

CDJ-1000mk3 new life project

Self assembly manual



Minsk 2018

Important!

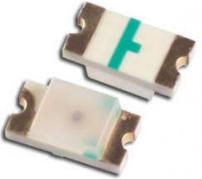
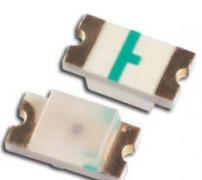
Everything you do with the equipment, you do at your own risk! I am not responsible for
the damaged equipment, time and money you spent.
For a successful result, you need to have a basic knowledge of radio electronics.

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

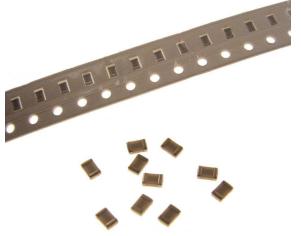
Pioneer CDJ 1000mk3. You can use the faulty (with problems in the main assy and CD-ROM)	
STM32F746G-DISCO board Can be bought here: http://www.st.com/en/evaluation-tools/32f746gdiscovery.html#samplebuy-scroll https://www.ebay.com/itm/STM32F746G-DISCO-NEW/173245262810?hash=item285638ebda:g:vFUAAOSwr95avt41 or other online stores.	
USB to mini USB cable (for download firmware only)	
Circuit SN74HC245 (TSSOP or other) 1pcs Can be bought here: https://www.ebay.com/itm/10-PCS-74HC245PW-TSSOP-20-74HC245-HC245-SMD-Octal-bus-transceiver-3-state/301264153227?hash=item4624be2a8b:g:A1IAAOswKQ9aAsp- 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 Can be bought here: https://www.ebay.com/itm/Monolithic-Multilayer-Chip-Ceramic-Capacitors-50V-1-22-33-47-68-470-680-pF-nF-uF/262768747666?hash=item3d2e3ce492:m:mWocGsIgk90L5iEYIOYA https://www.digikey.com/product-detail/en/kemet/PFR5221J63J11L4BULK/399-7681-ND/3465848 or other online stores or radio market.	
Capacitor 1uF 1pcs Can be bought here: https://www.ebay.com/itm/Monolithic-Multilayer-Chip-Ceramic-Capacitors-50V-1-22-33-47-68-470-680-pF-nF-uF/262768747666?hash=item3d2e3ce492:m:mWocGsIgk90L5iEYIOYA https://www.digikey.com/product-detail/en/kemet/R82DC4100DQ60J/399-5447-1-ND/1930840 or other online stores or radio market.	

<p>Resistor 10 kohm 3pcs Can be bought here: https://www.ebay.com/itm/1000pcs-Carbon-Film-Resistor-1-4W-0-25W-Full-Range-of-Values-1-2-10M/252856536398?hash=item3adf6c8d4e:m:mr1GacVeyo_CY3IVs-fkm4g https://www.digikey.com/product-detail/en/stackpole-electronics-inc/CF18JT10K0/CF18JT10K0CT-ND/2022766 or other online stores or radio market.</p>	
<p>Resistor 470 ohm 1pcs Can be bought here: https://www.ebay.com/itm/1000pcs-Carbon-Film-Resistor-1-4W-0-25W-Full-Range-of-Values-1-2-10M/252856536398?hash=item3adf6c8d4e:m:mr1GacVeyo_CY3IVs-fkm4g https://www.digikey.com/product-detail/en/stackpole-electronics-inc/CF18JT470R/CF18JT470RCT-ND/2022734 or other online stores or radio market.</p>	
<p>Resistor 36 ohm 5W 1pcs Can be bought here: https://www.ebay.com/itm/10pcs-Wirewound-Cement-Resistor-Ceramic-5W-Horizontal-5-1R-820R-ohm/122799381107?hash=item1c9769da73:m:mQs1ls2A74QQgBIGc9NFvw https://www.digikey.com/product-detail/en/yageo/SQP500JB-36R/36W-5-ND/18668 or other online stores or radio market.</p>	
<p>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.</p>	
<p>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.</p>	
<p>Soldering iron (25-40W) and accessories for soldering. Ability to work with a soldering iron.</p>	

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

<p>SMD LEDs green 22pcs Can be bought here: https://www.digikey.com/product-detail/en/lite-on-inc/LTST-C191KGKT/160-1446-1-ND/386834</p> <p>https://www.ebay.com/itm/0805-SMD-SMT-LED-Red-Green-Blue-Yellow-White-Orange-Purple-7Colours-Light/272173424833?var=570984529354&hash=item3f5ecce0c1:g:u2sAAOSwP~tW6aHj or other online stores or radio market.</p>	
<p>SMD LEDs blue 3pcs Can be bought here: https://www.digikey.com/product-detail/en/lite-on-inc/LTST-C190TBKT/160-1646-1-ND/573586</p> <p>https://www.ebay.com/itm/0805-SMD-SMT-LED-Red-Green-Blue-Yellow-White-Orange-Purple-7Colours-Light/272173424833?var=570984529354&hash=item3f5ecce0c1:g:u2sAAOSwP~tW6aHj or other online stores or radio market.</p>	
<p>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.</p>	
<p>LED 3mm for red (mounting type: through hole) 1pcs 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.</p>	
<p>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-XWltuvhMb6F1XcfCg or other online stores or radio market.</p>	
<p>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.</p>	
<p>40Pin 2.54mm Single Row Straight Male Pin Header Strip 1*40P Can be bought here: https://www.ebay.ca/itm/10PCS-40Pin-2-54mm-Single-Row-Straight-Male-Pin-Header-Strip-1-40P-for-Arduino/201080074697?trkparms=aid%3D222007%26algo%3DSIM.MBE%26ao%3D2%26asc%3D20180124145912%26meid%3Dd5249128c5c549158f0f870f79d33f02%26pid%3D100005%26rk%3D5%26rk%3D6%26sd%3D181918556293%26itm%3D201080074697&trksid=p2047675.c100005.m1851 or other online stores or radio market.</p>	

<p>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=item2ccb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.</p>	
<p>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=item2ccb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.</p>	
<p>**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=item2ccb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.</p>	
<p>**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=item2ccb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.</p>	
<p>**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=item2ccb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.</p>	
<p>**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=item2ccb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.</p>	
<p>**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=item2ccb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.</p>	
<p>**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=item2ccb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.</p>	
<p>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=item2ccb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.</p>	

<p>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=item2ccb5c3c15:m:mdj0PiM7YOyJ5ICPOQNDbTQ or other online stores or radio market.</p>	
<p>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:9scAAMXQleBTIygT or other online stores or radio market.</p>	
<p>Transistor PMBF170 9pcs Can be bought here: https://www.ebay.com/itm/10-pcs-PMBF170-NEXPERIA-MOSFET-N-Channel-60V-0-3A-830mW-SOT23-NEW/332489800228?hash=item4d69efba24:g:AtsAAOSw1EhZkKPd https://www.digikey.com/product-detail/en/nexperia-usa-inc/PMBF170215/1727-5173-1-ND/2531764 or other online stores or radio market.</p>	
<p>Single PCB Copper Clad Laminate Board for create of a PCB with buttons and LEDs (or manufacture of the board in the factory)</p>	
<p>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.</p>	
<p>Super glue (Cyanoacrylate)</p>	

*The number of components in the table is given to upgrade one CDJ.

*Some components, such as LEDs, resistors, capacitors and wires, you can't buy. They can be found in old broken electronic technique.

**Perhaps these elements will have to choose other values, to obtain the desired brightness of LEDs.

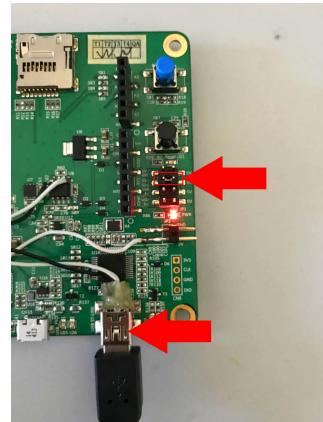
The STM32F746DISCO board has weaker MCU than the CDJ-2000s or XDJ-1000s, so the project has some hardware and software limitations of functions, in comparison with the original CDJs. Therefore, before you start modding the CDJ-1000mk3, read the main features of this project.

Parameter	Description	Note
Supported audio formats	44,1k 16Bit Stereo, .wav only	expansion is possible, but it is not in the basic plans
Supported media	Micro SD card only (FAT16, FAT32)	plans to add USB flash drive support
Rekordbox support	Playback of the analyzed database of tracks,	plan work with playlists, as well as add a

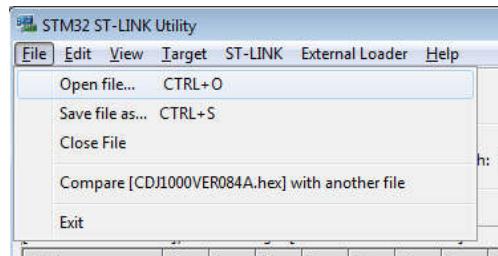
	drawing static and dynamic waveforms, drawing beat grid, reading of hot CUEs, memory CUEs (but for now, without loading into audio RAM (firmware ver.085 beta)). Restrictions: All playlists merge into one shared playlist.	loading hot CUEs, memory CUEs
Quantize	On development stage (firmware ver.085 beta). Now there is only a beat grid and phase meter.	
Supported MIDI	Not supported.	expansion is possible, but it is not in the basic plans
PRO DJ Link	Not supported.	expansion is possible, but it is not in the basic plans
Needle search	Supported. The STM32F746DISCO 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

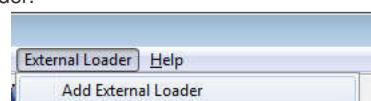
- Set the jumper on the STM32F746G-DISCO board to "5V link USB" and connect the board to the computer using the mini USB cable.



