Mysticum
powered by ChessLab BCS

Manufacturing recommendation and
guideline to use the software

status: 15th of March 2015

Introduction

Mysticum – the universal chess companion:

The **Mysticum** chess computer has been developed by Guido Marquardt since 2010. Everybody interested is welcome to rebuild this for own personal usage !
Michael Lang made this project public and besides maintaining an own dedicated web site, he is organizing workshops, where interested people can join to build up their own version. Carsten Meyer had been infected with same passion and is supporting the further development of the project. His circuit board has been used in the following rebuild and is the base for the documentation. With this guideline I like to encourage reproduction and want to give a simple overview of parts required, followed by tips and tricks to do the woodwork and electronics. I like to motivate all who are interested and who want to be part of this exciting project - Wish you all a successful start!

General background of chess computer:
Chess computers nowadays are sold in low cost segments, made out of plastic. There are only few new developments on the market available. Most devices from mass production can not be upgraded and are focussing on simple chess routines plus training functions for beginners.
The market niche for chess boards with a more exclusive configuration is supported by the company DGT. Alternative some collectors are buying rather old versions from the used market which have been manufactured during the 80th/ 90th. Prices are rather high and can go beyond 2.000,-€

Own motivation:

Since I'm not interested playing this beautiful game on a plastic chessboard - also not on a computer screen (although Fritz is representing a nice application, but we are business wise long enough in front of screens) I had to search for alternatives. There are none because the Novag Citrine is currently sold out and I don't like it's concept of usage and the DGT Revelation II is with 2.500,- Euro far to expensive for me.
On the internet I searched the internet for alternatives. Besides various Rasperry Pi solutions I found this project, which impressed me by it's open concept. Further benefit was the online support by Michael Lang und Carsten Meyer. Based on their activities and ongoing developments I decided build up one on my own and document all key steps required in parallel to my progress. Costs are within the range of 400,-Euro and everybody participating will learn a lot.
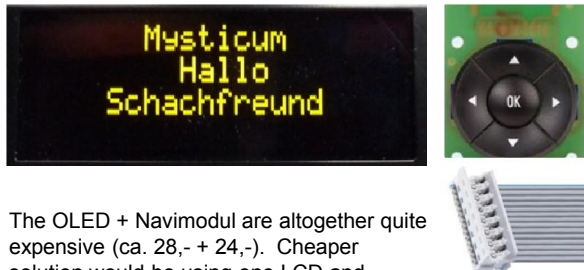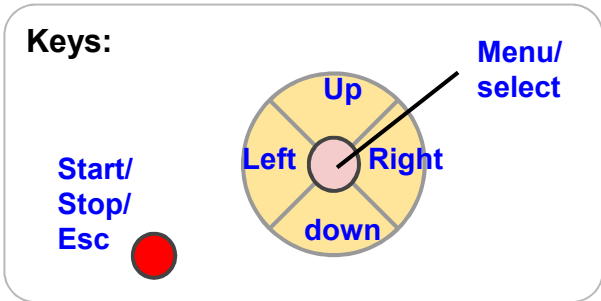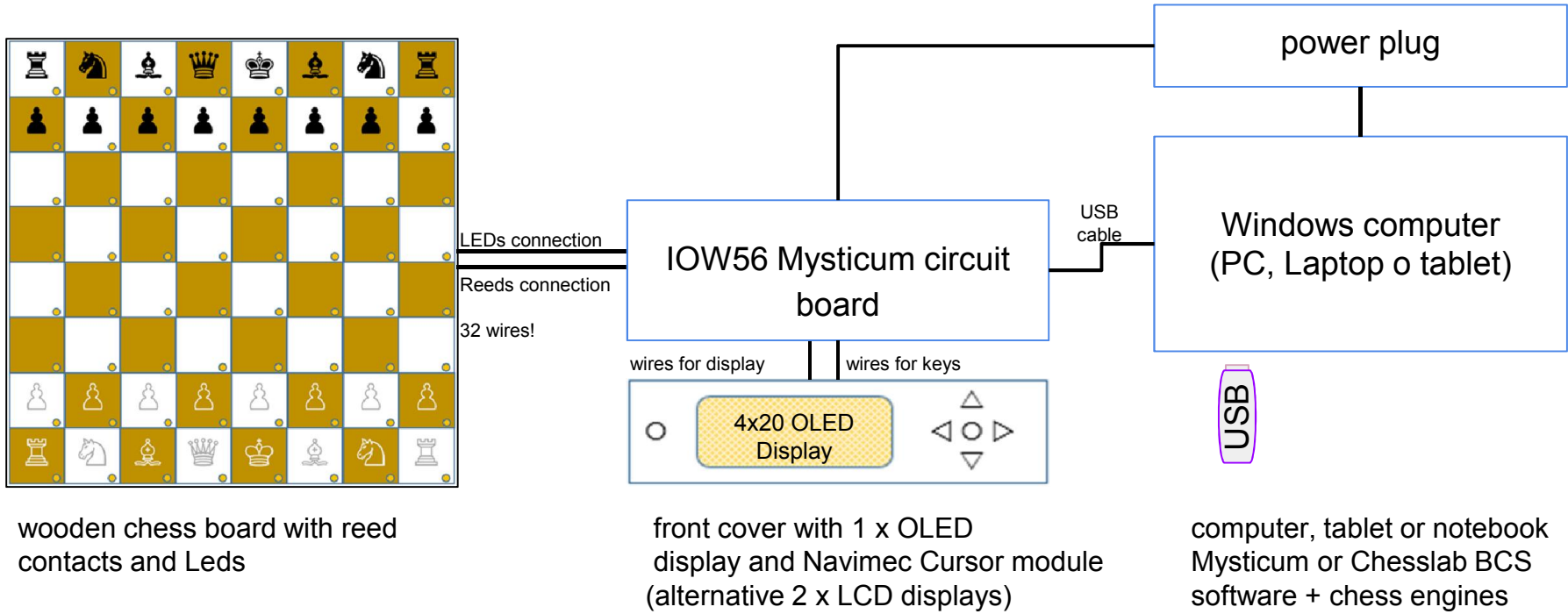
Remarks regarding Copyright:

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Step by step towards success …..

Basic layout of the key components fpr the chess computer

power plug

IOW56 Mysticum circuit board

Windows computer
(PC, Laptop o tablet)

LEDs connection

Reeds connection

32 wires!

USB cable

wires for display   wires for keys

4x20 OLED
Display

USB

wooden chess board with reed contacts and Leds

front cover with 1 x OLED display and Navimec Cursor module (alternative 2 x LCD displays)

computer, tablet or notebook Mysticum or Chesslab BCS software + chess engines

Keys:

Up

Menu/
select

Left   Right

Start/
Stop/
Esc

down

Mysticum
Hallo
Schachfreund

The OLED + Navimodul are altogether quite expensive (ca. 28,- + 24,-). Cheaper solution would be using one LCD and simple keys. But: both parts are worth the money. The Navimec Modul is using a MICA20 plug connection! It is possible to solder each wire direct onto the key ☺

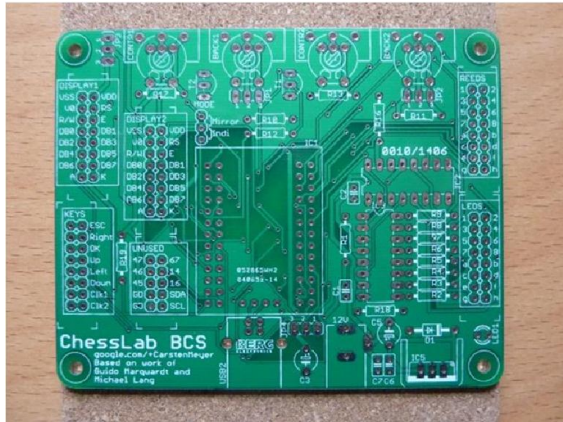small Windows 8.1 tablets with BHT: 122,5x120x10 mm are available quite cheap:

"i.onik" 8" Win Pad
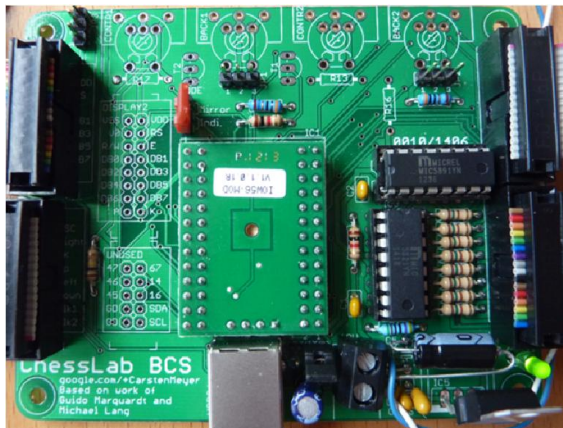**ab 88.-€**

HP Stream 7" Touch
ab 99.-€

and are functional

Mysticum circuit board using one OLED Display

Die Grundplatine Revision 1406 bereit zum bestücken

Die Grundplatine bestückt und in voller Aktion

alternative to the mysticum circuit board you can buy the **IOWStarter Kit56**. This was the base for mysticum chess computers until 2014.
Die ChessLab BCS circuit board simplifies the setup, saves time and ensures proper contacts for a much lower price

IOW56 Starter Kit für 82,11€

position	description	QTY		cost	source	remark
circ. board	ChessLab BCS board	1	pcs	≅ 20€	CM	supplied by Carsten Meyer
IC1	IO-Warrior 56Mod	1	pcs	38,98€	Segor	just the module is required
IC1	pins 13x2	2	pcs	1,41€	Segor	alternative pin connectors 1x36 RM 2,54 mm
IC1	socket 4x1	1	pcs	0,22€	Segor	part of the pin connector bar ☺
IC2	MIC 5891YN	1	pcs	4,40€	Segor	
IC3	MIC 5821YN	1	pcs	3,90€	Segor	
IC2-IC3	DILL16U socket	2	pcs	0,32€	Segor	
C1-C2	100nF film capacitor	2	pcs	0,32€	Reichelt	
C3	10µFelectrolyt capacitor	1	pcs	0,47€	Reichelt	
C7	330 nF capacitor	1	pcs	0,79€	Reichelt	
R1	1k Ohm 5% resistor	2	pcs	0,26€	Reichelt	
R2-R9	50 Ohm 5% resistor 1/4W	8	pcs	0,90€	Reichelt	<150 Ohm can be used as well
R19	100k Ohm resistor	1	pcs	0,10€	Reichelt	
JP1-JP4	multi pin connector	5	pcs	0,35€	Reichelt	use 3 pins
JP1-JP4	Jumper 1x3 Schw./Rot	5	pcs	0,25€	Reichelt	
K1	USB socket B-Typ	1	pcs	0,27€	Reichelt	
disp1	Display OLED 4x20	1	pcs	27,96€	Mouser	NHD-0420DZW module
module	Navimec Cursor module	1	pcs	27,90€	Reichelt	5 simple push buttons would be cheaper
20pol MICA	20pol Mica connector	1	pcs	1,10€	Reichelt	save the money and solder direct to the button ☺
push-button	Multimec push button	1	pcs	0,96€	Reichelt	red button for ESC function
USB cable	cable A- auf B St.1m	1	pcs	0,70€	Reichelt	
IDC socket-M	connection male WSL16G	4	pcs	0,44€	Reichelt	Reeds, LEDS, Display1, Display2, Keys
IDC plug-F	connection female PFL16	4	pcs	0,52€	Reichelt	Reeds, LEDS, Display1, Display2, Key
ribbon cable	color coded -16pol	3	m	3,00€	Reichelt	
shipping	shipping costs until 10kg	1	x	5,60€	Reichelt	

sum of costs (approx.) ∑ **158,- €**

Version 2 using 12V power plug and 5V regulation to relive the USB port

in addition to the parts above add:

C5	µA 7805 TO-220 transistor	1	pcs	0,27€	Reichelt	
LED1	LED 20 mA red or green	1	pcs	0,09€	Reichelt	
D1	1N4002 diode	1	pcs	0,08€	Reichelt	
R2-R9	440Ohm 5% resistor	9	pcs	0,10€	Reichelt	
C1-C2	100 nF Tantal	2	pcs	0,32€	Reichelt	
C5	47 µF35V Elko	1	pcs	0,15€	Reichelt	
C6-C7	100 nF Tantal	1	pcs	0,16€	Reichelt	
power plug	12V 1500mA power plug	1	x	8,95€	Reichelt	ECO-friendly with 2,1mm connector

additional costs (approx.) ∑ **10,- €**

> The sources mentioned are only recommendations based on actual availabilities. For sure there are cheaper sources on the market for parts required. All costs are based on January'15 including tax for quantities mentioned

Mysticum circuit board with 2LCD displays + 12V regulated
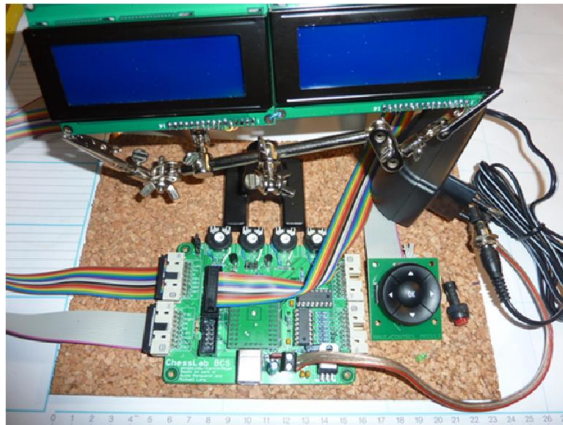
welcome to the new version, using two displays together with 12V power plug
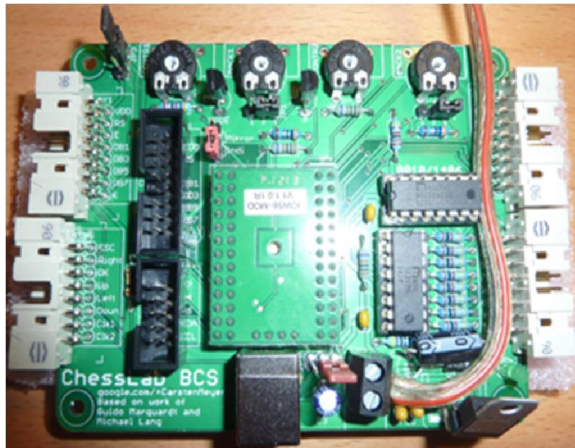
Die circuit board and its components

