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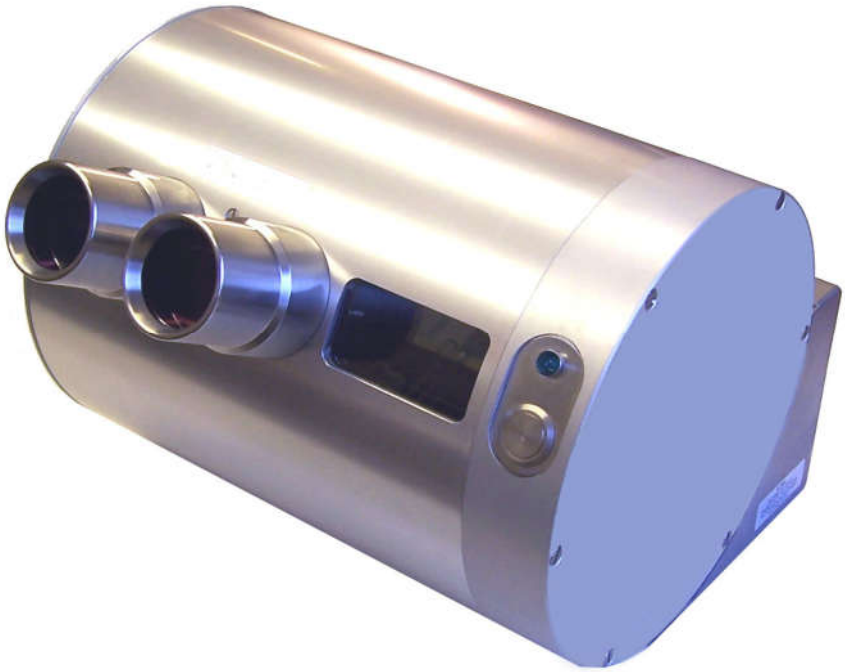
DE WIJS

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User manual of the 10 slide rotary viewer model 2007-c
07-02-AM-c
motor advance



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Introduction

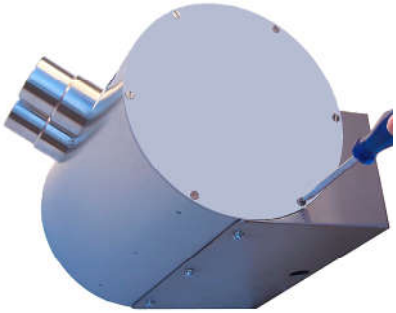
This viewer is the result 30 years of experience in building high quality 3D slide viewers for public use. Each change in the previous models extended the durability, stability and the quality. Especially this 10-slide rotary viewer 2007 has been adapted for the demand to show short 3D slide series to large amounts of public to be informed. To give any idea about the changes with respect to the previous model:

The PCB to control the motor has been updated by using a micro controller. The slide advance is now performed through a stepper motor.
This allows to configure the rotary viewer more accurate to the needs of an exhibit.

1. First indications for operational use

1.1 Opening the viewer for exchanging the slides.

- For exchanging the slides you have to remove the right cover of the round housing; see the image. That is the side where the text window and the pushbutton are located.
- Remove the 6 screws.
- Remove the DC adapter plug from the rear side of the drum.
- Now pull gently the right cover away of the main drum and place the whole thing right up on a table.
- Now you can insert or exchange your slides and text cards. Keep the order and position of the slides in mind that they won't be presented up side down!



Picture 1



Picture 2

1.2 Where to integrate the viewer in your exhibit?

Obviously you already have chosen a spot for the viewer in your museum, exhibition or other public environment. Here are some considerations that might help you to check the spot;

- Keep in mind the height of the viewer. Children and grown-ups both want to look in the viewer! 1.4 metres lens height under an angle of 30º allows most viewers to view.
- Depending on the interest of the viewer, people might form a queue. This could cause congestion in narrow pass ways.
- Watch out for sunlight to enter the lenses! The lenses will act like burn glasses on the slides. Just a short moment is enough, the sun will cause enough damage to the slide that it needs be replaced. Within 1 day, in worst case, you have to replace all slides. You can see this on the slide like tiny little spots showing the track of the sun during the day.
- Avoid spotlights to be shinning on the lenses. The slides are not going to be burned but it does shorten the lifecycle of the slide.
- When the viewer is to be mounted inside some kind of panel, be sure you can get easy access to the viewer for replacing the slides.