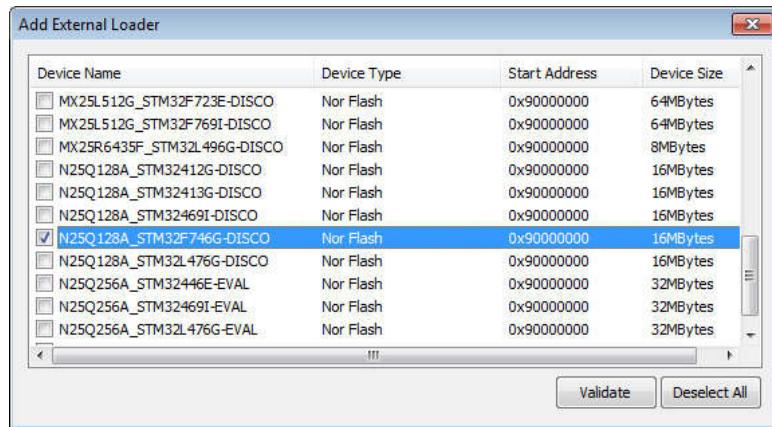
- Download STM32 ST-LINK Utility from the official web page <http://www.st.com/en/development-tools/stsw-link004.html> or take it in my archive CDJ1000_new_life_project.rar: https://drive.google.com/open?id=1TosmzRpz8K_REsWoLKB8q8zJHkgPR6lb
- Download the latest firmware file CDJ1000VERxxxx.hex on my github: https://github.com/djgreeb/CDJ-1000mk3_new_life_project (CDJ1000VERxxxx.hex where xxxx - firmware version).
- 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.
- Launch STM32 ST-LINK Utility.
- File->Open file. Open file CDJ1000VERxxxx.hex on your computer.



- External Loader->Add External Loader.



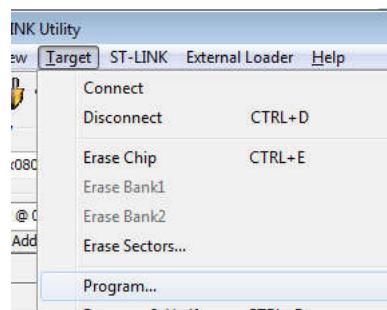
- Select N25Q128A_STM32F746G-DISCO Nor Flash



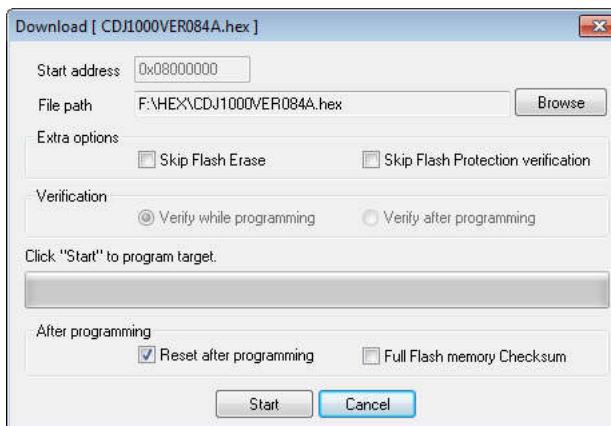
9. Target->Connect



10. Target->Program...



11. Push Start and wait for programming to finish:



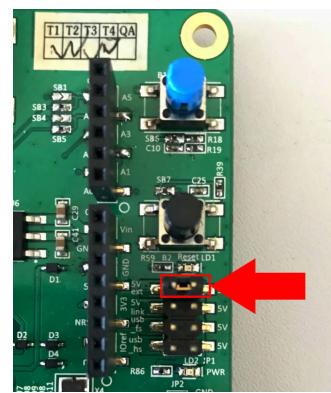
12. Close the utility. After downloading the firmware, the display will show the Pioneer DJ logo and the firmware version. If this does not happen, then you did something wrong. Try again.



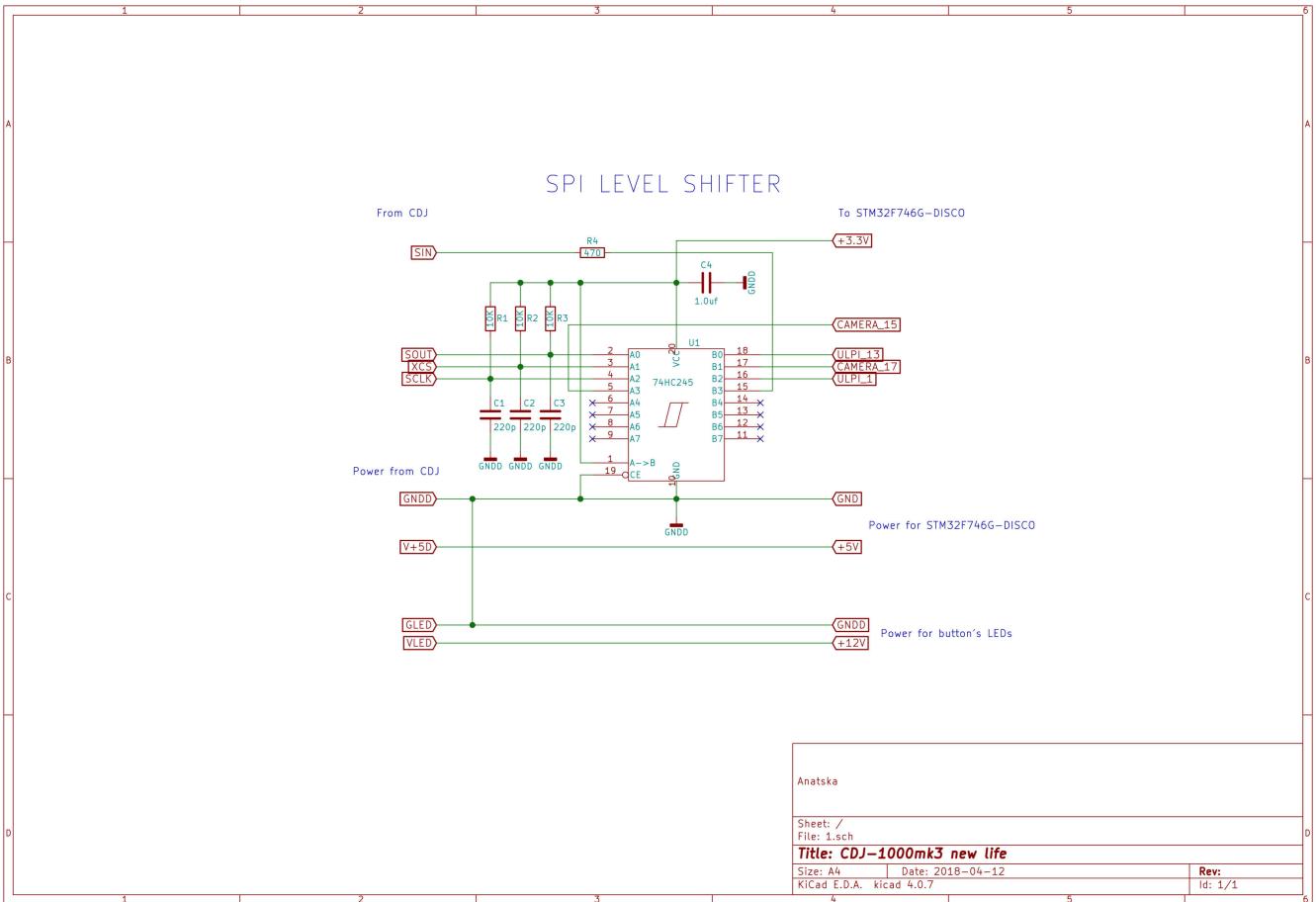
13. Insert the Micro SD card with the Rekordbox music library (wav files) on the back of the board and reconnect the board to the PC using the mini cable. This will display the:



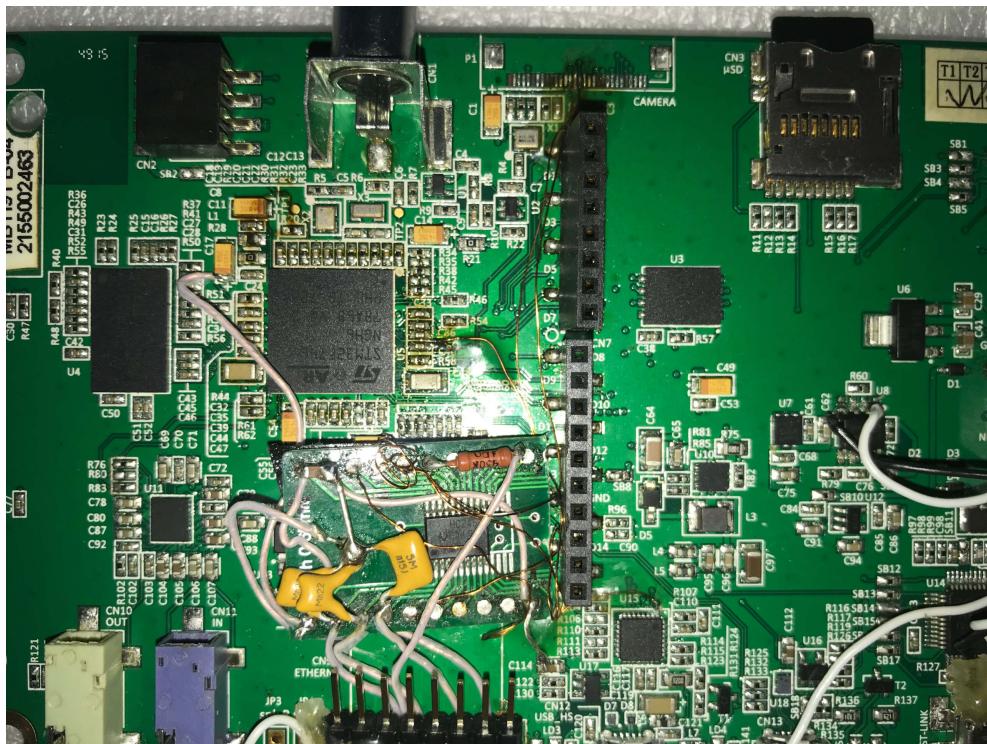
14. Disconnect mini USB cable and set the jumper on the STM32F746G-DISCO board to "5V ext".