2004 LCD Display
Blue

for 8,98€

for a better relieve of the USB port plus proper supply of the lcds, we are using a 12Volt 1500mA power plug. The contrast and backlight can be adjusted by the potentiometers

position	description	QTY		cost	source	remark
circ.board	ChessLab BCS board	1	pcs	≅.20€	CM	supplied by Carsten Meyer
IC1	IO-Warrior 56Mod	1	pcs	38,98€	Segor	just module required
IC1	socket 13x2	2	pcs	1,41€	Segor	alternative pin connectors 1x36 RM 2,54 mm
IC1	socket 4x1	1	pcs	0,22€	Segor	part of the pin connector bar ☺
IC2	MIC 5891YN	1	pcs	4,40€	Segor	
IC3	MIC 5821YN	1	pcs	3,90€	Segor	
IC2-IC3	DILL16U	2	pcs	0,32€	Segor	
IC5	µA 7805 TO-220 transistor	1	pcs	0,27€	Reichelt	
T1-T2	BC327-40 transistor	2	pcs	0,80€	Reichelt	BC327-25 as an alternative
LED1	LED 20 mA red or green	1	pcs	0,09€	Reichelt	
D1	1N4002 diode	1	pcs	0,08€	Reichelt	
C1-C2	100nF tantal	2	pcs	0,32€	Reichelt	
C3	10µ Felektrolyt Capacitor	1	pcs	0,47€	Reichelt	
C5	47µF 35V Elko	1	pcs	0,15€	Reichelt	
C6-C7	100 nF Tantal	2	pcs	0,32€	Reichelt	
R1, R12, R13	1k Ohm 5% resistor	3	pcs	0,39€	Reichelt	
R2-R9	440 Ohm 5% resistor	9	pcs	0,10€	Reichelt	
R10-R11	30 Ohm	2	pcs	0,16€	Reichelt	
R16-R17	22k Ohm	2	pcs	0,22€	Reichelt	
R18	515 Ohm	1	pcs	0,08€	Reichelt	
R19	100k Ohm	1	pcs	0,10€	Reichelt	
JP1-JP4	mulit pin connector	5	pcs	0,35€	Reichelt	use 3 pins
JP1-JP4	Jumper 1x3	5	pcs	0,25€	Reichelt	
K1	USB socket B-Type	1	pcs	0,27€	Reichelt	
Disp1-2	display LCD 4x20 blue	2	pcs	17,96€	amazon	no need for additional frame
Back 1-2	1k Ohm potentiometer 4mm	2	pcs	3,80€	Segor	adjustment of backlight
Cont 1-2	5k Ohm potentiometer 4mm	2	pcs	3,80€	Segor	adjustment of contrast
module	Navimec cursor module	1	pcs	27,90€	Reichelt	5 simple push buttons would be cheaper
20pol MICA	20pol Mica connector	1	pcs	1,10€	Reichelt	save money and solder direct to the button ☺
push-button	Multimec push-button	1	pcs	0,96€	Reichelt	red button for ESC function
USB cable	Cable A- auf B St.1m	1	pcs	0,70€	Reichelt	
IDC socket-M	connection male WSL16G	5	pcs	0,55€	Reichelt	reeds, leds, display1, display2, push-buttons
IDC plug- F	connection female PFL16	5	pcs	0,65€	Reichelt	reeds, leds, display1, display2, push-buttons
ribbon cable	color coded -16pol	3	m	3,00€	Reichelt	
power plug	12V 1500mA power plug	1	x	8,95€	Reichelt	ECO-friendly with 2,1mm connector
shipping	shipping costs until 10kg	1	x	5,60€	Reichelt	

Sum of costs (approx.) ∑ **157,-€**

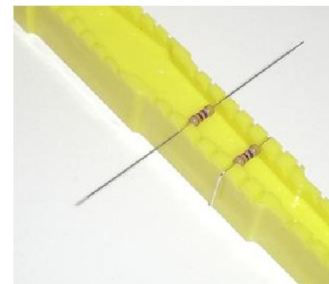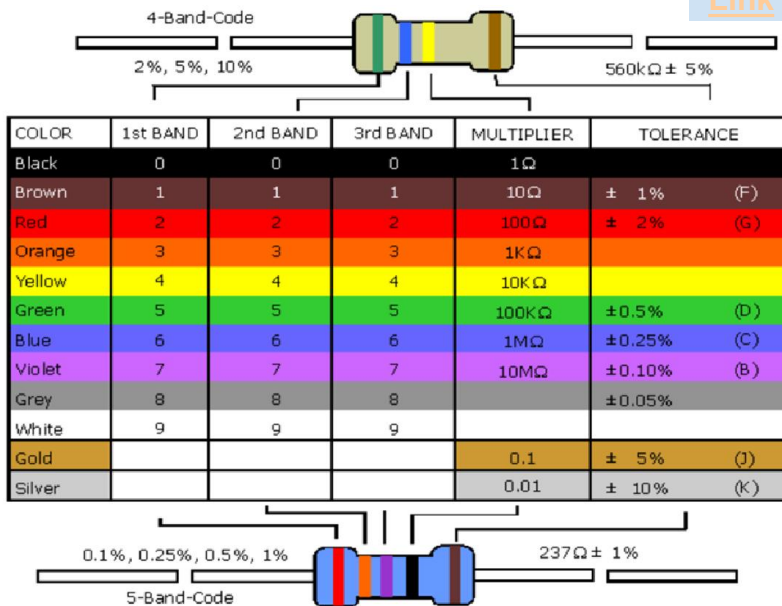# Assembly of circuit board together with tips und tricks (preparation)

required:

Soldering station
solder ø1mm oder
solder ø0,56mm
3. Helping hand mit
magnifying lense
desoldering pump
desoldering copper
bending theory
diagonal cutter
Snickers
coffee
Radio Bonn-Rhein Sieg
patience + accuracy

Order of assembly (recommendation solely):

Step1
1. sockets   > visual testing
2. plug connectors > visual testing
3. jumper   > visual testing
4. USB connector   > check solder connections

Step2
5. LED   > visual testing
6. resistor   > visual testing
7. diode   > visual testing
8. capacitor   > check solder connections
9. snap in chips   > carefully
10. apply IOW56   > test contacts

Info concerning color codes of resistors:

Link

4-Band-Code

2%, 5%, 10%   560kΩ ± 5%

COLOR	1st BAND	2nd BAND	3rd BAND	MULTIPLIER	TOLERANCE	
Black	0	0	0	1Ω		
Brown	1	1	1	10Ω	± 1%	(F)
Red	2	2	2	100Ω	± 2%	(G)
Orange	3	3	3	1KΩ		
Yellow	4	4	4	10KΩ		
Green	5	5	5	100KΩ	±0.5%	(D)
Blue	6	6	6	1MΩ	±0.25%	(C)
Violet	7	7	7	10MΩ	±0.10%	(B)
Grey	8	8	8		±0.05%	
White	9	9	9			
Gold				0.1	± 5%	(J)
Silver				0.01	± 10%	(K)

0.1%, 0.25%, 0.5%, 1%   237Ω ± 1%

5-Band-Code

bending theory

simplify verification with a multimeter

Solder technique / solder

It is recommended to use an adjustable soldering station with a temperature of **290ºC / 554ºF** .

