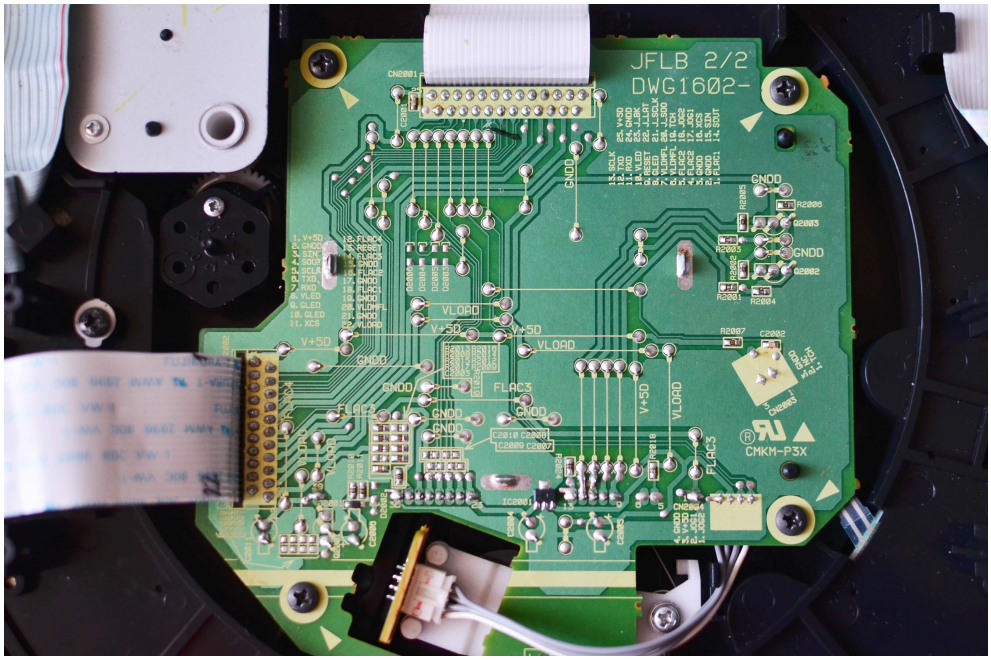


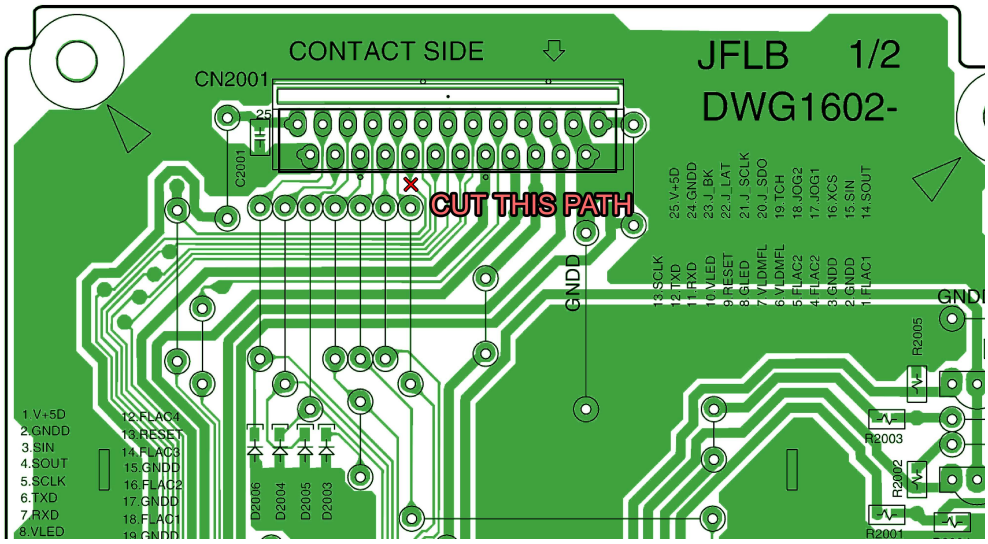
5. On the back of the board, 8 wires must be soldered. These wires will be connected to the STM32F746G-DISCO board and TSSOP to DIP adapter board. It is also necessary to cut several paths on the board.