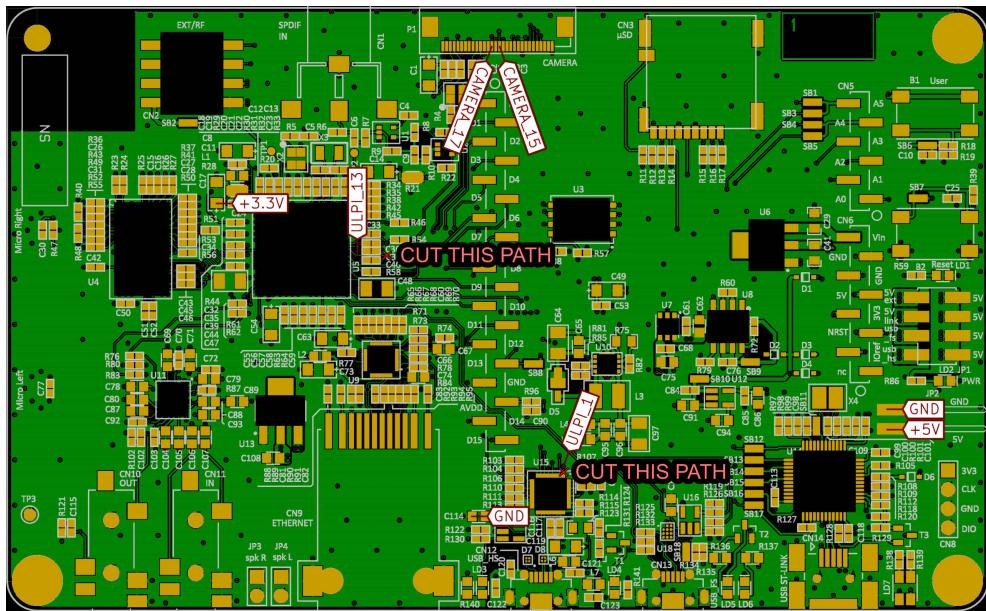
15. Now we need to assemble the scheme using the TSSOP to DIP adapter board and the components from the first table.



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.



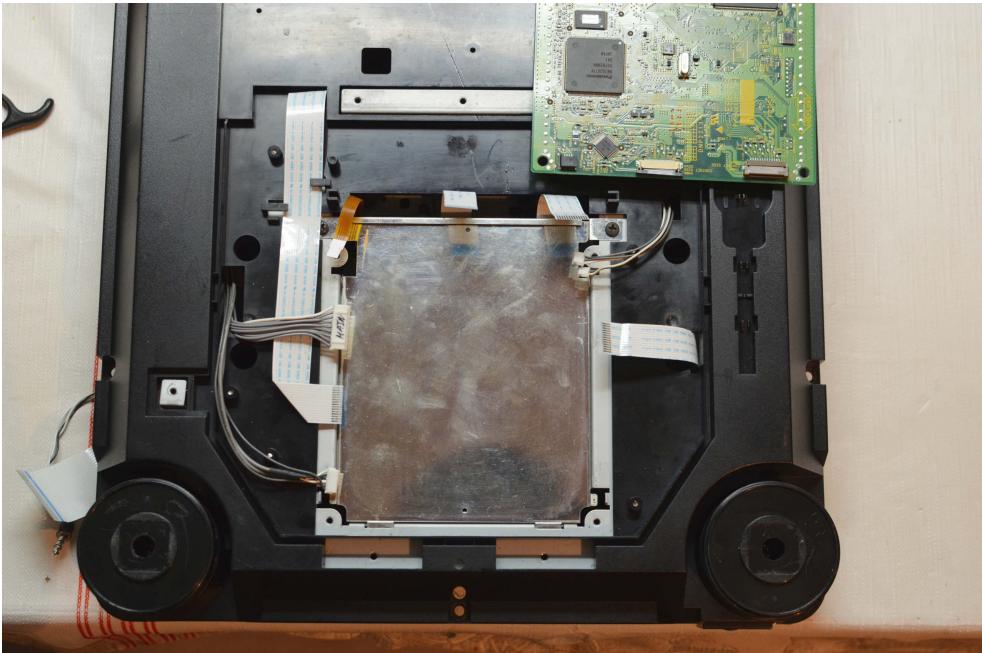
Here are the places to connect TSSOP to DIP adapter board. You also need to cut 2 paths.



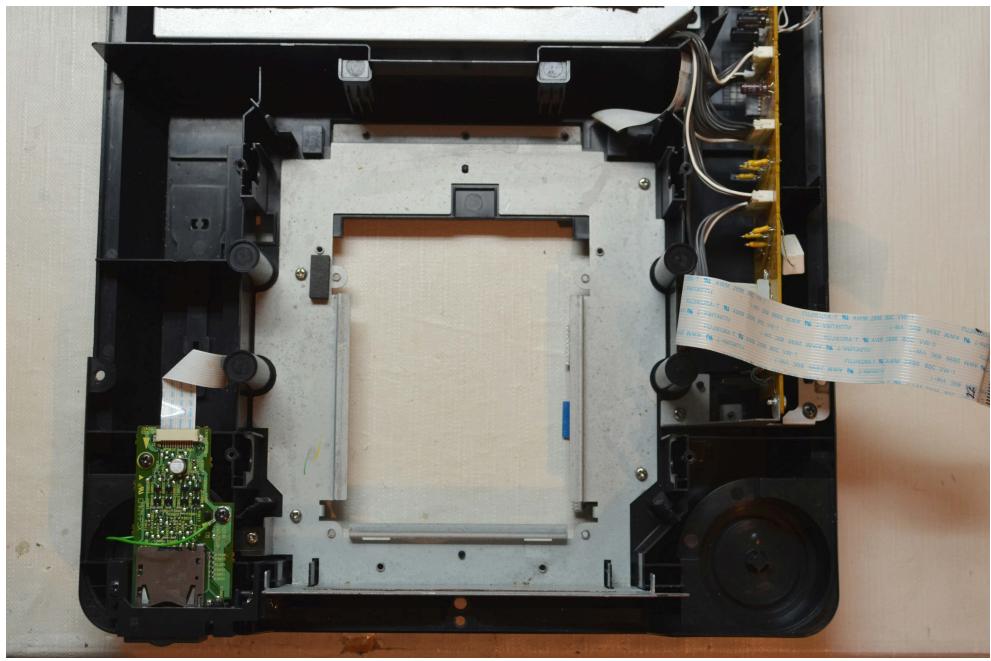
Step 2: prepare CDJ-1000mk3

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

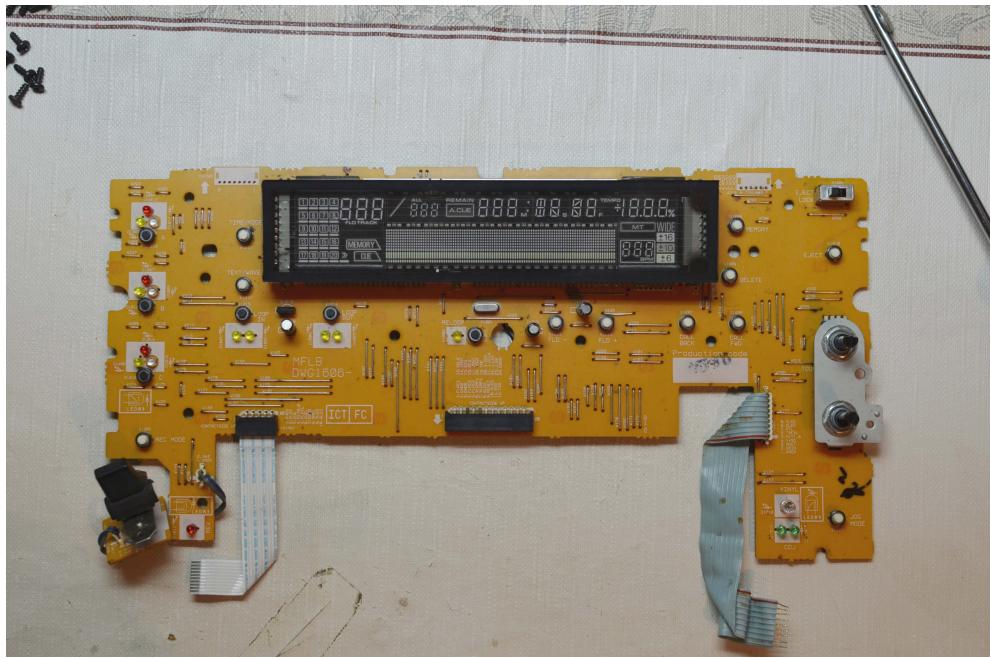
1. Unscrew the bottom cover and remove the main board (main assy).