Carsten recommends **plumb solder** especially for those who have not that much experience. A mix of 63/37 with 2% flux thickness of 1 mm. I myself used 60/38er with 1mm or even 0,56mm
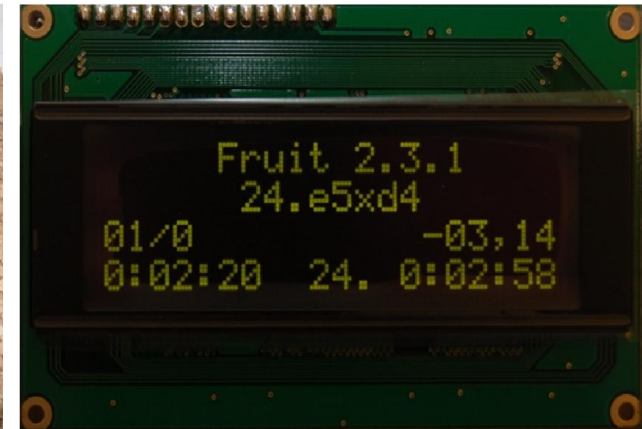
Layout of ChessLab BCS circuit board 0010/1406 with one OLED
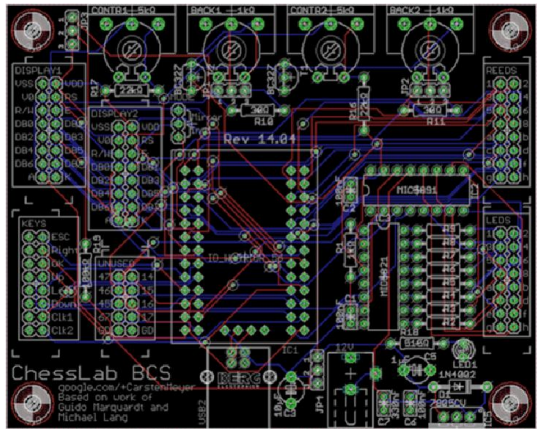
Mysticum circuit board Revision 0010/1406 layout

Assembly for version 1 with power supplied by USB solely

OLED display with 16 contacts

Display1:

VSS	⊙	⊙	VDD
V∅	⊙	⊙	RS
R/W	⊙	⊙	E
DB∅	⊙	⊙	DB1
DB2	⊙	⊙	DB3
DB4	⊙	⊙	DB5
DB6	⊙	⊙	DB7
A	⊙	⊙	V

Reeds:

1	⊙	⊙	2
3	⊙	⊙	4
5	⊙	⊙	6
7	⊙	⊙	8
a	⊙	⊙	b
c	⊙	⊙	d
e	⊙	⊙	f
g	⊙	⊙	h

Keys:

⊙	⊙	ESC
⊙	⊙	Right
⊙	⊙	OK
⊙	⊙	Up
⊙	⊙	Left
⊙	⊙	Down
⊙	⊙	Clk1
⊙	⊙	Clk2

Leds:

1	⊙	⊙	2
3	⊙	⊙	4
5	⊙	⊙	6
7	⊙	⊙	8
a	⊙	⊙	b
c	⊙	⊙	d
e	⊙	⊙	f
g	⊙	⊙	h

connection male WSL16G

A mysticum(Var2) trapped in a Fritz! cardboard box as a preliminary solution

Attention:
To use this version of assembly you need to get the original version by Guido Marquardt. Otherwise screen will stay blank and you could start searching for non existent failures!
The contrast of the OLED Display is just great…!

	VCC	RS	E	1	3	5	7	NC	
1	⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙								16
	GND	NC	R/W	0	2	4	6	NC	

OLED Display1: / **Mysticum Disp1:**
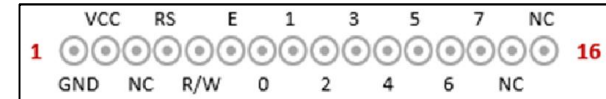
|				
1	GND	Ground	VSS	brown
2	VCC	Supply Voltage 5V	VDD (5V+)	red
3	NC	**Not Connected**		orange
4	RS	(H/L) Data/Instruction	RS	yellow
5	R/W	(H/L) Read/Write	R/W	green
6	E	Enable	E	blue
7	DB0	Data bit 0	DB0	violet
8	DB1	Data bit 1	DB1	grey
9	DB2	Data bit 2	DB2	white
10	DB3	Data bit 3	DB3	black
11	DB4	Data bit 4	DB4	brown
12	DB5	Data bit 5	DB5	red
13	DB6	Data bit 6	DB6	orange
14	DB7	Data bit 7	DB7	yellow
15	NC	**Not connected**		green
16	NC	**Not connected**		blue

V0 = Not connected

Connection of OLED display with "Display 1" port
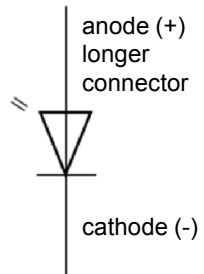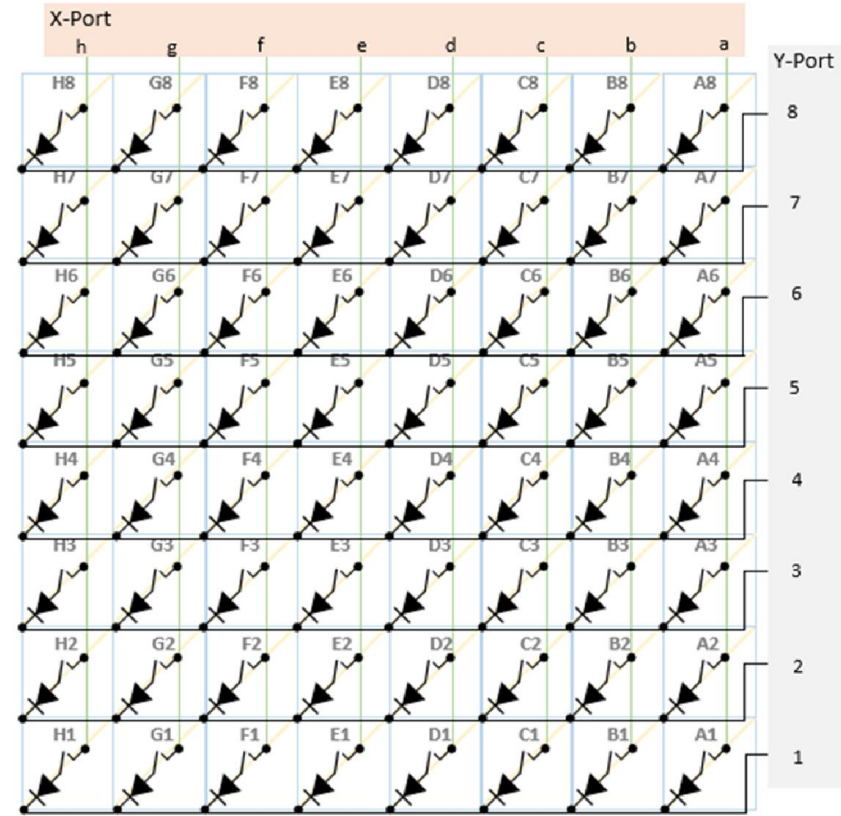
Wiring diagram for LEDs and Reeds beneath the chessboard