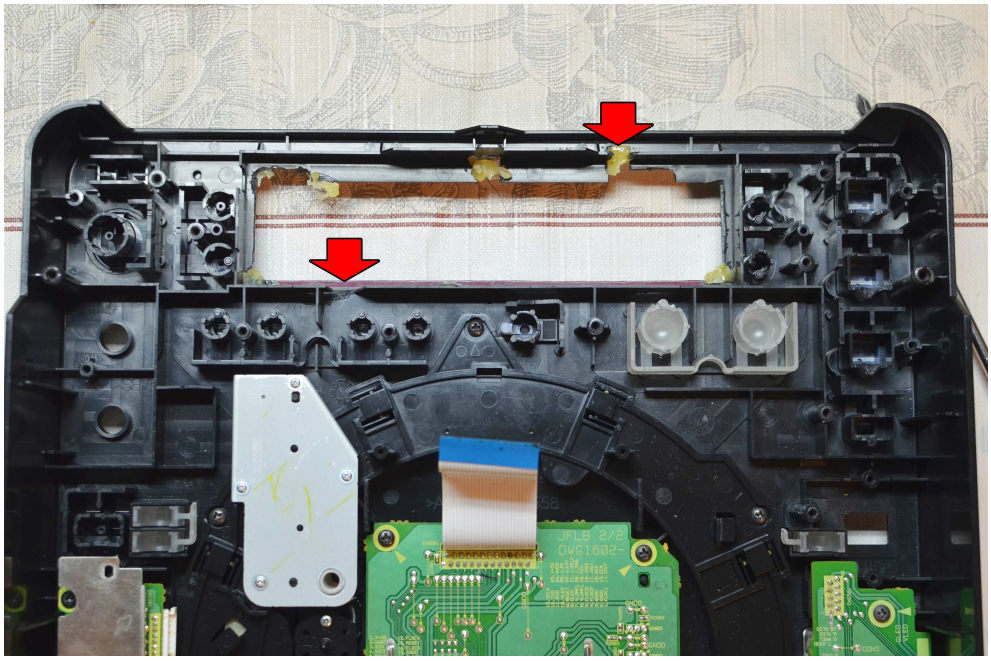


6. Cut the one path on the jog board (JFLB assy).

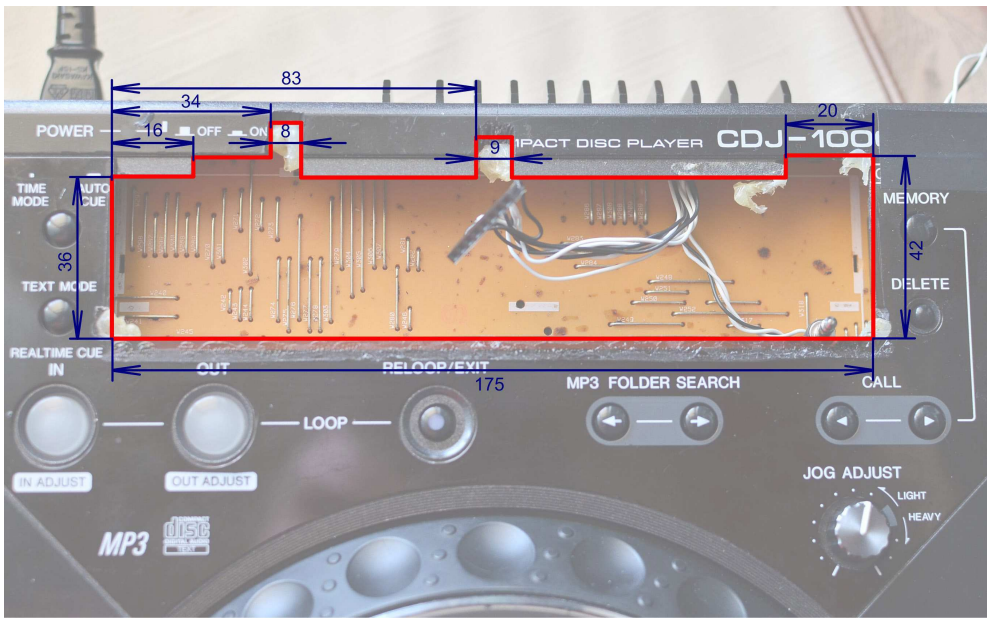




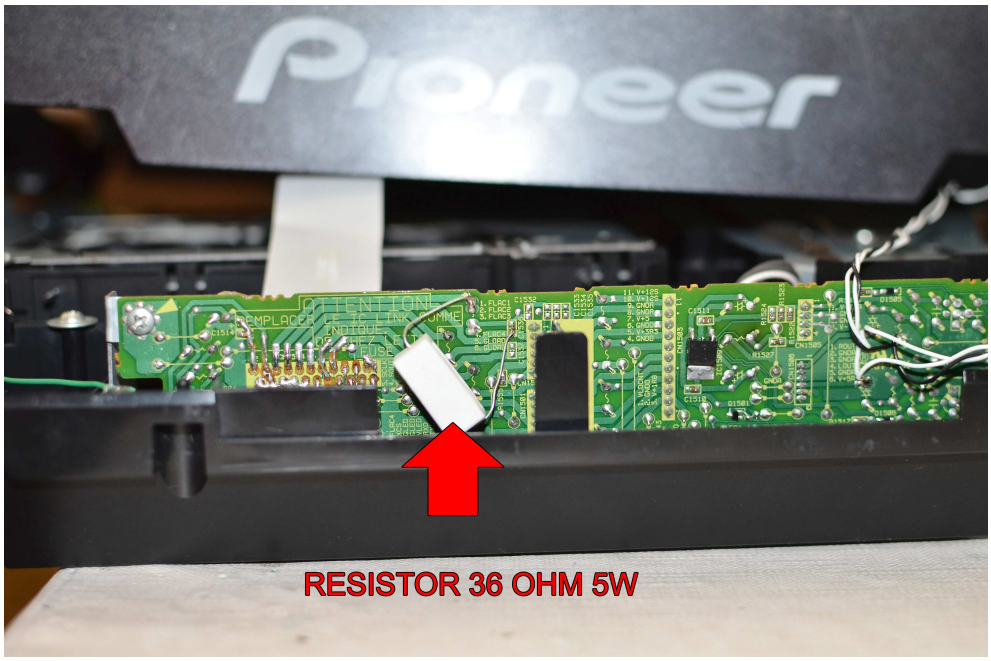
7. Remove excess plastic partitions.

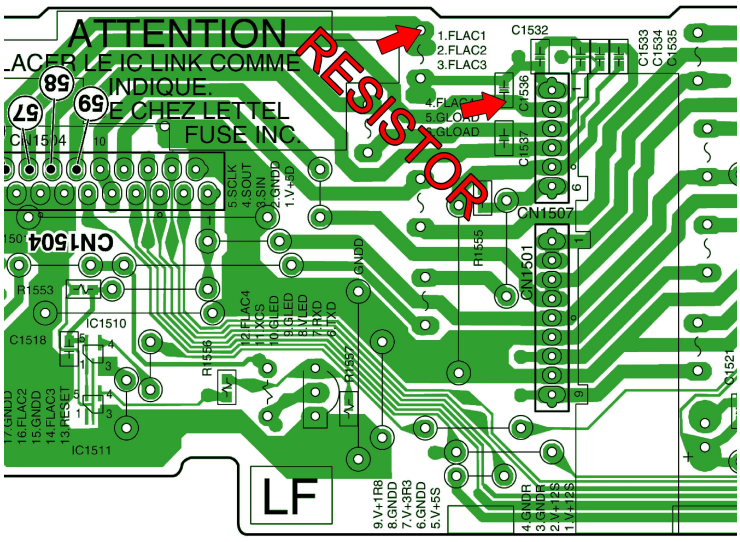


8. In the display area, you need to cut out the window for installing the display module. After that, you can install the display board (MFLB assy) in place and connect all the flexible cables to it.

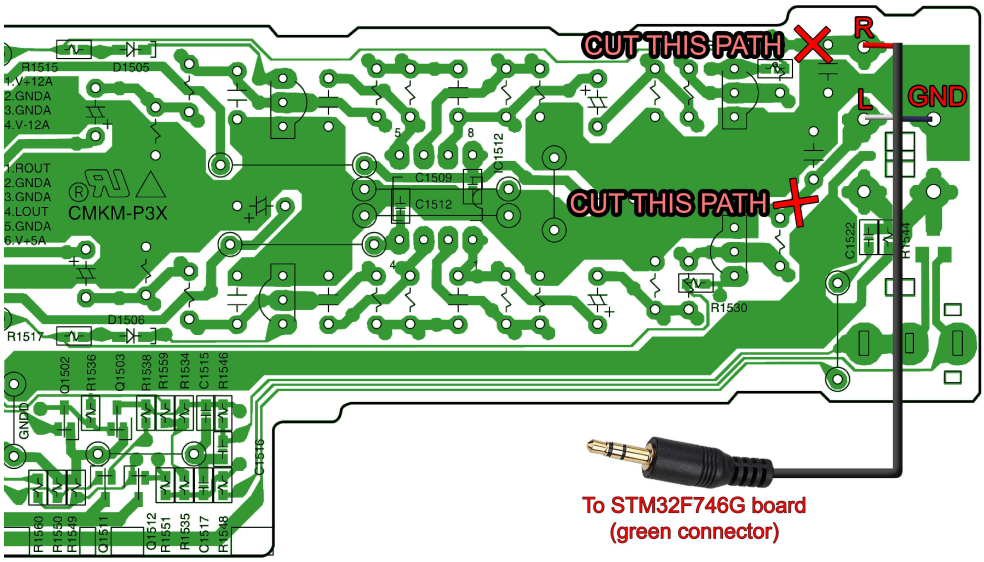


9. To the MJCB board solder a resistor 36 ohm 5W. This resistor is needed for the stable operation of the power supply. It imitates the load instead of the removed FL display.