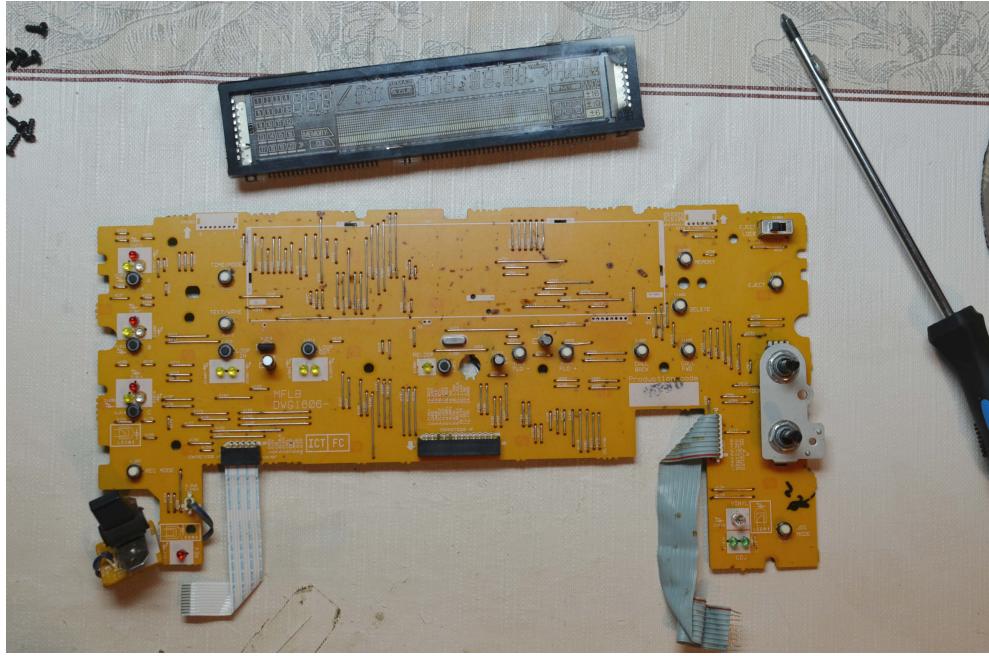
2. Remove the top cover, unscrew and remove the CD-ROM. It will not be used in the project.



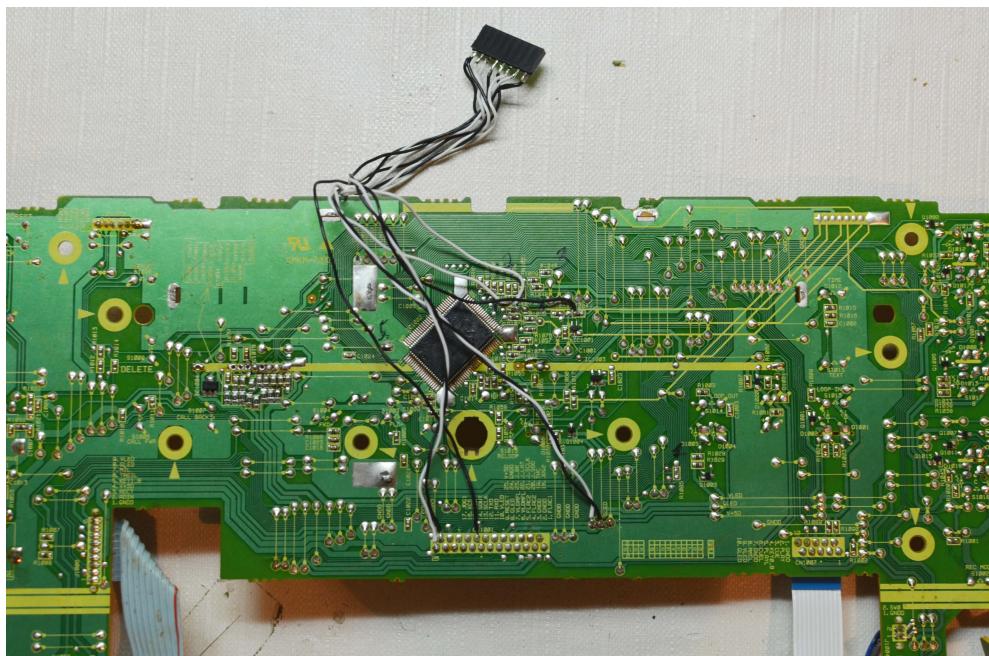
3. From the top, unscrew and remove the board with the display (MFLB assy).

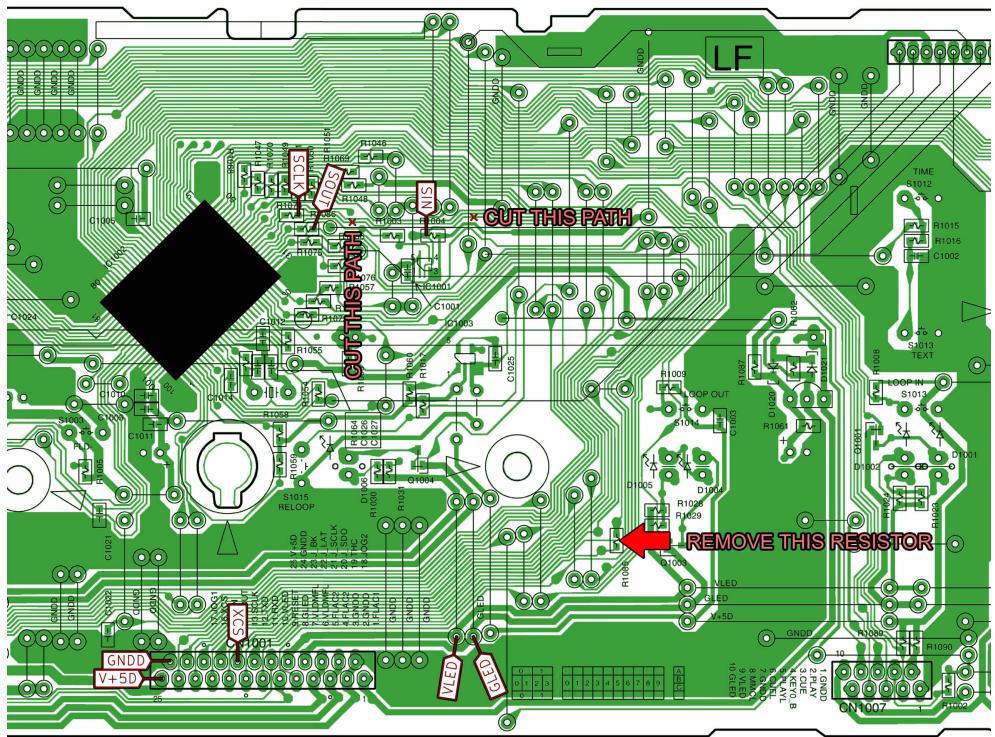


4. Unmount the display from the board. Need to solder.

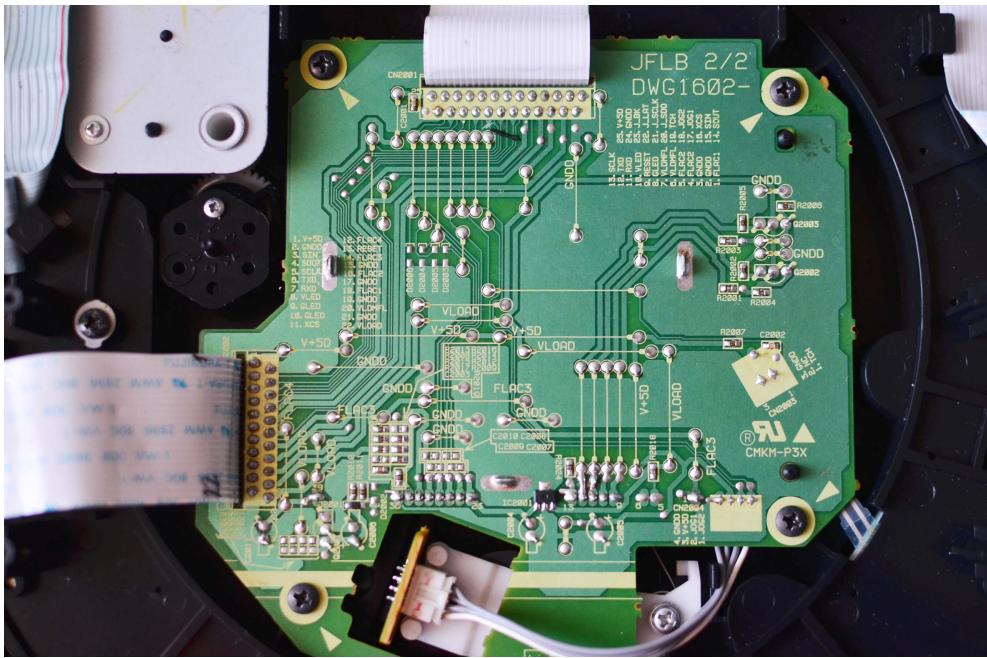


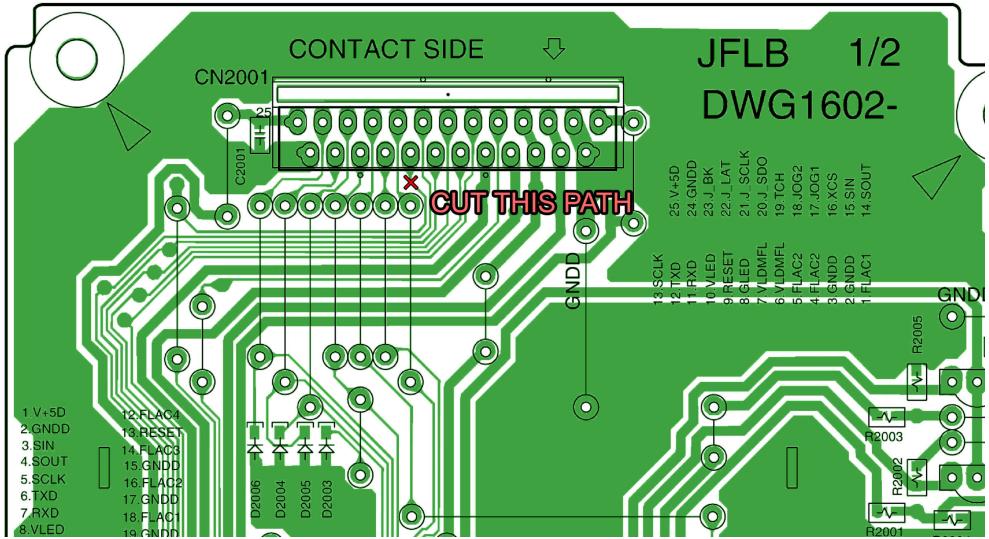
5. On the back of the board, 8 wires must be soldered. These wires will be connected to the STM32F746G-DISCO board and TSSOP to DIP adapter board. It is also necessary to cut several paths on the board.