wiring of the led-matrix
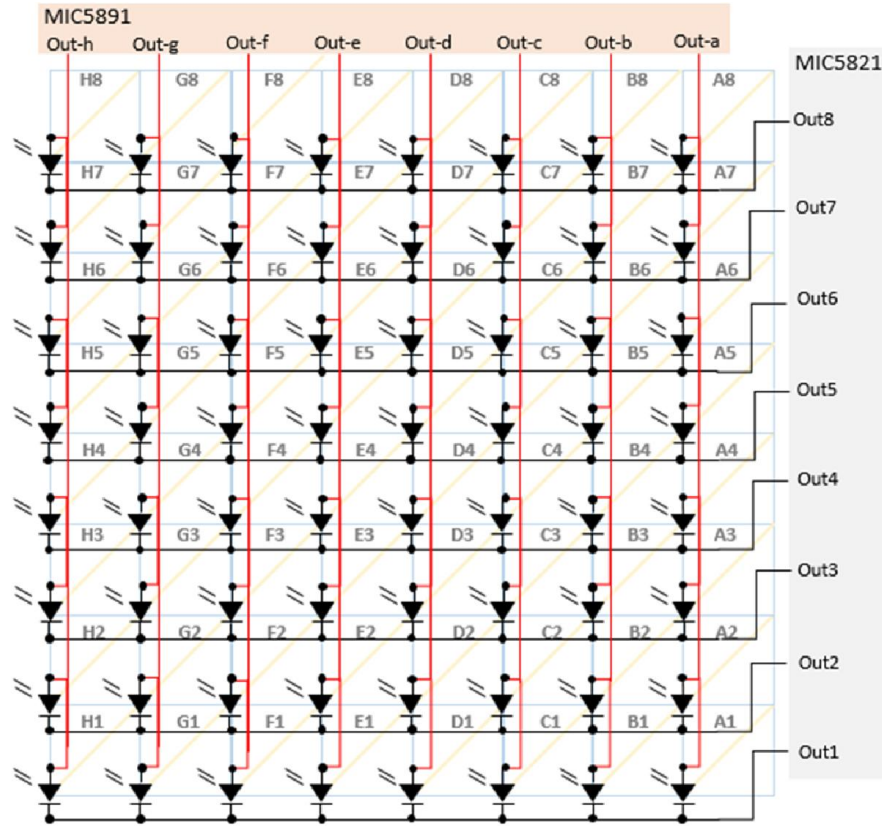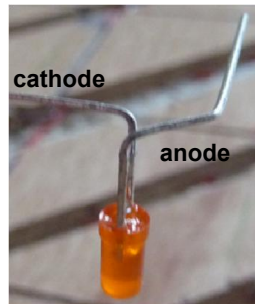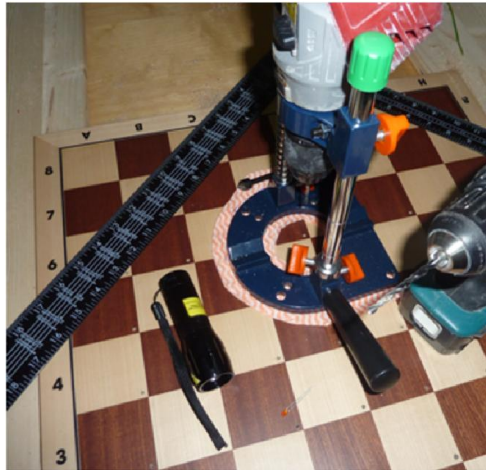
wiring of the reed matrix

anode (+)
longer
connector

LED
3mm
level
orange

cathode

anode

cathode (-)

diodes
1N4148

Reed contact
KSK 1A66

View: Chessboard turned upside down, field H1 on the
left corner at the bottom

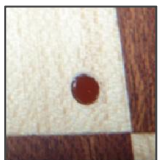| Pos.	parts	QTY		costs	source	remark	
board	Mahagoni/Ahorn FG58mm	1	pcs.	54,95€	Niggemann	MB1000SN	
LEDs	LED 3mm orange-flat bottom	64	pcs.	7,68€	Segor	order 70pcs. (recommended)	
reeds	KSK1A66, 0,5A, 2,2mm	64	pcs.	24,96€	Reichelt	order 70pcs. (recommended)	
diode	1N4148 Switching diode 100V 0,15A	64	pcs.	1,28€	Reichelt	order 70pcs. (recommended)	
wire	bell wire 1mm	1	km	3,50€	Reichelt	1km=joke; 5 coils à 10m o.k.	
	sum of costs (approx.)		∑	92,37€			

tools which make sense + additional recommendations:
(for those who have no CNC machine @ home)

upright	drilling upright	for a better guidance during drilling (check amazon)
twist drill 1	3mm drill	for the led hole on the chessboard surface
twist drill 2	4mm drill	5mm drilling depth to insert the leds
counter sink 1	6mm countersink	deburring holes on top of the chessboard
counter sink 2	12mm countersink	deburring holes on the bottom of the chessboard
milling cutter	mini milling cutter	for the reed contacts and wiring - depth of 5mm Tiefe towards chessboard surface o.k; alternative: router
Multitool	with 20mm saw	to deepen slots of reeds (for better switching if required)
hot-melt adhesive	⇨	fixing of reeds, leds and wires
torch/ lupe	⇨	for the older hobbyist beneath us
angle meter	⇨	to draw the reparation lines in a proper angle
tensioning tool	⇨	to to the milling proper
multimeter	⇨	big support to check contacts and functionality of reeds
first aid kit	⇨	for the not so well experienced hobbyist!

while doing the 3mm drills for the leds

the back side during milling of reed channels

Not too bad...or?!

Not perfect but functional
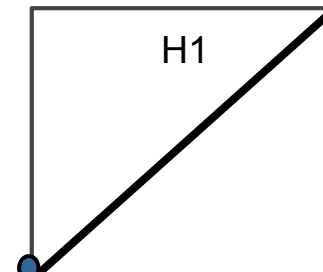
H1
representing one chess field

Milling should be done along the line given by the led holes.
Cable channels can be milled with an offset of 0,5cm

To do the sketches is somehow "tricky". A drilling jig in Power Point has been generated with the right dimensions but the print out showed different measures. Some changes to the sizes and after several print outs I could proceed. The upright needs as well some training and acuracy. A Dremel would be easier to handle.
In general the result is o.k, considering me as a beginner (check picture on the left) - Result: vout of 64 holes, 6 (9,4%) didnt came out proper. This can be adjusted with fluid wood, wax or some paint. ...the 3mm flat bottom leds fit perfect into each 58er Field - discret as planned; On my point of view better compared to 5mm leds.
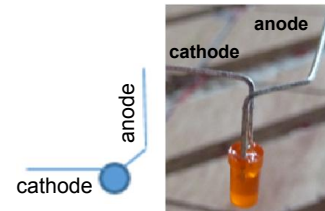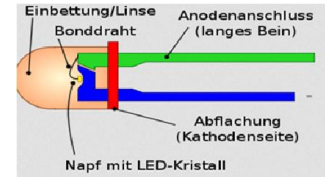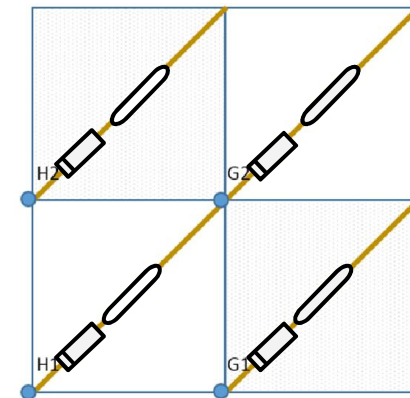
Procession the wooden chess board

chess board flipped (upside down)
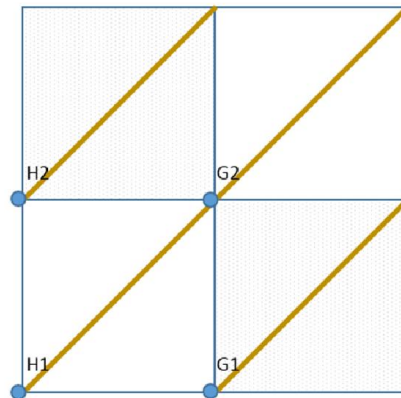
cable channels wide (brown) + narrow (blue)

leds have to bowed carefully as shown

mounting guide for reeds and diodes

1. key steps for leds

upper side:
1. mark position of leds
2. drill careful 3mm holes
3. counter sunk holes on both sides

bottom side:
1. widen hole with a 4mm drill
   (test required depth prior drilling

2. woodwork (cable channels)

bottom side (board with 14mm thickness):
1. mark lines as shown
2. milling channel for reeds with **9mm**
3. thin milling of channels with **5mm**

upper/- bottom side:
distance between surface and reed contact
should be **5mm**! (functionality of switching)

3. assembly of leds

bottom side:
1. bow leds as shown
2. fit in cables and solder them
3. leave cable longer on the end

4. mount reeds/ diodes

bottom side:
1. test proper position of reeds
2. solder reeds together with diode
3. fitting and the wiring (for led contacts)
   towards a connector

upper side:
1. fix a magnet with an adhesive
   to test switching of reeds

zu 4.: bow reed contacts carefully on its end and solder with the diode as shown. contacts can be coated prior with solder. The "helping hand" gives great support.. Pay attention not to heat up the parts too long by soldering. Otherwise the parts will be damaged. Attention: to firm handling will break the glass of reed contacts.
I had to replace three of them ...