1.3 How do I mount the viewer against a wall?

The 10 slide rotary viewer holds a bracket at the back that has several holes to attach the viewer with screws or bolts against a wall. First you have to remove the 3 bolts on the top of the bracket (see the image) and the bolts underneath the viewer to position the bracket only against the wall. Think about how you want to let the cables run through the bracket; are they going through the wall or do they go through the hole at the bottom of the bracket?



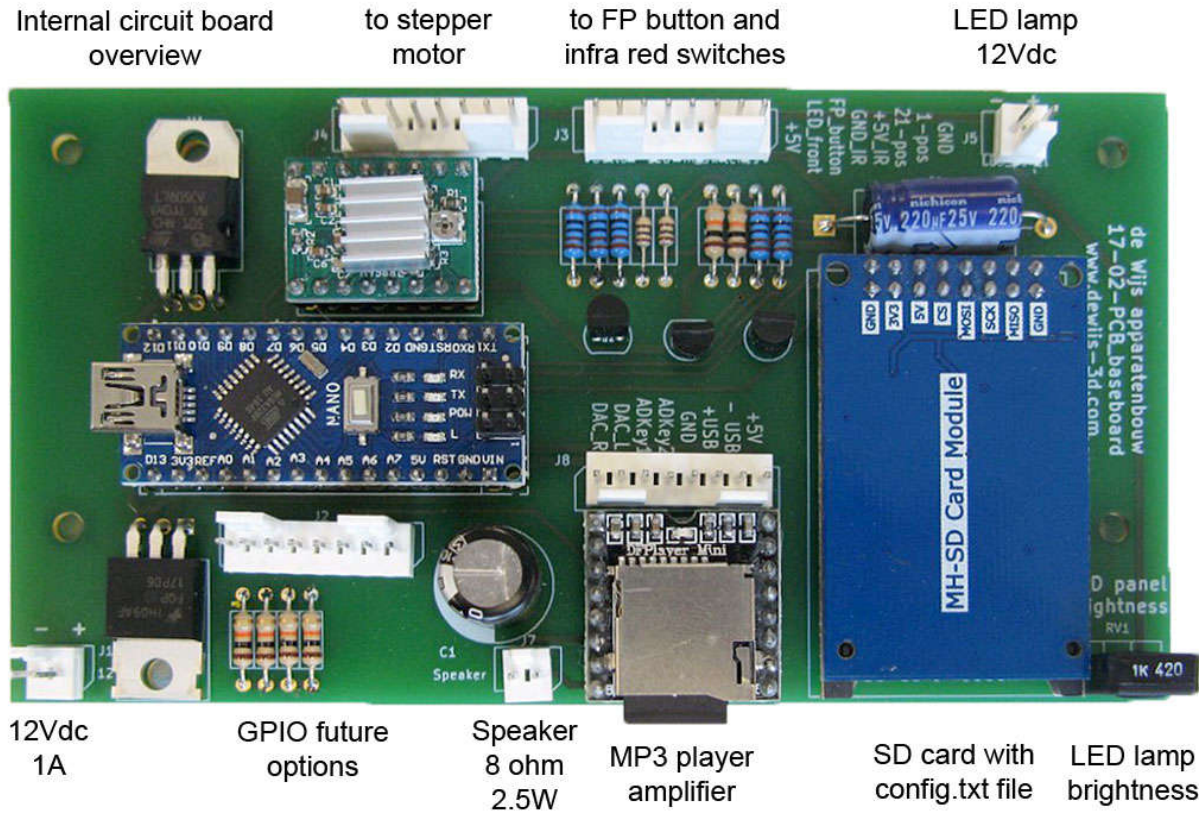
Picture 3

2. Operation

In mid-2017 a transition has been made to a more advanced electrical circuit control circuit with respect to the previous version. It holds an Arduino© micro controller and a stepper motor to revolve the slide drum. This allows more custom show settings, including audible output to a speaker.

2.1: How to change show settings.