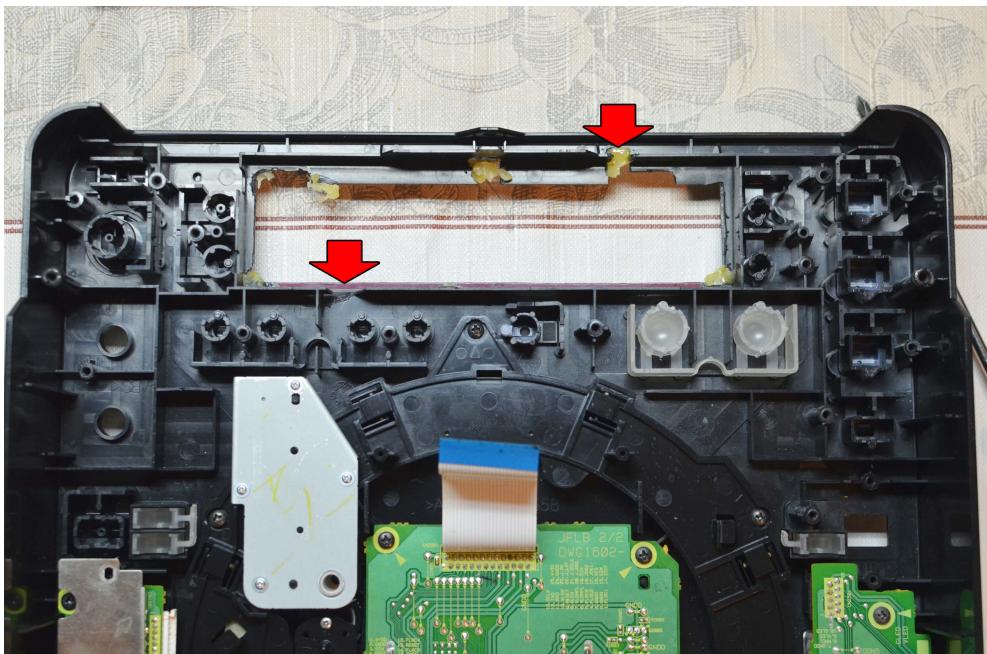


6. Cut the one path on the jog board (JFLB assy).

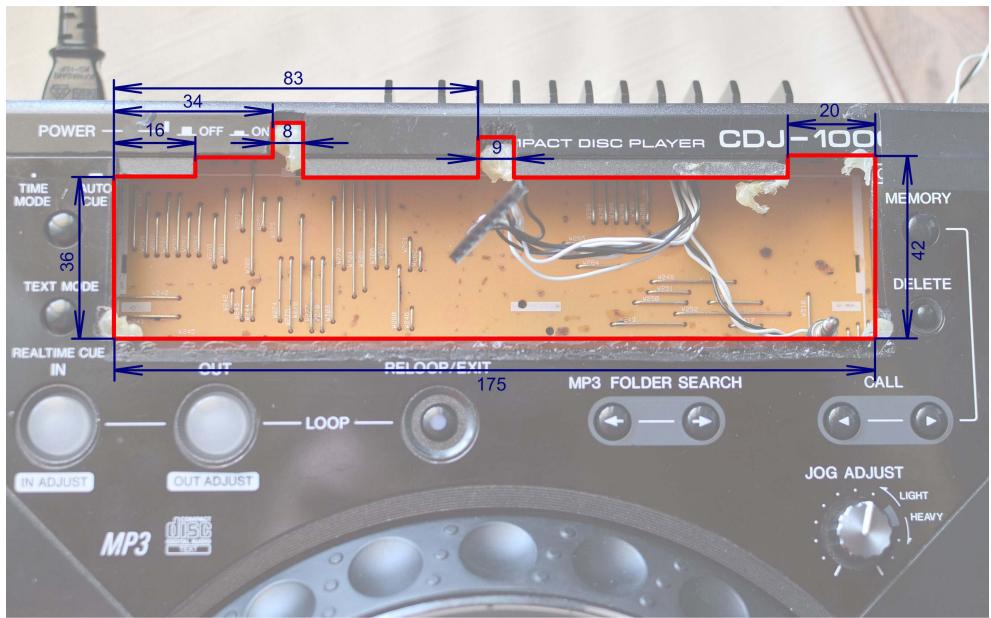




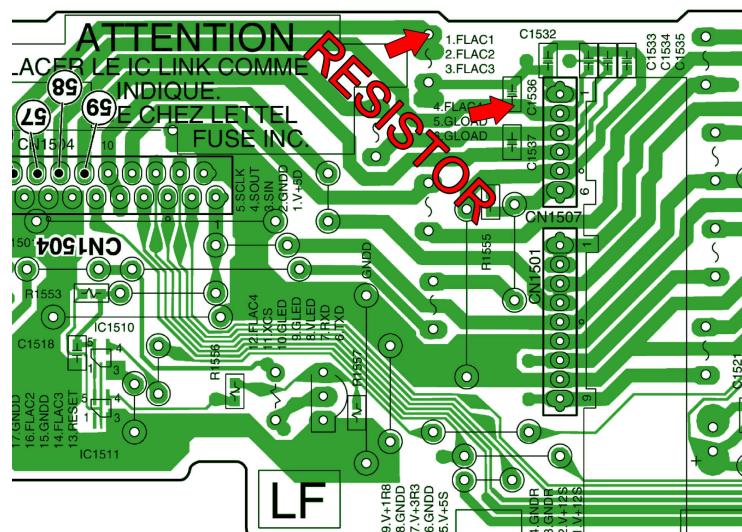
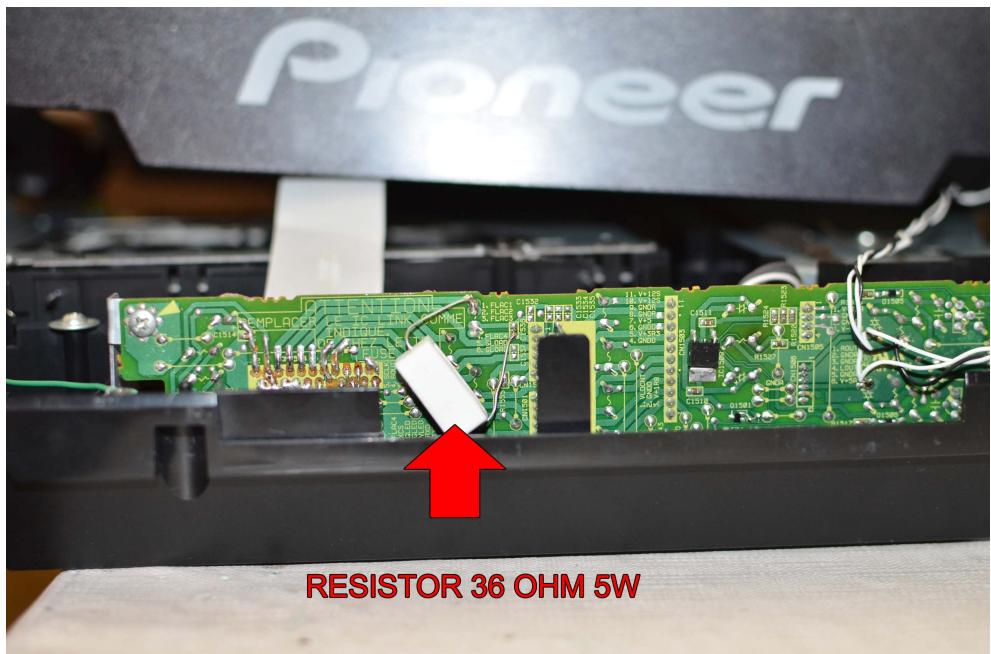
7. Remove excess plastic partitions.



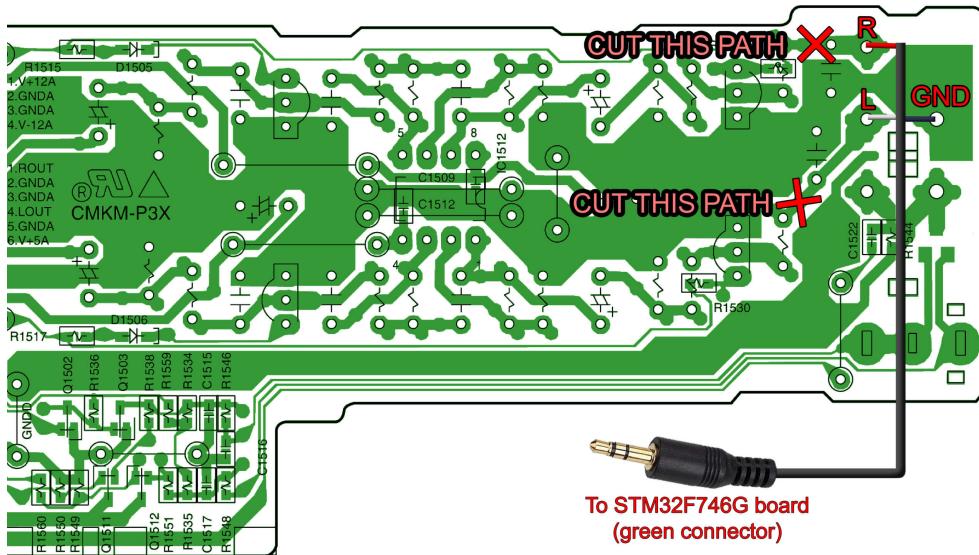
8. In the display area, you need to cut out the window for installing the display module. After that, you can install the display board (MFLB assy) in place and connect all the flexible cables to it.



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-2000, you need to create a board and a case for the display module.