The final bottom side:
All wires can be hidden in the cable channels. Maybe fix them with some thin adhesive. Next step is to do a connection test with the multimeter. I had to adjust some reed positions due to the fact of no proper marking of the channels. After all is functional you can fix the reeds on their cable ends with hot-melt adhesive. Attention not to break the glass - the melted glue is hot and should not get in direct contact with the reeds/ diodes

 Some replica show channels for reeds solely. Alternative milling has been done for the complete backside except for the borders. All ways will work. Benefit of this solution is a clear guidance for the wires and it is also a support for the soldered connections. I used different milling depth to reduce the dust of wood ☺

processing the chess figures

replace sleaze with a box cutter

Optional support

using the Makita drill to remove plumb

fix the neodym magnets with hot-glue

test the reed switches

the completed chess board including figures, recognized by it's magnets

pos.	description	Qty		costs	source	comment
figures	Staunton turnier KH95mm	1	set	19,95€	Niggemann	MF9642
magn.	Neodym super magnets N35 1x10	2	pck	6,30€	Reichelt	height 1mm; 1pck=20 pieces
	sum of costs (approx.)	∑		**26,25€**		

additional tools recommended:

| drill	accu drill	to make place for the neodym magnets
drill 1	8mm drill	for drilling holes for the magnets
knive	box cutter	to scratch/ remove the plumb
adhesive	hot glue	fix magnets on the bottom of each chess figure
✚	first aid kit	for the not so well experienced hobbyist!

Mount the neodym magnets
Replace the sleaze in the middle of the figures to find out how the weight has been mounted inside the figures. Some showed enough depth to glue the neodym magnets directly.
For those where you need more space, simply use an acu drill. It is possible to hold the figures with one hand, while drilling with the other. Level the hole with a box cutter and fox then the magnet with some hot-glue.Continue figure by figure but watch out the sharp box-cutter.

support invented by Carsten Meyer: use moldable plastic (sold by Pearl) to fabricate an individual support which can be used to fix the figures in a bench vice without damaging them. You would need three stripes of plastic. This will mold at 60°C. if the plastic is modable you can form it individually. Once hardened it can be used until it gets molded again.

a quick test…. (first impressions)
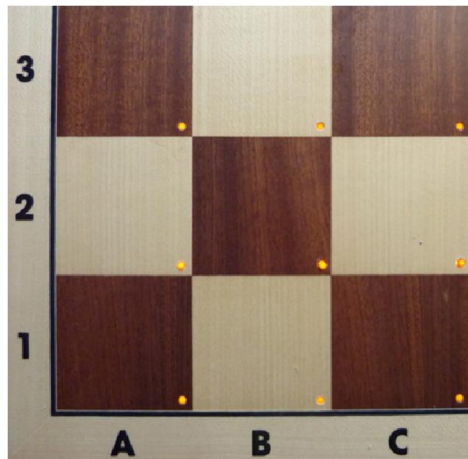

LEDs blinking bright enough

First test after wiring completed
Of course everybody is keen to start immediately...Not wise! First check all contacts beneath the boards, using a multimeter. Test as well the reed contacts if they switch based on magnets recognized on their fields. This is the basic requirement to get the mysticum software proper.
On the next pages we have described how the menu is working plus how the installation can be done. Carstens software visualize if the figures have been placed in the middle of their fields. If no figures are recognized the Leds will indicate a question mark. If at least one figure is positioned proper the chess Lab software will trigger all leds in a repeated sequence. The leds are shining in full beauty.

Using various displays:
dependant on your money in the pocket you will be happy with a blue shining lcd display or a black/ yellow OLED display. Both display are good but based on it's incredible contrast, I prefer the OLED display.
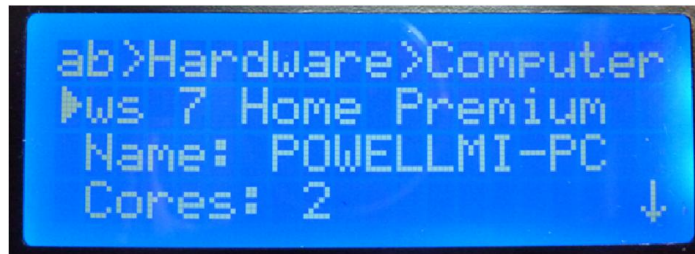
the blue 4x20 LCD ….a food solution for only 9-15 Euro

Using a blue/ white LCD display:
you can use this as well solely by the 5V suppled via USB port. Better of course is the supply by an 12 Volt adapter, using an additiona voltage stabilizator (check out page 6) Contrats and brightness can be adjusted via an individual potentiometer.
Quality of visualization speaks for itself… proper and good enough. Based on price/ value this is a good recommendation
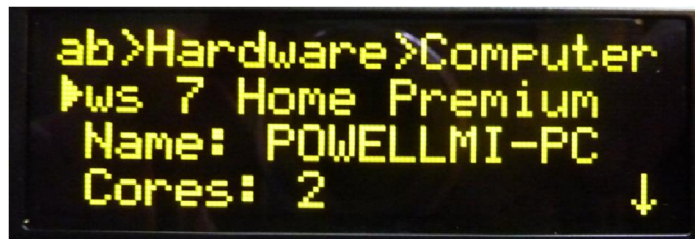
The 4x20 OLED….great stuff but also a bit more pricy with 25,-Euro

Using a black/ yellow OLED display:
The OLED display doesn't need much power. Therefore it is ideal if there is no separate power plug forseen and power is supplied just via the USB port. The display itself is pin compatible with the standard 4x20 lcds and can be used for all versions discribed int his manual. Power consumption is typically 15~50mA for each diaplay.
advantages of the OLED technique:
- No seperate contrast adjustment necessary
- No restriction of perspective
- economic in power cosnumption
- less construction height compared to lcd displays

Most chess board are using red leds with a typicall rounded head. I have used here orange colored leds which are flat headed. Thsi is more decent and looks just great. Fixing those proper will be done after all tests have been completed successful.

Mysticum in a Box - The quick and dirty case solution

my name is "Mysticum" and I'm working great

A housing for the electronics ...Quick and cheap solution (preliminary):

Man/ woman selects:

|	
1x	small cardboard box (for mysticum board, LCDs, Navimec module and switches)
1x	compass for the navimec module (35mm diameter)
1x	accu drill with 6mm drill (for 12V connector and the three switches)
1x	box cutter or similar sharp knife
1x	computer/ laptop with ChessLab software installed (check infobox)

installation time: max 10 minutes

Experience of first try-out:
The first try out was working at once. Only some reeds were not functional. Later on I had some difficulties with soldering joints. With a multimeter I had to check out the contacts. After fixing some connections and re-solder some joints on the mysticum circuit board/ beneath the chess board, all following tests passed successfully!