10. Also, on the MJCB, you need to cut 2 paths and solder the 3.5mm jack cable to transfer the audio signal from the STM32F746G board to the RCA output on the player.



11. Connect the 3.5mm jack and 8 wires to the STM32F746G board. Connect a flexible cable that connects the top and bottom of the player, as was done. This is enough to turn on and check the player. You can load and search tracks with the "TRACK SEARCH" buttons on player. Do not forget to insert the microSD card.

To use other navigation buttons, like on CDJ-2000nxs, you need to create a board and a case for the display module.

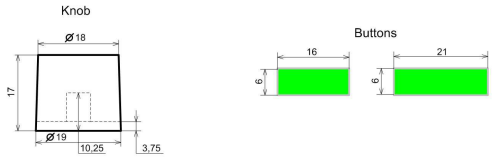
Step 3: creation of a display module

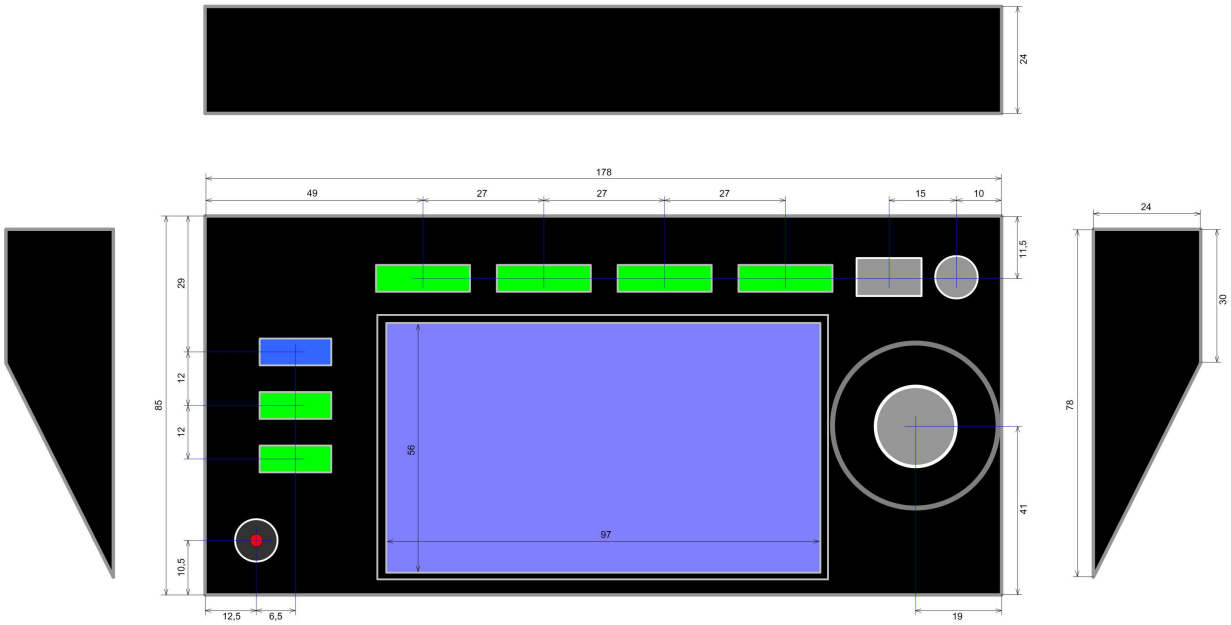
The creation of the display module consists of 2 stages. The first stage is the creation of the hull (you need to work with plastic, plexiglas). The second stage is the creation of a single-layer boards for buttons and leds.

Stage 1:

From black plastic, I cut out such elements as in the drawing. A drawing is also in my archive in my archive CDJ1000_new_life_project.rar https://drive.google.com/open?id=1TosmzRpz8K_REsWoLKB8q8zJHkgPR6lb Rectangular buttons, fastening for buttons and fastening for the encoder I cut out from transparent plexiglas. Plastic parts I glued using super glue.