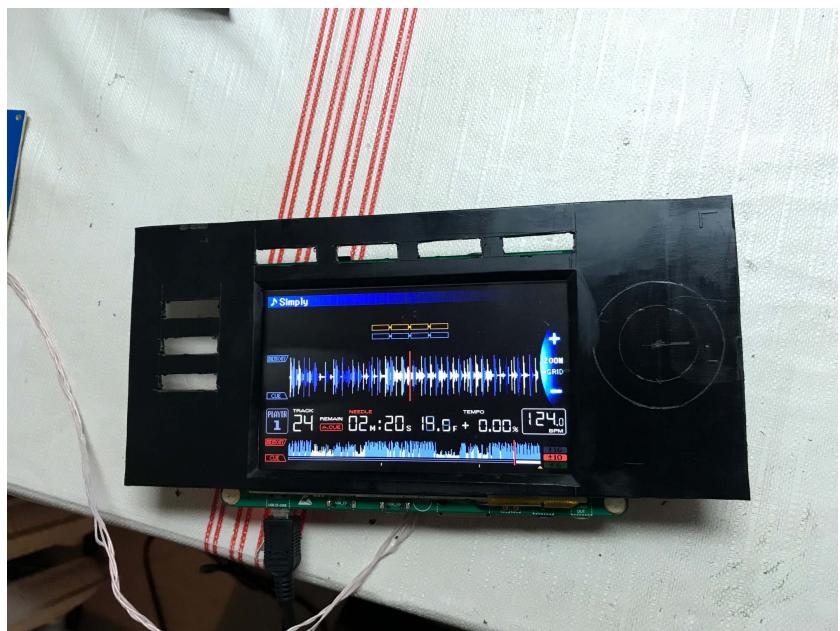
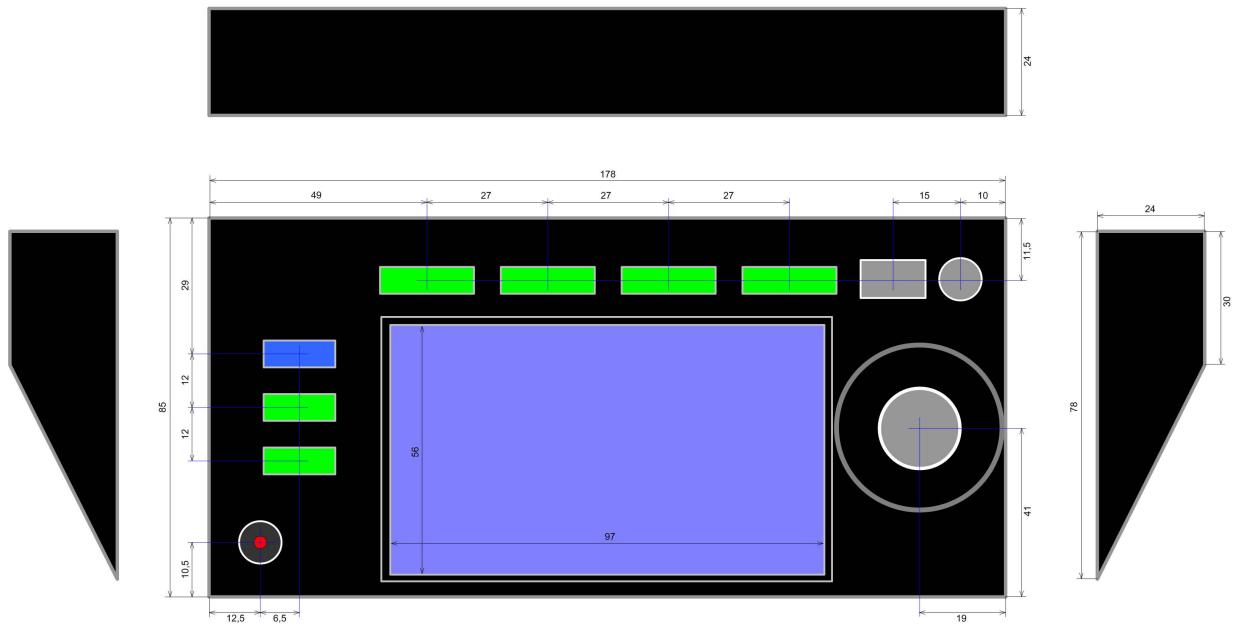
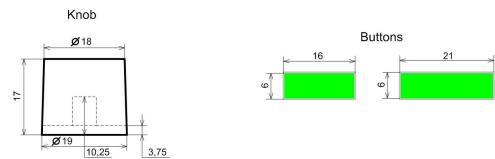
Step 3: creation of a display module

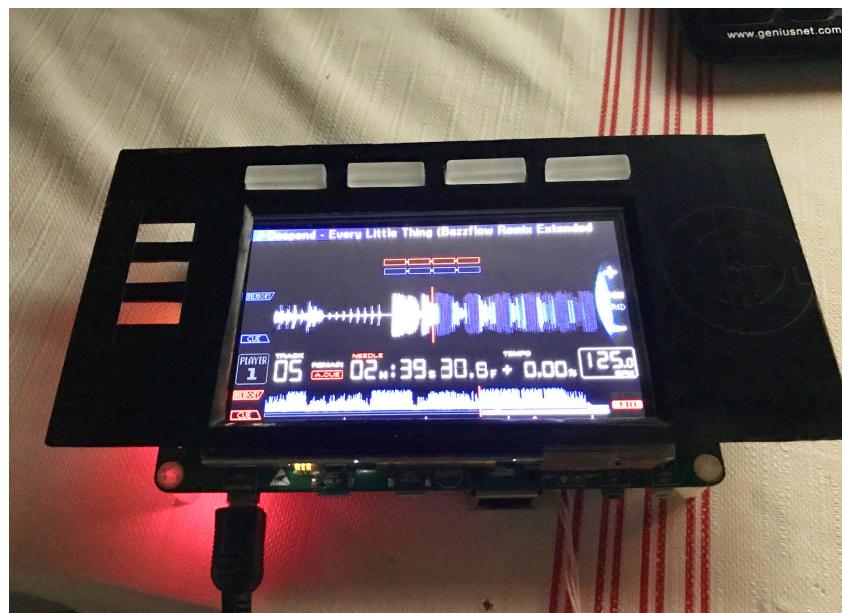
The creation of the display module consists of 2 stages. The first stage is the creation of the hull (you need to work with plastic, plexiglas). The second stage is the creation of a single-layer boards for buttons and leds.

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.

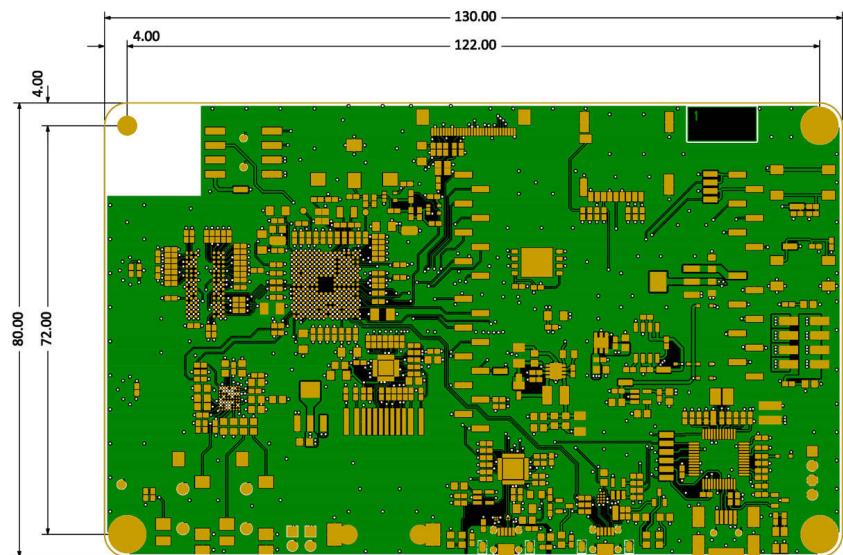
Knob 18mm







The STM32F746G-DISCO board has such dimensions:



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



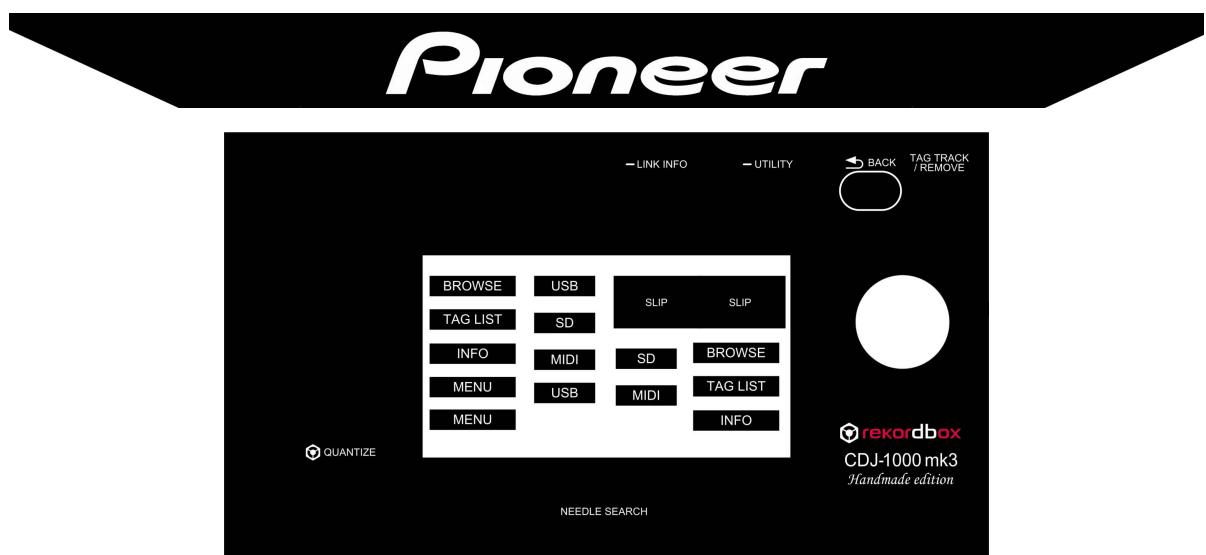


Menu Search Knob can be cut from plastic. You can buy the original (part number DAA1259 or DAA1246) or accidentally choose a suitable cap from the tube.