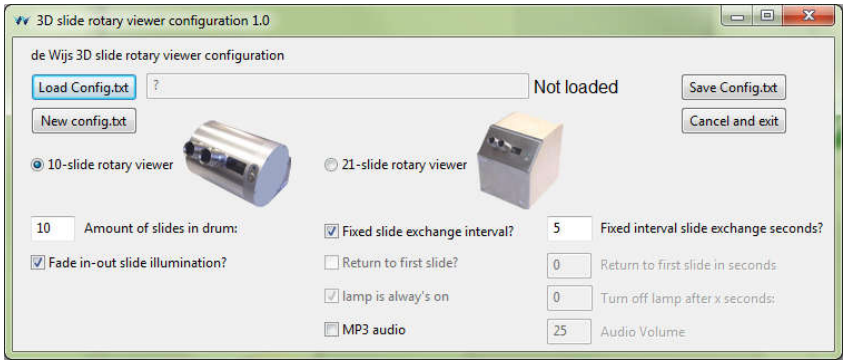
The baseboard of the viewer holds, besides the Arduino, several modules with specific tasks. Bellow an overview is given.



The back light illumination brightness maximum can be set by a small trimmer at the right lower corner of the circuit board.

The baseboard holds an SD card slot. This SD card's only purpose is to store show settings. These settings are stored by means of a config.txt file in the root directory. In Chapter 1.1. you can see how to open the viewer to get access to the slide drum as well as she SD card slots. Take the big SD card out of its slot and insert it into a Windows based computer.

When you have inserted the SD card into your computer, browse to the root directory of this SD card where you can see **config.txt** and **rotary_config.exe.** You can edit the config.txt file by using notepad or, more safe, use the rotary_config.exe program to make the correct settings. When you execute this program, it looks like this:



Turning on or off specific functions, automatically disables or enables some other functions because of relevancy in that situation.

2.2: Loading current config.txt.

When starting up rotary_config.exe, it would automatically try to load config.txt in the same directory as the program itself is stored. You will be notified in the program whether it is loaded or not.
You can have the program itself dragged to another location on your computer and execute it from another place. But this relocation causes the needs of the user to manually find the config.txt file by clicking on ‘Load Config.txt’.
It is recommended not to relocate the rotary_config.exe file and leave it on the SD card.

2.3 New config.txt.

In the situation that config.txt is not loaded, corrupt or not found in the root directory of the program. You can choose for ‘New config.txt’. it creates default settings in the program and, when saving, it creates a new config.txt in its root directory of the program.

2.4 Saving Config.txt

When you are finished editing the show settings. You can press on ‘Save Config.txt’. The config.txt file is stored in the path of the loaded config.txt. After a successful save, you can exit the program.

2.5 What type of viewer do you have.

The program is designed for both the 10-slide as the 21-slide table rotary viewer. Setting to one of these viewers, prevents users to make higher slide number settings then allowed.

2.5.1 Amounts of slides in the drum.

This field sets the amount of slides in the drum. You are allowed to insert les slides then the drum can hold. The system skips empty slide slot positions.

2.5.2 Fade in-out slide illumination.

For ‘Ease of use’ reasons, the backlight illumination of the slide can be set to fade off and on during slide transitions or set to a hard turn off-on transition.

2.5.3 Fixed slide exchange interval

This will set the interval time of the slide exchange. You can set it between 5 and 300 seconds. It could avoid visitors to stand too long watching images while other wait. However the visitor can interrupt the elapse of time by pressing the front panel button to advance earlier.

2.5.4 Return to the first slide

This function will ‘reset’ the show order for the next visitor. Especially when the drum holds an order of images to tell a story. When the visitor leaves the viewer in the middle of a story it is kind of ‘service’ to return to start position for the next visitor. The setting is accompanied with a duration setting in seconds; the time elapsed after the last button press before it decides to revolve back to start position (slide 1).

2.5.5 Lamp is always on

Activating this setting will always have the backlight of the slide turned on. Except during slide transitions.
Turning this setting off will allow to turn off the backlight after a specified amount of seconds of inactivity which saves the lifespan of the slides. The backlight is also off when the drum is in start position (slide 1).

2.5.6 MP3 audio.

When enabling this feature, the system is able to play MP3 files on the micro SD card. Each slide is associated with MP3 files like 0001xxxx.MP3, 0002xxxx.MP3, 0003xxxx.MP3, etc.
On the baseboard, a 2 pin header allows to connect an 8 Ohm speaker. The tiny on board amplifier is able to produce a maximum of 2.5 Watts.
This setting is accompanied with an Audio Volume setting.
It can be set between 0-30.

2.5.7 Other configurations

The Arduino micro controller is loaded with a program (firmware) specifically made for the de Wijs viewers. Through the micro USB plug, new firmware can be loaded. Do not upload other firmware or experiments. The Arduino does not have a ‘return to factory defaults’ option. Uploading new firmware requires the Arduino IDE and knowledge about programming. It is recommended to contact de Wijs to do this job.