Knob 18mm


Knob
Ø18
17
Ø19
10,25
3,75
Buttons
16
6
21
6

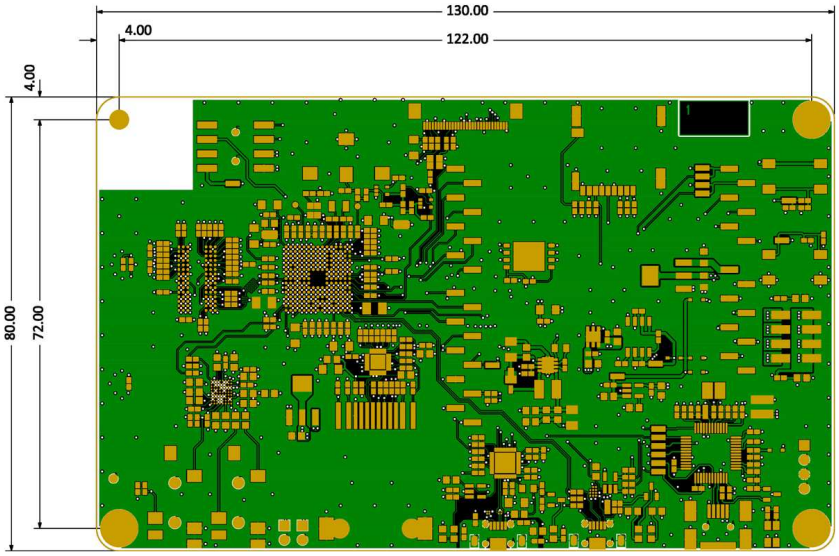

24
178
49
27
27
27
15
10
11,5
29
12
12
65
56
97
41
10,5
12,5
6,5
19
24
30
78


Simply
ZOOM
GRID
TRACK
REMAIN
NEEDLE
TEMPO
1
24
02M:20S
18.9R
0.00%
124.0
BPM


www.geniusnet.com
PLAYER
1
05
02.39.30.8
0.00
125.0


Show Me (Original Mix)
ZOOM

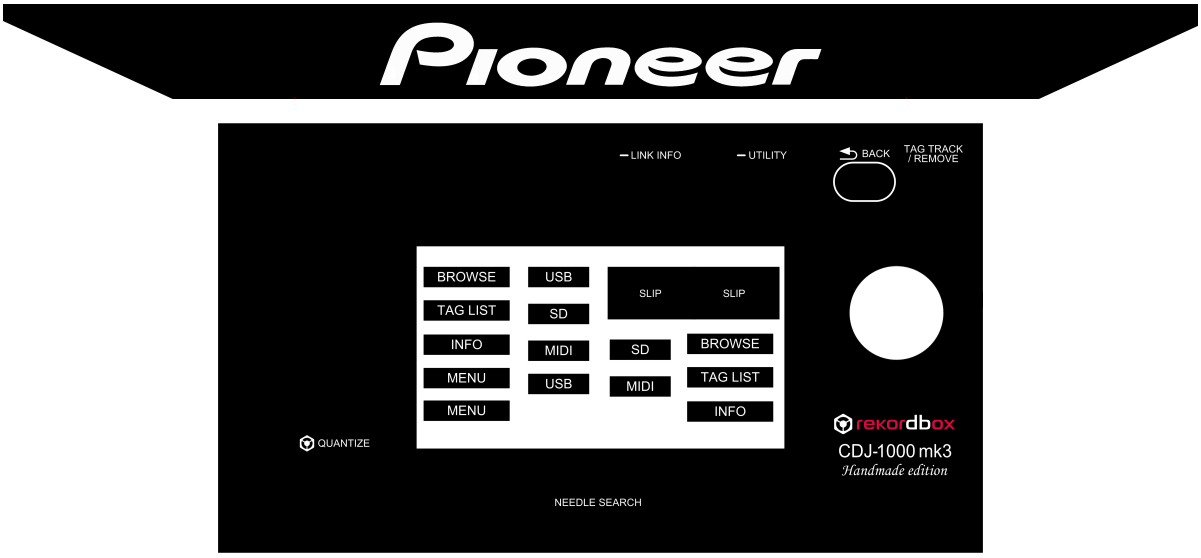
The STM32F746G-DISCO board has such dimensions:



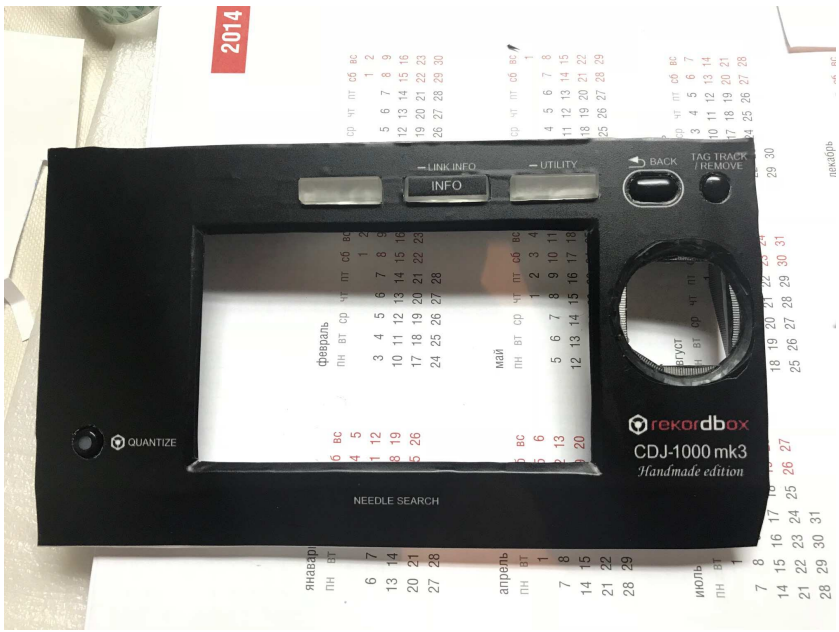
Bezel for the encoder I made from aluminum 40mm knob.

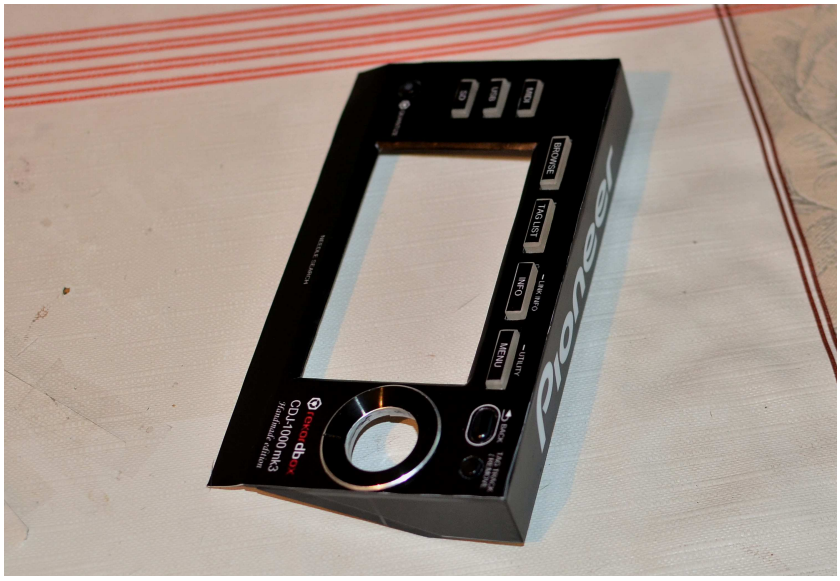
Menu Search Knob can be cut from plastic. You can buy the original (part number DAA1259 or DAA1246) or accidentally choose a suitable cap from the tube. You can also print the knob on a 3D printer, file knob_edit24.stl.

On the panel, over the plastic, a vinyl sticker is pasted. Source files for printing vinyl stickers are in my archive CDJ1000_new_life_project.rar.



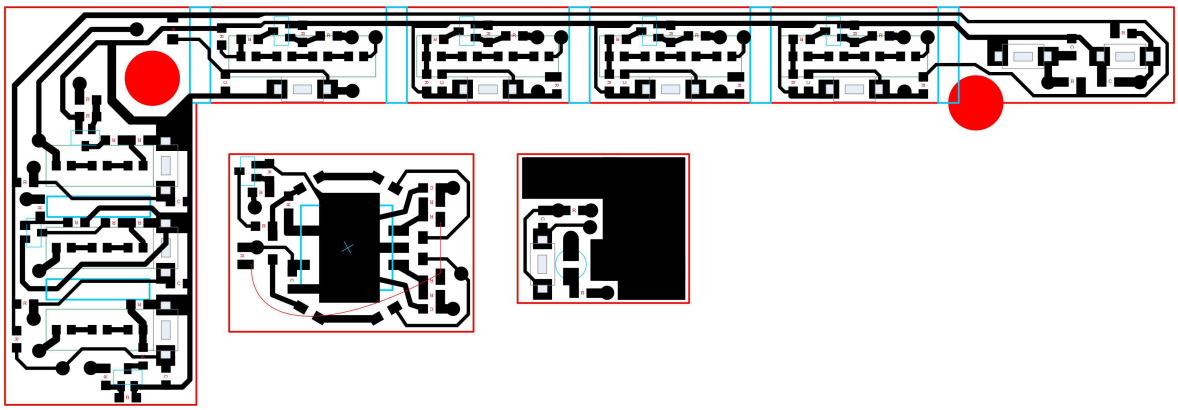
After I pasted the vinyl sticker on the panel and buttons, I got this result.