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.

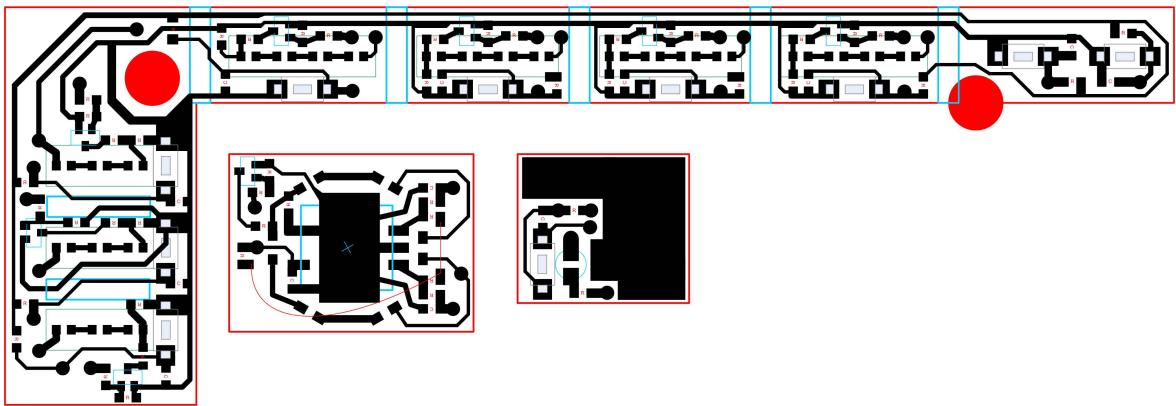


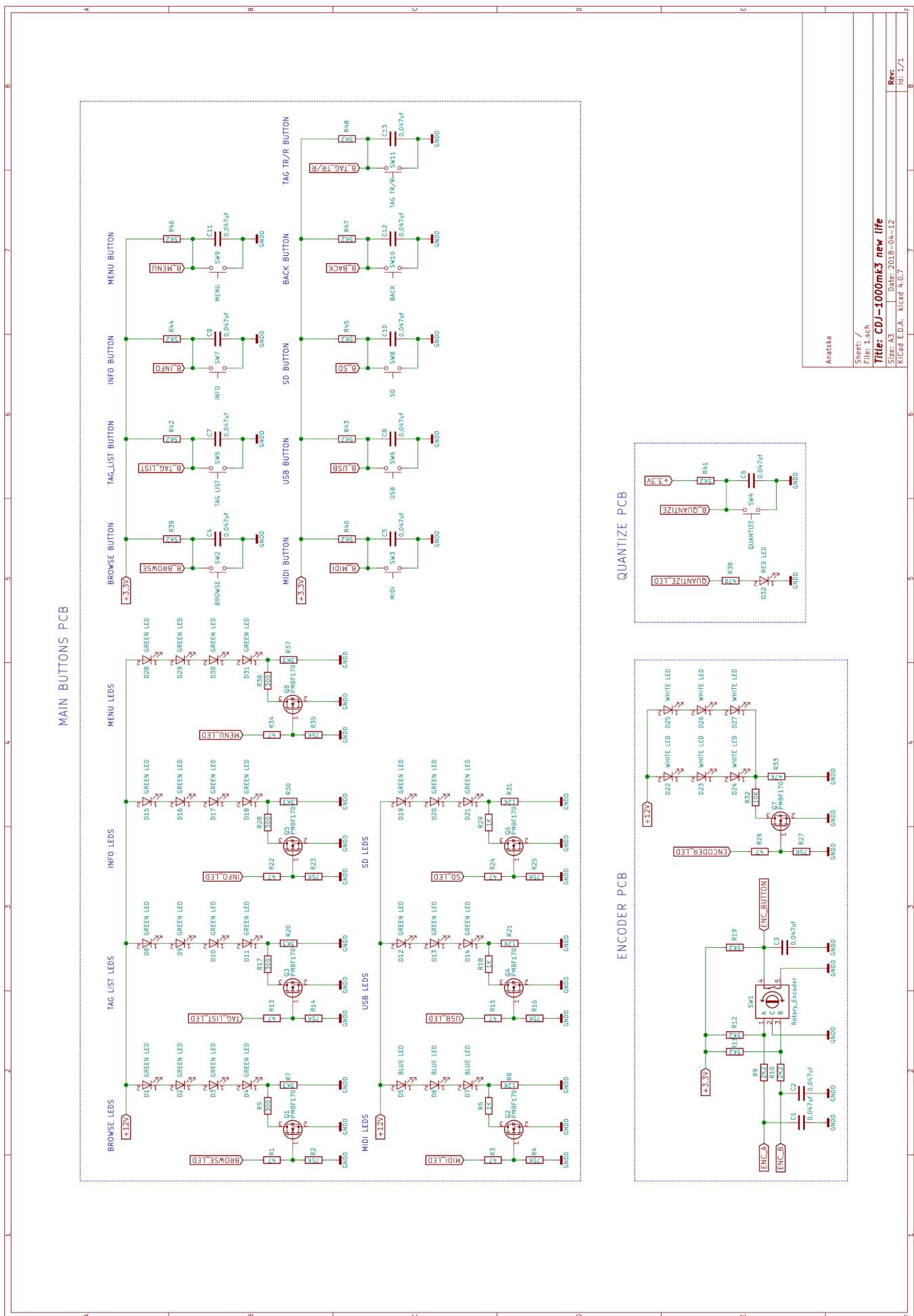
After I pasted the vinyl sticker on the panel and buttons, I got this result.



Stage 2:

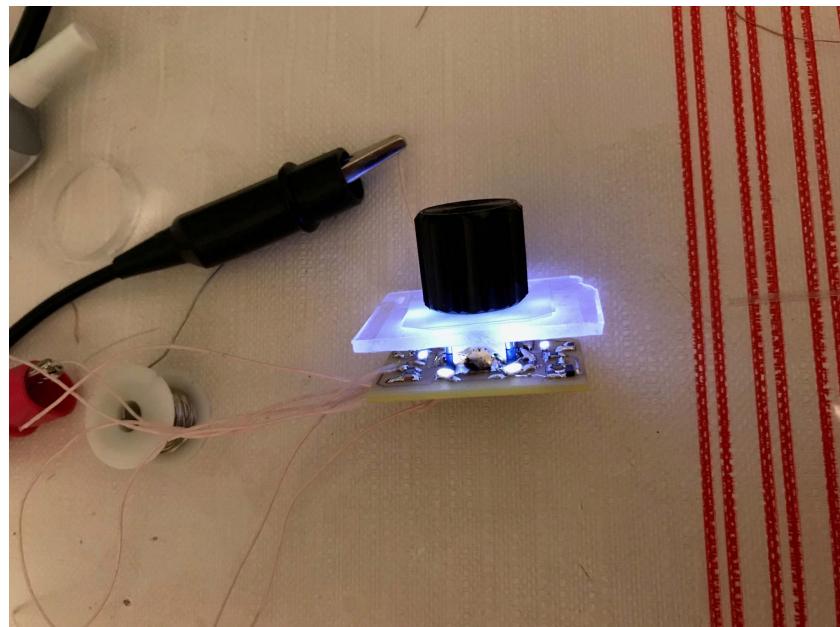
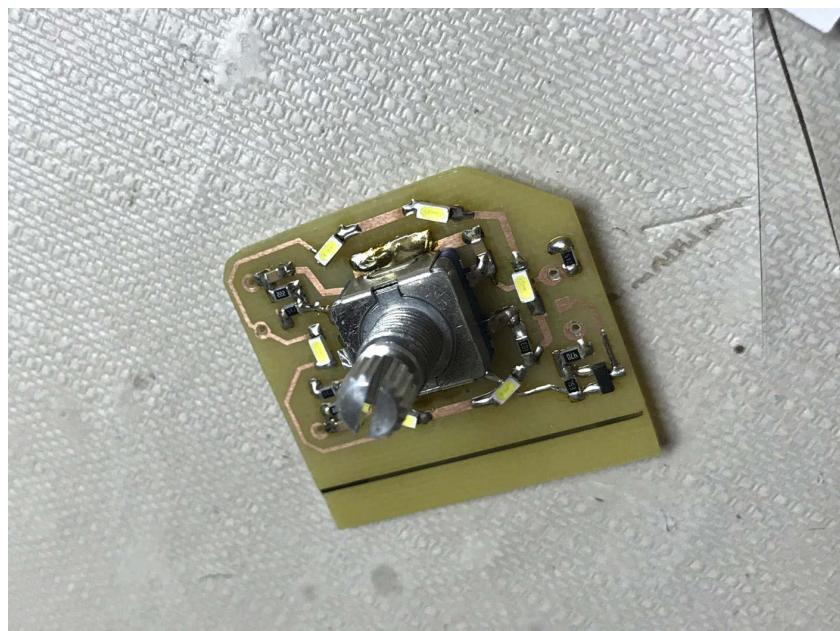
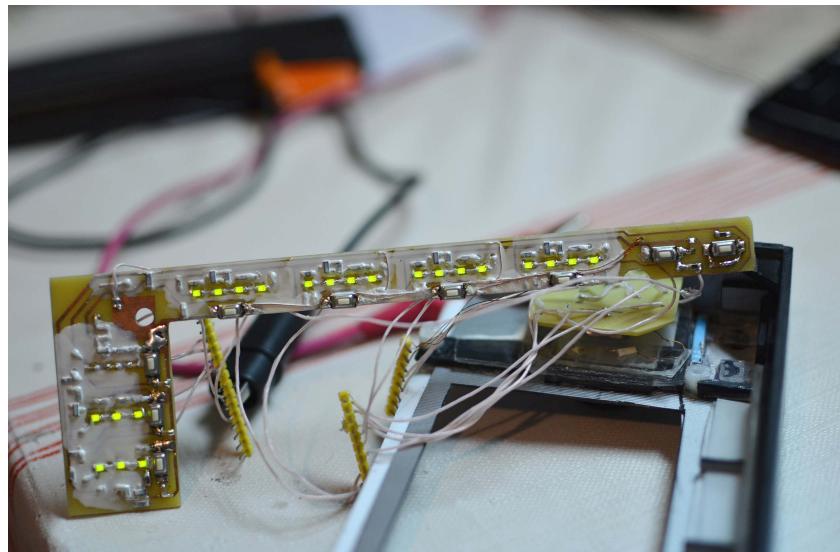
To install the luminous buttons you need to make 3 single-layer PCB. They can be made at home, as I did, or ordered at the factory (for example in China). Files for the manufacture of PCB are in my archive [CDJ1000_new_life_project.rar](#). All elements must be soldered according to the scheme.