Don’t take the drum from its axle!

4 Data

4.1 Technical specifications of the rotary viewer

Slides:

- Slide frame format; 41x101 mm.
- Maximum picture size; 23x33 mm.
- Compatible with RBT frames, mounted between glass maximum 3 mm. Thickness.
- The drum can hold 10 slides and accompanying text cards.

Optics:

- One lens barrel holds 2 achromatic lenses of ∅ 37 mm. f= 120 mm. each.
- Total focal distance is 60 mm.; magnification: 4.2 x
- Lenses are coated on all sides
- Lens separation is fixed to 62 mm.

Illumination:

- The slide is illuminated by a LED backlight.
- The colour temperature is 4200 Kelvin.
- The spectral colour band starts after 400nm wavelength.
- The lamp runs on 12 Volts dc at ± 65mA at full brightness.
- Replacement part: 14-13-LED60x130_4200K at de Wijs (custom made panel)
- PWM fading of light at a frequency of 1Khz.

Mechanics;

- The Housing of the viewer is made of plain anodised aluminium. The wall bracket and lens barrels are made of stainless steel.
- The slide drum revolves on ball bearings and don't need any lubrication.
- A stepper motor using a cock wheel mechanism revolves the drum.
  Replacement part: NEMA17 model: 42BYGHW609, 1.7A, 1.8º/step
- Important bolts inside the viewer that keep the drum and middle column assembled, are additionally secured with lock-tide glue.

Electronics;

- The viewer runs internally on 12 Volts and 5 Volts dc. The viewer comes with an AC adapter giving **12 Volts dc. at 1000mA**
- Depending on the state of operation, the viewers power consumption fluctuates from 2 up to 10 Watts. The lowest power is at 'wait state'; no illumination, motor not running and no audio.
- The audible power output J7 is at 8 ohms 2.5 Watts maximum.

4.2 Technical data for maintenance / repair purposes.

Header J1 pin information; Power input.

Pin number	Description	Comments	Leads	In -out
1	Ground	0	White	Pwr
2	Power +12 Volts	12 Volts 1000mA	Brown	In

Header J2 pin information: GPIO / future usage

Pin number	Description	Logic levels	Leads	In -out
1	Analogue in/out A0	-		-
2	Analogue in/out A1	-		-
3	Analogue in/out A2	-		-
4	Analogue in/out A3	-		-
5	Analogue in/out A6	-		-
6	Analogue in/out A7	-		-
7	Ground	0		Pwr
8	Power 5V+	1		Pwr

Header J3 pin information: internal switches / button

Pin number	Description	Logic levels	Leads	In -out
1	Power +5V	1	Orange	Pwr
2	LED front panel	PWM 0-5V	Bleu	Out
3	Front panel button	0=not pressed, 1=pressed.	Yellow	In
4	Ground IR switches	Resistor in path on PCB!	Green	Pwr
5	Power IR switches	5V	Red	Pwr
6	Opto ‘stop’ for all slides	1 = passing slide stop	Brown	In
7	Opto first slide position	1 = first position	White	In
8	Ground	0		Pwr

Header J4 pin information: Stepper motor

Pin number	Description	Logic levels	Leads	In -out
1	Coil 1A	0-12V	Green	Out
2	Coil 1/A	0-12V	Black	Out
3	Coil 2B	0-12V	Bleu	Out
4	Coil 2/B	0-12V	Red	Out
5	n.c.			
6	n.c.			
7	n.c.			
8	n.c.			

Header J5 pin information; LED backlight

Pin number	Description	Comments	Leads	In -out
1	Ground	PWM controlled	Black	PWM-out
2	Power +12 Volts	PWM 0-12V	Red	Pwr

Header J7 pin information; Audible speaker output

Pin number	Description	Comments	Leads	In -out
1	Speaker con. 1	8 ohms impedance 2.5W max.		-
2	Speaker con. 2	-		-

Header J8 pin information: MP3 player direct control

Pin number	Description	Logic levels	Leads	In -out
1	Power +5V	1		Pwr
2	USB-			-
3	USB+			-
4	Ground	0		Pwr
5	Adkey2	Control switches, analogue levels		In
6	Adkey1	Control switches, analogue levels		In
7	Dac_L	Digital audio left		Out
8	Dac_R	Digital audio right		Out