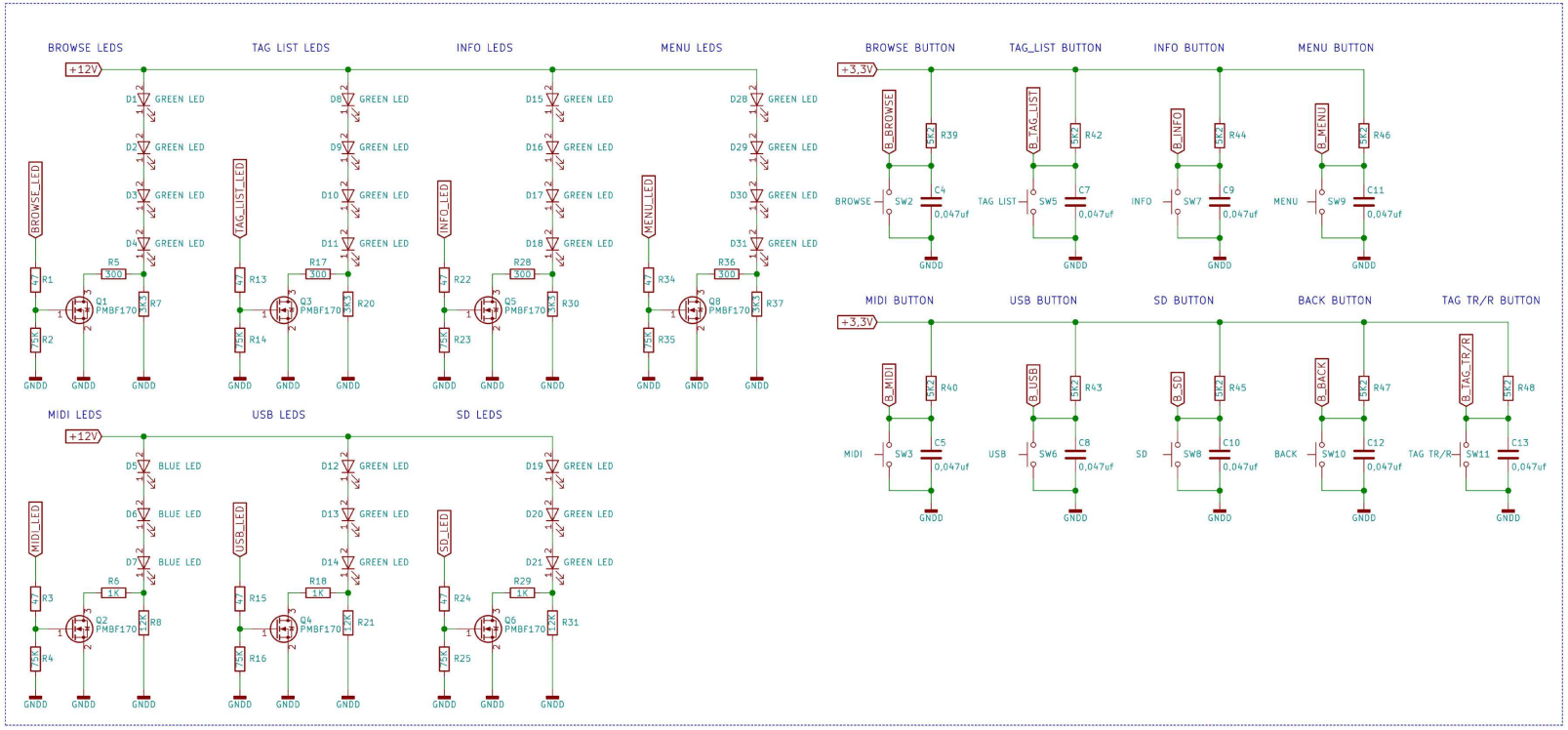


Stage 2:

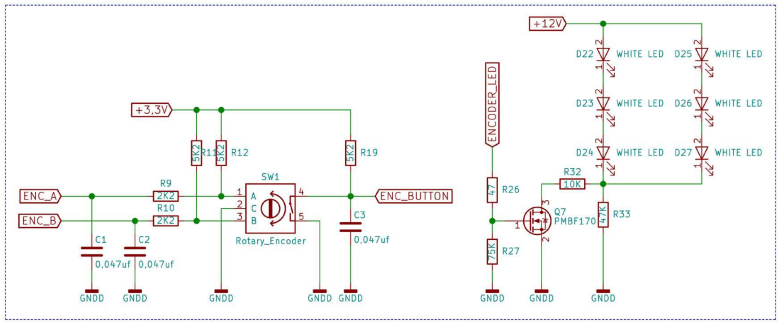
To install the luminous buttons you need to make 3 single-layer PCB. They can be made at home, as I did, or ordered at the factory (for example in China). Files for the manufacture of PCB are in my archive CDJ1000_new_life_project.rar. All elements must be soldered according to the scheme.