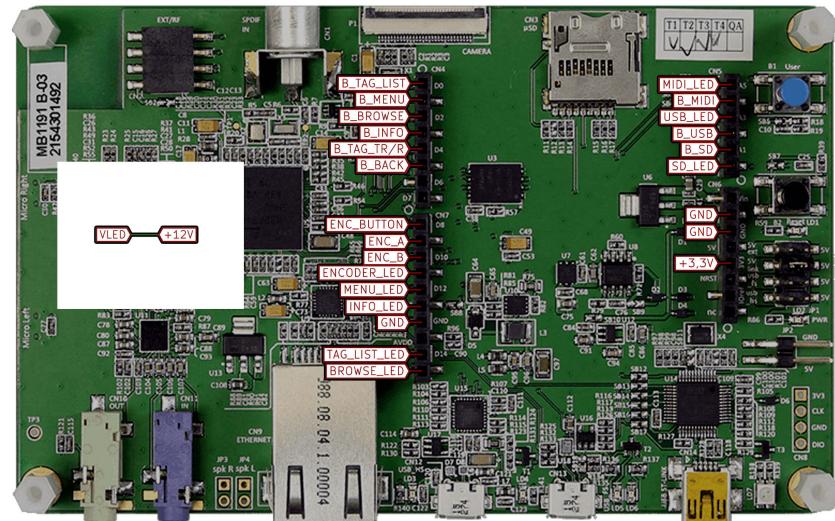
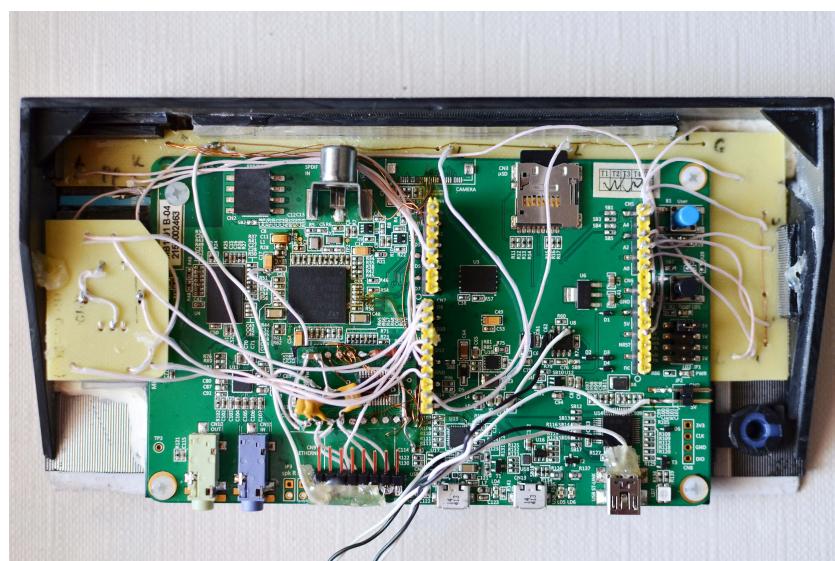
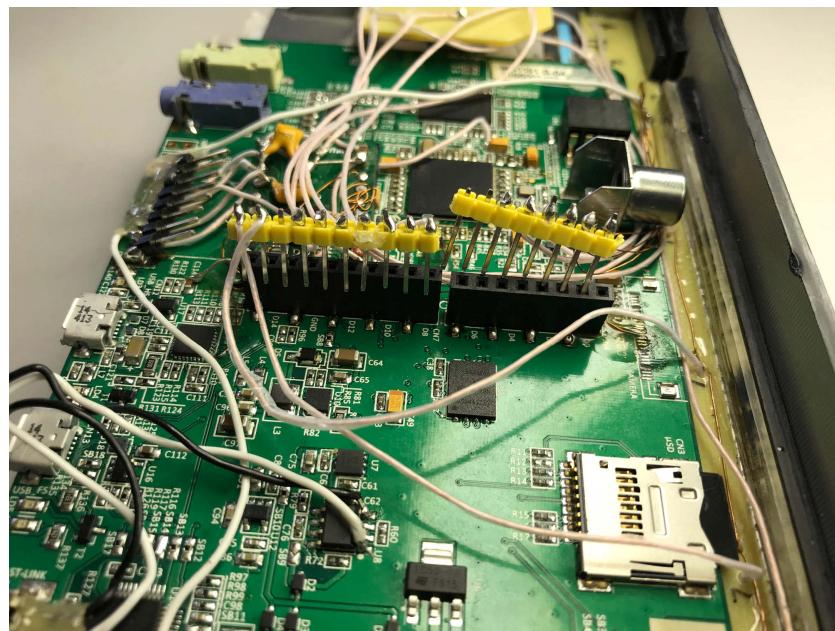


Sheet: /
File: 1.sch
Title: CDJ-1000mk3 new life
Size: A3 Date: 2018-04-12
Kicad 4.0.7 Rev: 1/1
Id: 1/1

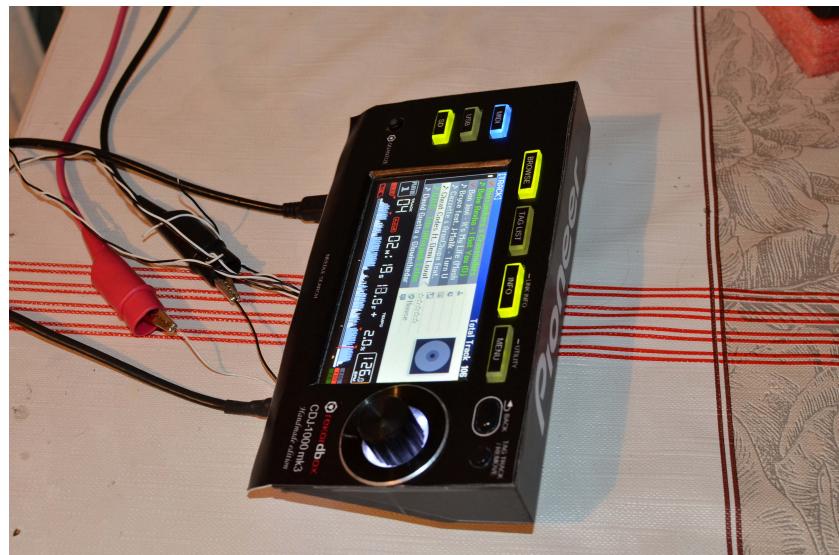
As a result, I made these PCB:



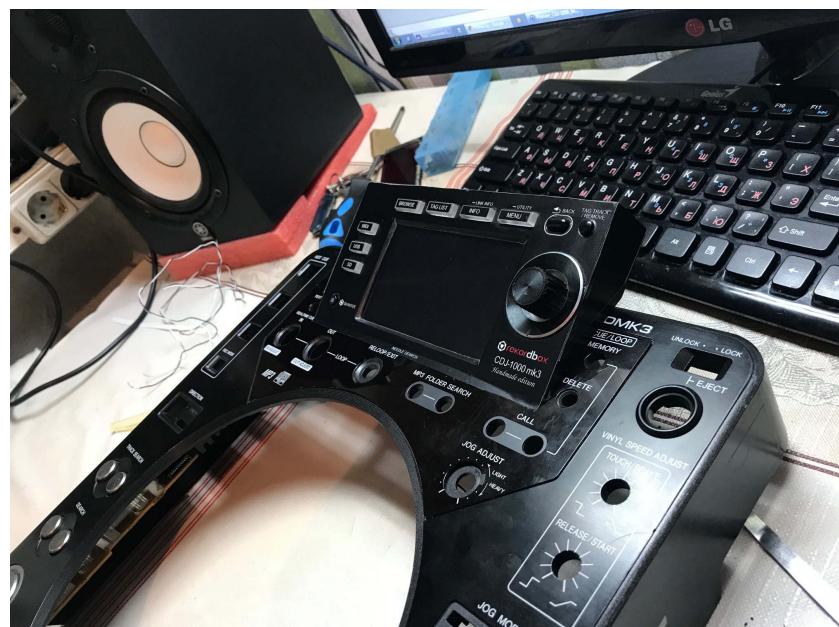
Wires are soldered to the PCB. The second end of the wires is soldered to the single row straight male pin header. There are other wires on the STM32F746G-DISCO board, which I'm not talking about. Do not pay attention to them, they are only needed for me to debug.



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/digreeb/CDJ-1000mk3_new_life_project

I'm also interested in ideas and suggestions. For example, such as manufacturing the body of the display module on a 3D printer.

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 audioparser 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 points 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 coefficients 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/BREAK mode
// - optimized SPI-DMA transfer process
// - optimized potentiometer's curve for VINYL RELEASE/START and TOUCH/BREAK mode
ver. 0.82a
// - added track number and status (playing or played) in INFO mode
// - added filling buffer step sequencer for optimize time gaps
// - fixed filling buffer step sequencer algorithm
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

```



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www.facebook.com/digreeb

GitHub:

https://github.com/digreeb/CDJ-1000mk3_new_life_project