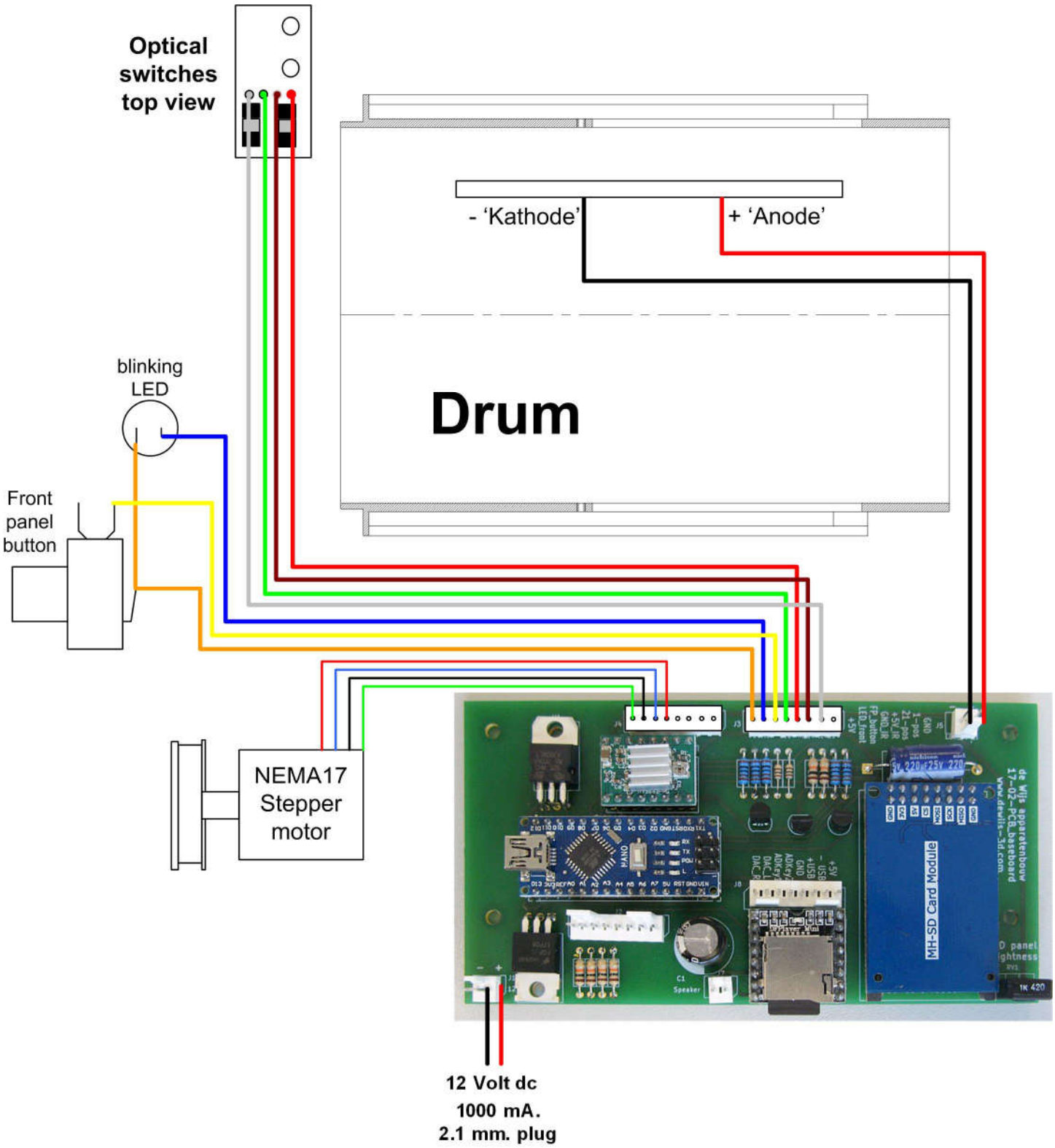
4.3 Electronic component list

Component number	Value	Description
R1	1K 0.25W	Carbon film resistor
R2	1K 0.25W	“
R3	100Ω 0.25W	“
R4	100Ω 0.25W	“
R5	10K 0.25W	10K for OPB620 IR switch or 470K for OPB818 switch
R6	10K 0.25W	10K for OPB620 IR switch or 470K for OPB818 switch
R7	1K 0.25W	“
R8	1K 0.25W	“
R9	10K 0.25W	“
R10	10K 0.25W	“
R11	10K 0.25W	“
R12	10K 0.25W	“
RV1	1K 0.25W	Variable resistor vertical mount
C1	1000uF 25V	Radial electrolytic capacitor
C2	220uF 10-16V	Radial electrolytic capacitor
D1	LED 5 mm.	White
D2	OPB620	Infrared slotted switch, gap 5 mm.