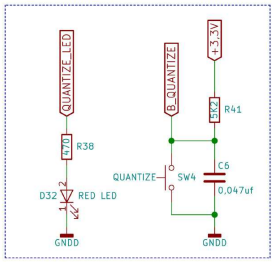
MAIN BUTTONS PCB



ENCODER PCB

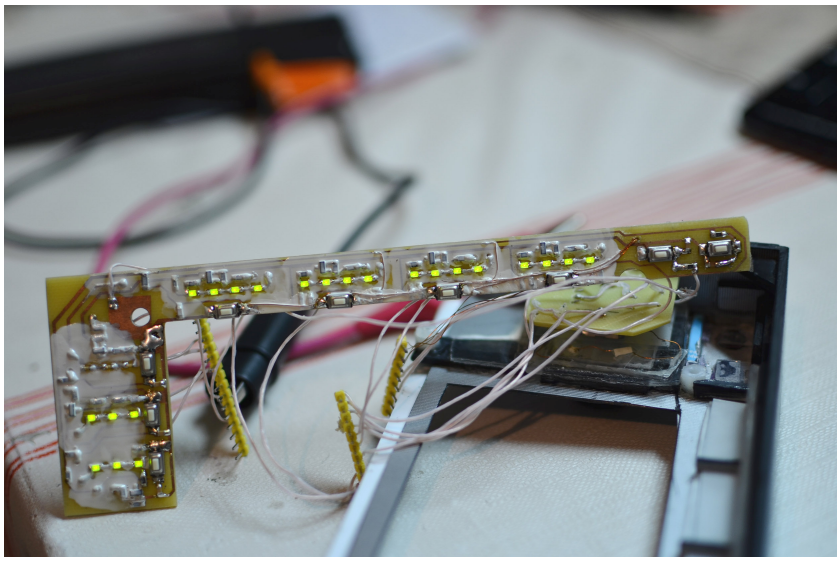


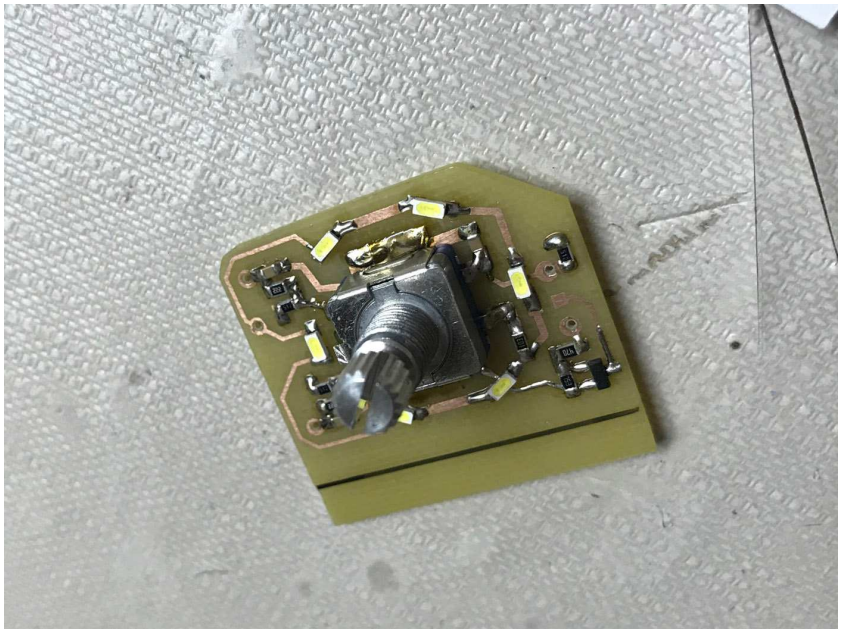
QUANTIZE PCB

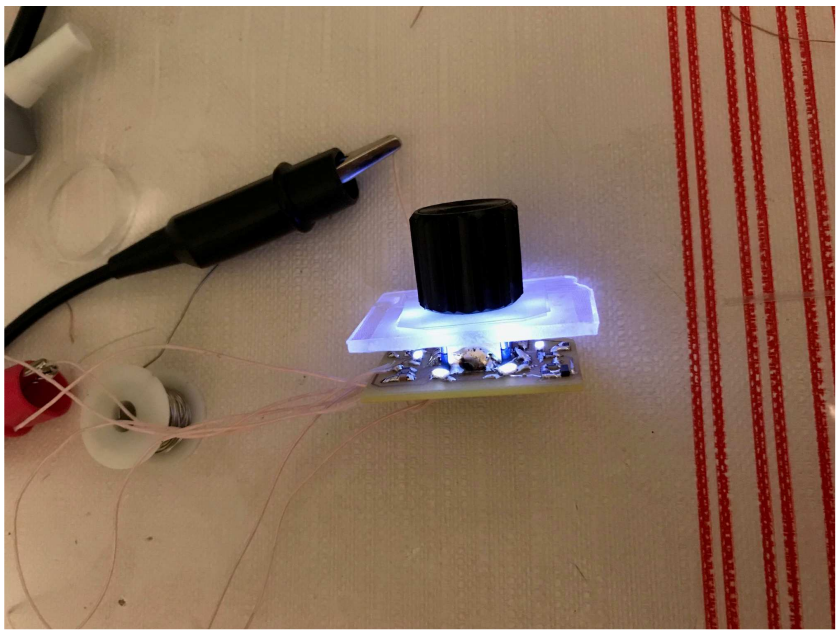


Anatska	
Sheet: / File: 1.sch	
Title: CDJ-1000mk3 new life	
Size: A3	Date: 2018-04-12
KiCad E.D.A. kicad 4.0.7	Id: 1/1
	Rev:

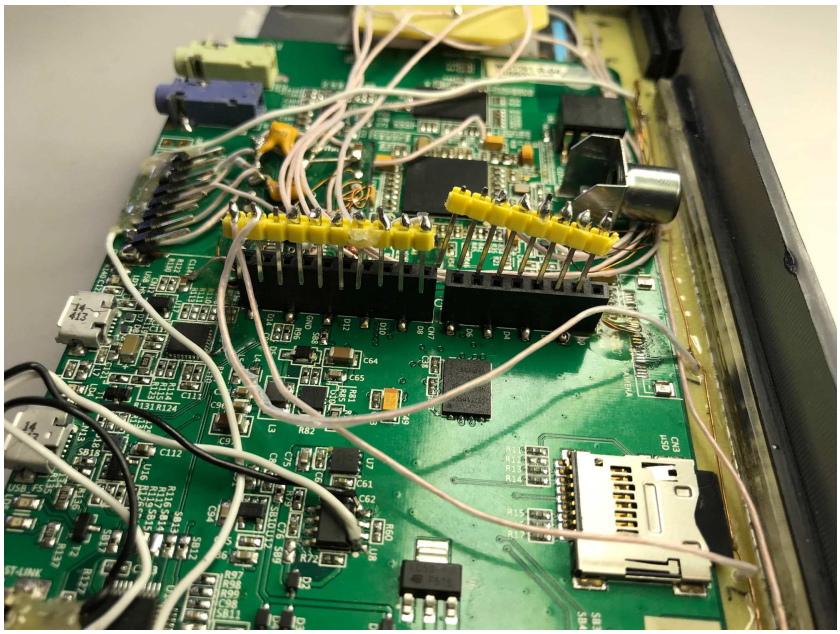
As a result, I made these PCB:

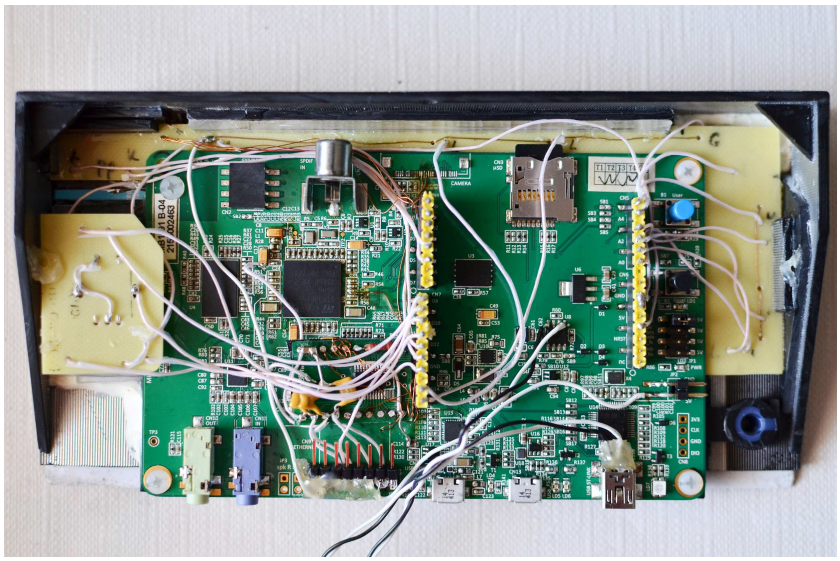


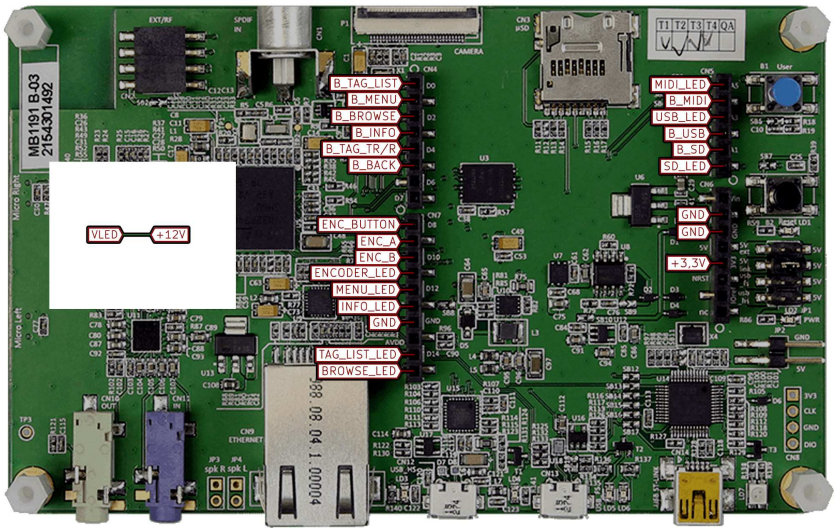




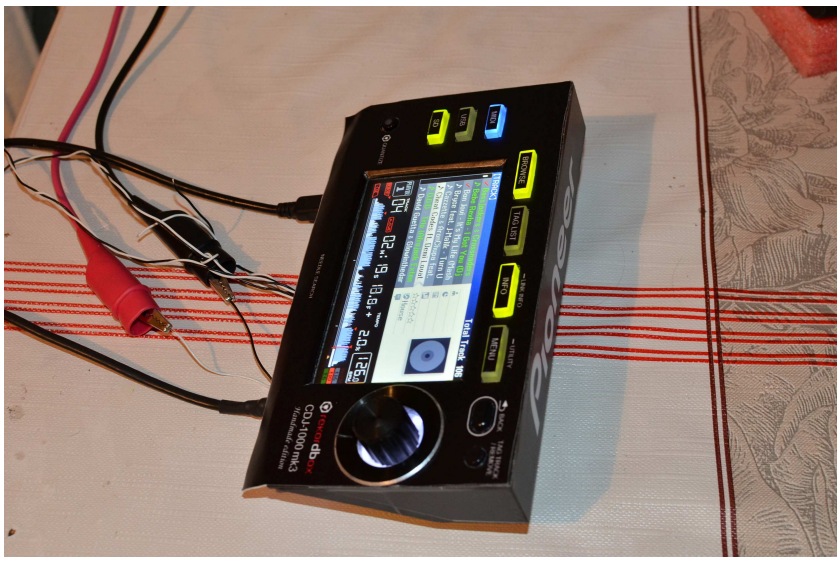
Wires are soldered to the PCB. The second end of the wires is soldered to the single row straight male pin header. There are other wires on the STM32F746G-DISCO board, which I'm not talking about. Do not pay attention to them, they are only needed for me to debug.



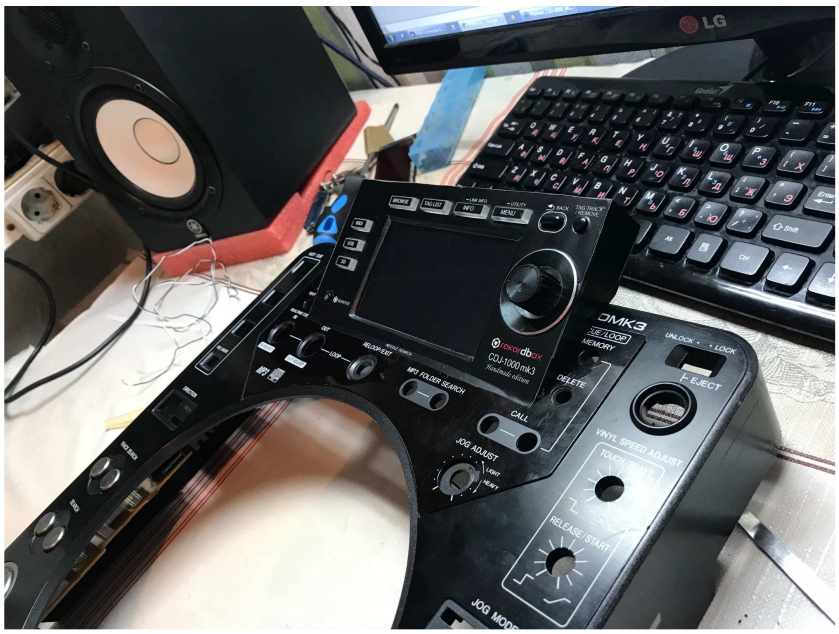




Testing…



After that, the display module is installed in the CDJ-1000mk3 casing and connect 8 wires + audio jack 3,5 mm.



This completes your work. But I will, if possible, work on improving the firmware and adding new features. You can follow the new versions in my git-hub: https://github.com/djgreeb/CDJ-1000mk3_new_life_project

Additional Information:

Reverse Engineering Pioneer CDJ-1000 serial protocol:
https://drive.google.com/open?id=0B8FarhJkT4w_Q2Z1d1pydFdtQzQ

History of firmware changes:

ver. 0.61a
- optimized browser function
- added dark_green color in browser for text on white line cursor

ver. 0.62a
- optimized DATABASE_PARSER finction
- DATABASE_PARSER using WFORMDYNAMIC massive only

ver. 0.63a
- optimized LOAD_TRACK function. Now the PCM[] massive is not used.
- PCM[] converted in uint16_t
- optimized audio processing for new uint16_t PCM[]. Now the calculation of 1 sample is 5us instead of 7.5us

ver. 0.64a
- fixed joint in circular buffer in audio processing
- optimized ring buffer size for increased audio processing performance

ver. 0.65a
- optimized audio processing (read SDRAM). Now the calculation of 1 sample is 4us
- added SD_LED blink
- added encoder blink when loading track

ver. 0.66a
- added touch screen control

ver. 0.67a
- added basic function needle search
- fixed function BSP_LCD_DisplayStringAt.
- added TRANSPARENT_MODE for text.
- changed method of determination the font with dynamic width (Font15P) and other fonts with static width.
- optimized touch controller driver
- create audioparcer for SEEK function

ver. 0.68a
- added QSPI flash support

- added animation startup logo

ver. 0.69a
- added REKORDBOX logo on startup
- added tag list
- added internal function for RedrawWaveforms process

ver. 0.70a
- added INFO mode in BROWSER and TAG LIST menu
- added internal functions for optimize code

ver. 0.71a
- improved the functionality of the TAG LIST menu

ver. 0.72a
- added symbol red check mark for TAG LIST
- improved the functionality of the TAG LIST (added TAG TRACK/REMOVE button)
- bugs fixes internal functions browser and tag list
- bugs fixes NAVIGATOR function
- added loading track from TAG LIST

ver. 0.73a
- added UTILITY window
- added long press MENU button for entering to UTILITY
- fixed check WAV header
- optimized process add/delete tracks in TAG LIST