Next steps:
testing of the navimec module, trigger each field on the chess board with an magnetic figure and check if this gets visible by the software. After this test complete all figures with their magnets (if not already completed) Later on you may clad the back with a sleaze to protect all wires and even more the surface of the tables where you like to play chess (sleazes can be purchased cheap in homeware stores like Tedox or any other nearby)

The chess board with all leds shining..
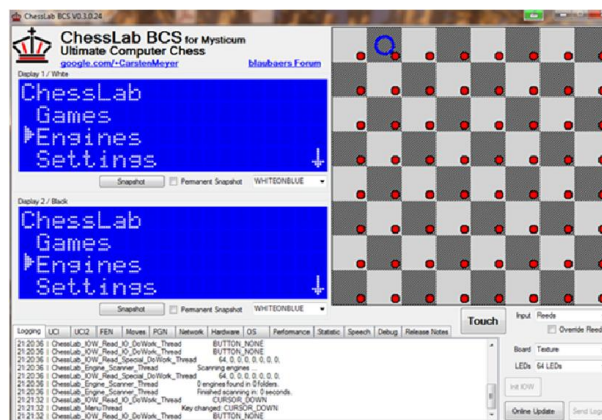
the chessLab software ....

**...works also on the I.ONIK tablet !**

Although the software by Carsten is still under development, you can use it already to test the functionality of board. The final release will be completed during next months and I will continue to document its development. Download of software is possible here: http://www.chesslab.de/downloads/publish.htm

Mysticum I- The vegane chess computer during final assembly

version **2**

wooden box (16,5 x 12,5 x 4 cm) working
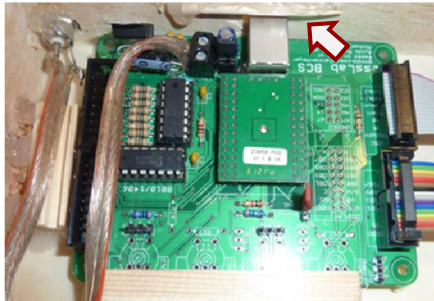
shashlik skewer as a guide for the USB port

The box prior final assembly

Functional and

One unit completed ...works just great!

the I.onik slides on sleaze beneath the chess board

pos.	parts description	Qty	costs	source	remark
box	wooden box 16x12,5x4	1	6,89€	Hobby Lill	shipping costs 3,90
connect	centronics 36pol; connector	2	1,84€	Reichelt	good and cheap solution
cable	centronics 36pol Stecker 1:1	1	2,95€	Reichelt	1,8m long but cheap
sleaze	sleaze "green"	1	4,95€	tedox	1x1m cut to size
profile	wooden profile for the tablet slot	1	4,95€	Hornbach	
	sum of costs(approx.)	∑	**22,22€**		

Additional helpful tools:

adhesive	hot glue	positioning of the OLED displays, guide bar et cetera
+	first aid kit	if the worst comes to the worst (safety first)

final assembly of mysticum and wooden chess board
Die cardboard box "Fritz" was only a preliminary solution and not really suitable for the living room.
I checked out the marketand could find a "ready-to-use" wooden box for the Mysticum. During the assembly once more I identified the tools missing but had to improvise best I could.
For the navimec module i had to drill 20 holes and use then a rasp to get a proper hole (Don't repeat this ..it is not professional). Better use a 35mm caliber drill. On my side I thought ...key is functionality...

Mounting of the tablets:
Mount wooden profiles, coated with sleaze benat the board. The I.Onik tablet slides into it and hides itself underneath the chess board during the game.All options can be addressed via the navimec key module and menu visible on the OLED display.

From first idea to researches on the internet till finalization and first game (which I lost) I needed two month (solely during free time/ weekends).
During this time Michael Lang and Carsten Meyer accompanied me via "hangout" and I have to thank them for their support! Great stuff..

Mysticum forum and ChessLab Software
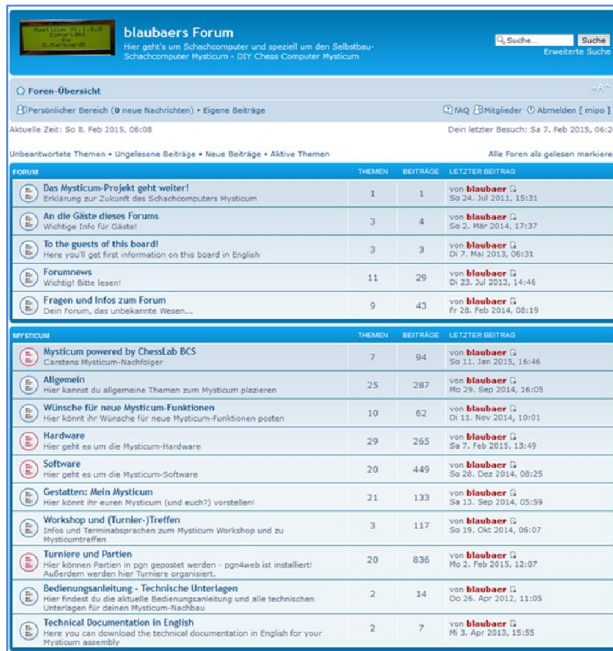
A great forum ...for all who are fascinated

blaubaers Forum:

Michael Lang controls the forum where all up-to-date informations concerning Mysticum can be found. He started with the web site since 2012 and is full of passion when it comes to chess boards. Besides picture of individual replicas you will receive great details concerning latest hardware/ software and of course this document. It is a good start and please have a look on your own: LINK

To start playing chess you can use Guido Marquardts version1 and version 2. But...2015 started with the release of a complete new version, developed by Carsten Meyer who's goal is to increase the functionality, simplify usage and bring all up to latest technologie. I accompany him during his development and document key progress + general usage. Our goal is to achieve a perfect solution for us and all who want to copy our solution. Why we are doing this?   ….. Why not! and because our own **passion2learn** - it is our pleasure and hobby!

Installation of ChessLab Software:

Requirement: computer, notebook or tablet with windows operation system
                  recommended is windows 7 or windows 8.x; 32 or 64bit
                  .NET framework 4.5.2 by Microsoft   <Download>
                  ChessLab software   <Download>

Recommended procedure:
① close all running software applications.
② enable or install .Net Framework 4.5.2
③ install the chessLab software
④ Connect chess board/ Mysticum box via USB cable to the computer/ Tablet

Attention: You need to connect two displays to use this software version

start of installation
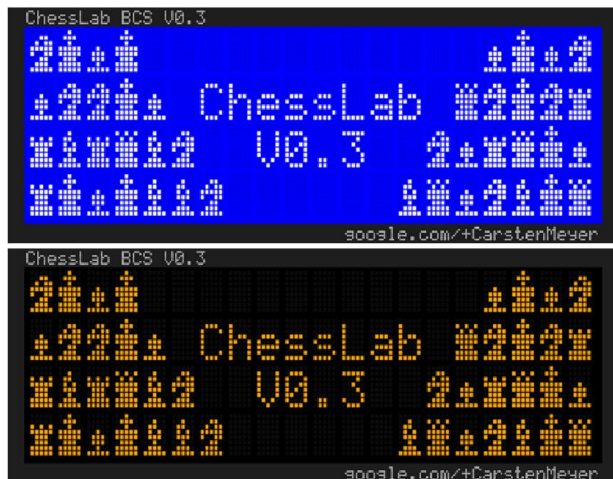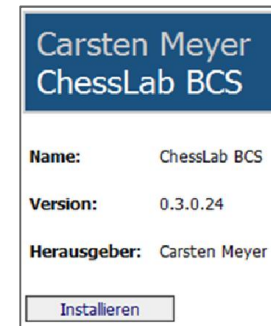
A warm welcome of the lcds during start