D3	OPB620	Infrared slotted switch, gap 5 mm.
Q1	FQP17P06	P-channel MosFET TO220
Q2	BC547B	NPN transistor
Q3	BC557B	PNP transistor
Q4	BC547B	NPN transistor
U1	LM7805	Positive voltage regulator 1 Ampère TO220
U2	A4988	Stepper motor driver module with heat sink
U3	DFPlayer	MP3 player module with micro SD and on board amplifier
U4	Arduino Nano	Micro controller
J1	2 pin header	2.54” pin spacing
J2	8 pin header	“
J3	8 pin header	“
J4	8 pin header	“
J5	2 pin header	“
J6	SD card reader	for Arduino
J7	2 pin header	2.54” pin spacing
J8	8 pin header	“

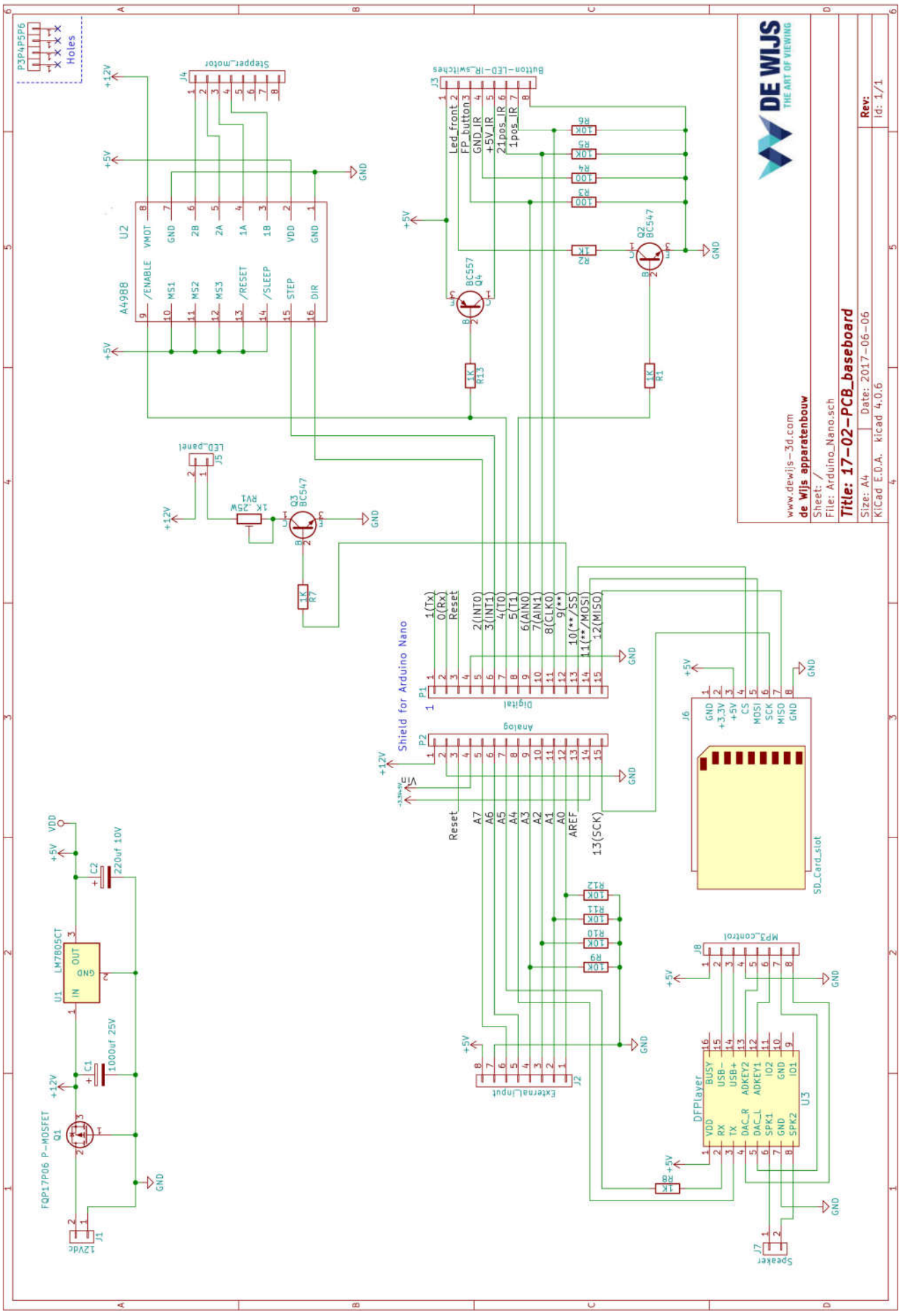
4.4 Mechanical part list for replacing parts (most common)