ver. 0.74a
- added SPI transfer for CDJ-1000mk3 panel

ver. 0.75a
- added reading cues and memory pionts from ANLZXXXX.DAT
- fixed bug SPI DMA (see note*)

ver. 0.76a
- added PLAY, TEMPO, TEMPO RESET, JOG MODE buttons
- added pitch slider 4 ranges
- added calculation tempo and bpm after pitch change

ver. 0.77a
- added PLAY blink led, CUE led
- improved jog vinyl mode (inertial process)
- added TRACK SEARCH buttons
- improved ShowTempo function
- added TIME MODE button, REMAIN MODE
- added CDJ JOG MODE work
- optimized pitch bend coeficients aka CDJ-1000mk3
- optimized VINYL MODE precision jog step

ver. 0.78a
- improved static scroll UI
- added BEATGRID massive
- shift up 1px static information, static waveform
- beatgrid support
- improved Phase Meter

ver. 0.79a
- improved BPM calculating after pitch change
- added BPMGRID for tracks with variable BPM

ver. 0.80a
- added Font13D for phase bars
- added slip mode marker on jog display
- added master player ICON
- added slip mode red button and slip mode jog illumination
- fixed bug spin jog at maximum speed (variable overflow)
- added first SLIP MODE functions with audio processing
- added animation icon and gradient for phase bars
- improved jog pitch bend in reverse mode
- improved jog in slip mode

ver. 0.81a
- added CUE blink
- improved time mode button code
- added VINYL RELEASE/START and TOUCH/BREAKE mode
- optimized SPI-DMA transfer process
- optimized potenciometer's curve for VINYL RELEASE/START and TOUCH/BREAKE mode

ver. 0.82a
- added track nubmer and status (playing or played) in INFO mode
- added filling buffer step sequencer for optimize time gaps
- fixed filling buffer step sequencer algoritm

ver. 0.83a
- improved the work of the function of static and dynamic waveforms
- added "remain/foward time style" for progress bar

ver. 0.84b
- added blink progress bar when the remaining time is less than 30sec
- fixed DrawMinuteMarkers function
- improved performance static and dynamic waveforms (added ForceDrawVLine function)
- added checking device UID
- fixed fatal error when deleting a track from an empty tag list
- the first addition of a function CUE audio

ver. 0.85b
- added CUE button process
- improved CUE audio process
- optimized pitch bend coefficients
- added loading of Hot Cues and Memory Cues attributes

ver. 0.86b
- added MEMORY CUE calling
- bugs fixes calling CUEs when jog in CDJ mode
- added CUE, MEMORY CUE and HOT CUE triangles on dynamic waveform

ver. 0.90b
- database parser DeviceSQL updated based on document: "Rekordbox Export Structure Analysis" James Elliott Deep Symmetry, LLC
- change colorystic dynamic waveform (lower white point)
- change long touch timer for MENU button
- added bpm to INFO menu
- added colored rating to INFO menu
- added KEY to INFO menu
- added duration to INFO menu
- maximum tracks in database - 512 (not enough memory)
- maximum playlists in database - 20 (not enough memory)
- supported only latin encoding in track names and tags
- added encoder signal filter
- show KEY on waveform fisplay
- added pages in the browser with animation: playlists, tracks, SD card information
- browser animation bug fixed
- resized cue marker on dynamic waveform
- change logic INFO button
- fixed database parser

- fixed text line overflow error
- added REALTIME CUE (set, when track playing)
- added AUTO CUE to the first bit of the bitgrid
- added full UID chip in HEX in utility
- fixed TAG LIST exiting borders when deleting tracks

ver. 0.97b

- improved browser menu
- add flash disk name and date (at the root of the browser)
- fixed floating pitch tempo values
- improved slip mode on CUE
- fixed the work of jog with a hot CUE
- improved mechanical imitation of jog
- changed color and style gradient bar
- changed color dynamic waveform
- optimized dynamic waveform work
- added QUANTIZE for CUE and LOOP
- exclude noise at the end of the track
- added CRC control for SPI Rx package
- fixed start phase detection BEATGRID
- added LOOP MODE (beta)
- optimized time display function to improve performance

ver. 1.03

- changed function control for SPI Rx package
- in UTILITY it is now possible to change parameters and save to internal memory
- added load lock
- added AUTO CUE LEVEL with MEMORY, FIRST BEAT MODE and analog tresholds (-36dB, -42dB and other)
- added TIME MODE DEFAULT
- added TEMPO RANGE DEFAULT
- SLIP REVERSE MODE for REVERSE SWITCH
- added ability to select RGB or BLUE waveforms
- added LCD brightness
- added jog indicator when the track ends
- added jog brightness
- added BPM color
- added audio output level
- for use JOG PWM output pin CN4-7 for it to work. see schematic STM32F746 Discovery
- for LCD PWM to work, remove R85 and install
  it between U10-7 and GND. Remove R81 and R66. Connect together the U10-7 and RMII_CRS_DV,
  at the point where R66 was.) see schematic STM32F746 Discovery

ver. 1.05

- added dynamic waveform color map from original dump cdj-2000nxs

ver. 1.07

- fixed rekordbox parser from parser version 0.39 SLDZ project

ver. 1.11

- SDRAM initialization has been removed, which speeds up loading
- the code is split into separate files
- increased delay before starting SPI DMA to start transactions between STM and Pioneer panel mpu
- modify HAL_SAI_Transmit_IT and SAI_FillFifo and HAL_SAI_IRQHandler function

ver. 1.13

- changed interpolators coefficients (optimal 32x, 4-point, 3rd-order)

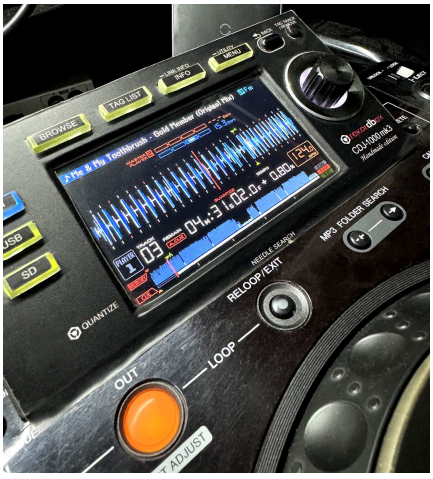
ver. 1.15

- optimized audio prc (removed unnecessary variable translation operation before sending to SAI)
- added variable audio TRIM depending on playback speed
- added an algorithm for smooth changes in the TRIM variable to prevent clicks in the sound when there is a sudden change

ver. 1.17

- the dynamic waveform is now 480px wide and has HOT CUEs lettering

Screen with wide version of the waveform (1.17)



Contacts:	
Andrei Anatska	
Minsk City	
Instagram	instagram.com/dj_equipment_development
YouTube:	youtube.com/channel/UCA6XayxHQ-knm6hkCL-jbjw
Mail:	greeb-mail@mail.ru
Facebook:	www.facebook.com/djgreeb
GitHub:	https://github.com/djgreeb/CDJ-1000mk3_new_life_project