Achromatic lens	⍉ 37 mm. f= 120 mm. (2 pieces for each lens barrel!)
LED back light	60x130x3 mm. 4200K (custom de Wijs part)
Stepper Motor	NEMA17, 42BYGHW609, 1.7A, 1.8º/step
17-04-PCB_baseboard	Printed Circuit Board
14-04-PCB_IR_switches	Printed Circuit Board
C0911VAAA push button	Arcoelectric anti vandal push button.
Ac wall socket adapter	12Vdc output 1000mA current output. Plug 5.5/2.1

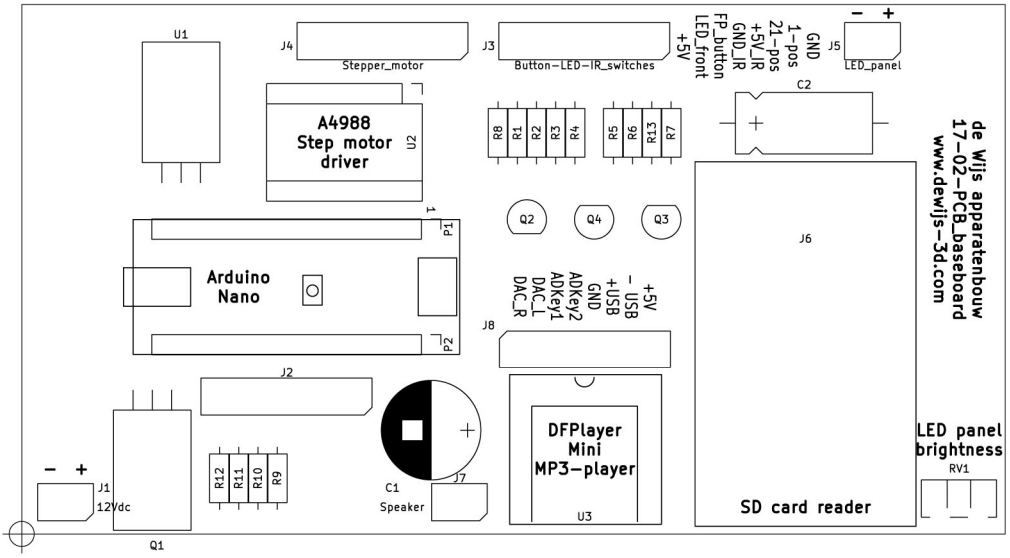
4.5 Internal electrical connection diagram.

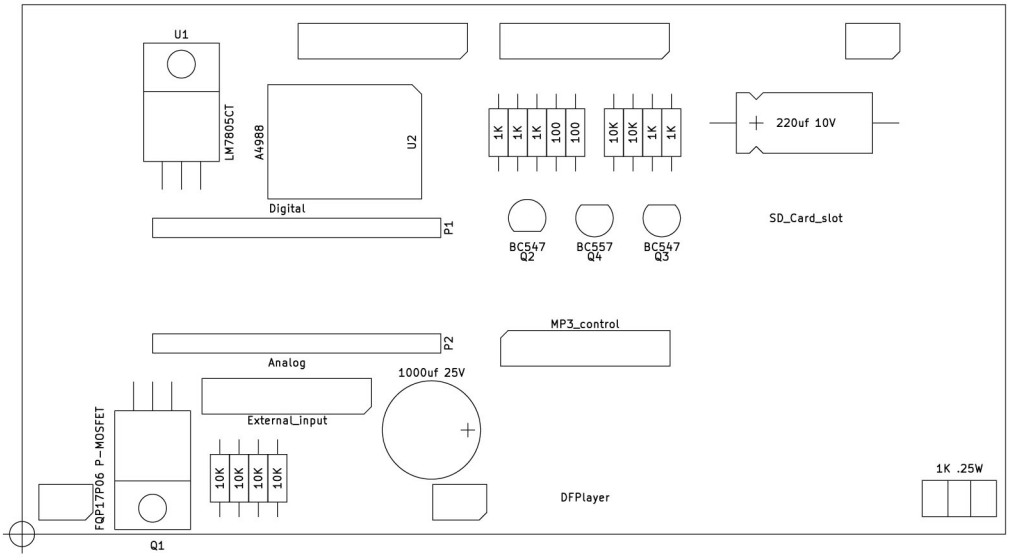


4.6 Electronic schematics



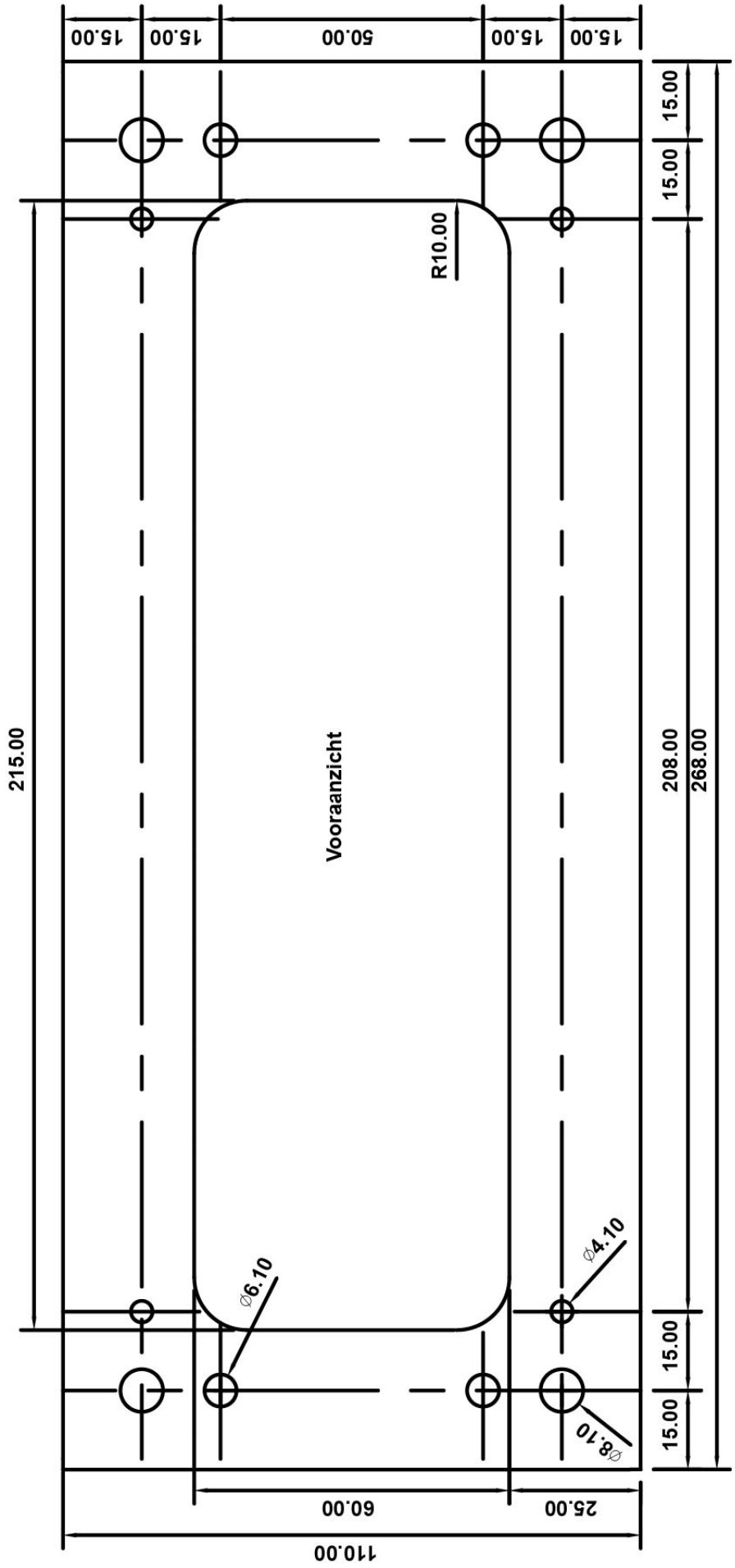
4.7 PCB layout





Top: part number
Bottom: part value

4.8 Rear view wall bracket



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