testing of reeds and leds
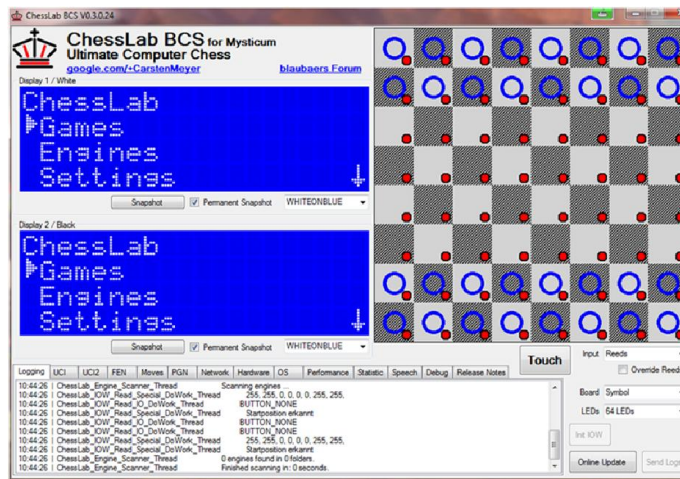
ChessLab BCS for Mysticum software developed by Carsten Meyer
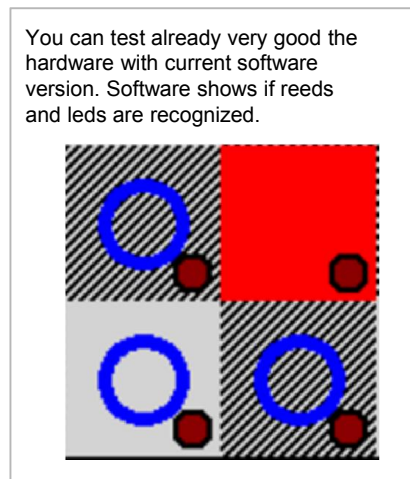
You can test already very good the hardware with current software version. Software shows if reeds and leds are recognized.

Mysticum software by Guido Marquardt

My name is Mysticum - the OLEDs are glooming and I'm ready to play the game, dear chess companion!
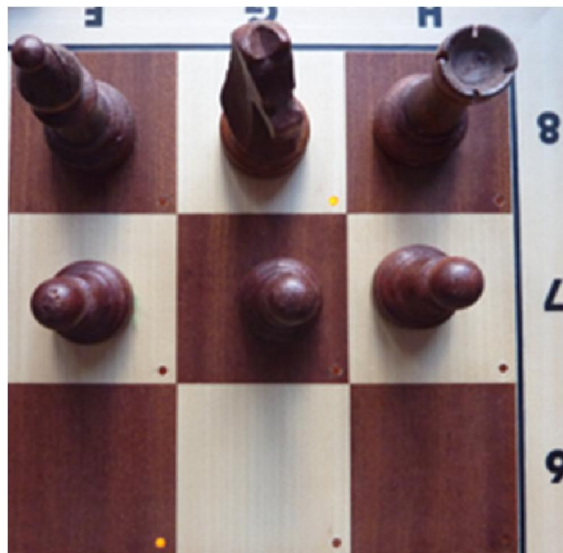
Move of computer (G8 - F6), shown vial leds on the board: knight wants to move from field G8 to field F6

Mysticum...from first idea to realität:

Abstract from original manual of mysticum software developed by Guido Marquardt, founder of the root project [Mysticum V1.8.10.6, dated February 9th 2012]:

"While searching for a suitable chessboard for a good value which includes indication leds and which I could use to store and analyze the games I began to design an own board. During the development the idea rose up to include a silent computer mainboard which would turn the whole application into a powerful chess computer.
The idea of a „Mysticum" was born. You may have got into the touch of hardware required. On my side the biggest obstacle was to use the complete application without monitor, keyboard or mouse" "

As a matter of fact a remarkable software has been realized with functionalities only availabel on very few commercial chess computers...I don't know any of them which can be used in same flexible way or is able to be modified similar. Especially the idea to control all with a simple menue guided by the display/ cursor module is just great. From my point of view excellent to concentrate completely on playing chess. (ie: no interruption of software updates, virus scanner etc ☺)

installation of mysticum software:

Requirement: PC, laptop or tablet with windows operating system
recommended is windows XP, 7 or windows 8.x; 32 or 64bit
.NET framework 2 or 3.5 by Microsoft   <Download>
mysticum software (apply for download)   <Antrag zum download>

recommended procedure:
① apply for download directly with Michael Lang
② download software and unpack zip files in an unlocked folder
③ close all open applications (Just to be sure)
④ installation of .Net frameworks (if you face problem check out questions and answers page)
⑤ connect mysticum hardware to the computer via USB
⑥ click on the application "Mysticum" which can be found in the folder Mysticum V1

attention: please use version 1 or 2 only with **one display** !

appliance:

menue select

up

left   right
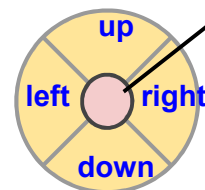
down

start/ stop/ Esc

functionality during the game:

▲ - Up: show move of book
◄ - Left: show additional move
► - Right: show additional move
▼ - Down: show ponder move
OK - O.K.:   menue/ select = selection
● - Start/ ESC   [START/ STOP/ ESC]

❶ switching on:

The program starts with initialization of the display and gives an info regarding software version and name of the programmer . On the next screen the user will receive a warm welcome, shown with
 "Hello dear chess friend". The chess program (motor/ engine) will be started which was active before.
If you start the application for the first time **Fruit 2.3.1** will be loaded.
The menue shows the following options:

← **Partie fortsetzen/ continue game**	continue previous game	◄
→ **Neue Partie/ new game**	new game with figures on their home position	►
↓ **Demo Modus/ demo modus**	Mysticum plays a game against himself	▼
↑ **Hardwaretest / hardware test**	testing reeds, leds and push-buttons	▲

Display:

```
MYSTICUM
HELLO
DEAR CHESS FRIEND
```

```
←    CONTINUE GAME
→    NEW GAME
↓    DEMO MODUS
↑    TEST HARDWARE
```

Display:

```
                    5
      W♘ ON G2
2  |♟|♟|♟|♟|♟|♟|♟|♟|
1  |♜|♞|♝|♛|♚|♝|♞|♜| W
```

```
        MM IV

00/0              +00,00
0:00:00      1      0:00:00
```

→ new game:
Push the ► button to start a new game plus confirm action with ◄. The Mysticum checks if all figures are recognized on their home position. If a figure is not recognized the relevant led will turn on and display shows exact potion of figure missing. If all figures are recognized the leds flicker short and the display indicates which engine is active. The time resets to **0:00:00** and the game can start now….**finally !!**
You select first move and move the figure as an example from E2 towards E4. computer calculates his answer and shows on the display but also on the board with two leds where he wants his figure to be placed. The clock waits until the move has taken place. If the function "ponder" has been enabled, Mysticum will analyse the setup in the background.

❷ Switch back to the main menu:
By confirming the [OK] button you can access the main menue. Following options will show up:
Neue Partie/ new game, **Spielstufe/ level**, **Motor/ engine, Partie/Stellung/ game/position**,
Einstellungen/ settings, a possible **Ausschalten/ tunr off** and **Menü verlassen/ leave main menu.**
While using the arrow keys ▲or ▼ you will scroll up and down. Confirm selection with [OK]. screenshot to the right show that the motor has been changed to **Fruit 2.3.1.** If you like to switch sides during the game just confirm action with the ● [START/STOP/ESC] key. The computer will take over your position and you can continue to strand on the previous side of the computer☺ Please use this unfair method only for consultation purpose. While pushing once again on the ● [START/ STOP/ ESC] key, you will switch back to your previous position and game color.

```
      MAIN MENU

   →  NEW GAME  ←
     GAME LEVEL
```

```
      FRUIT 2.3.1
      2.♞B8-C6
00/0              BUCH
0:00:"0     2.      0:00:00
```

Menu structure of the mysticum software (version 1)

1. Main Menue
- 1.1 New game
- 1.2 Game level
- 1.3 Engine
- 1.4 Game/ position
- 1.5 Settings
- 1.6 Turn off
- 1.7 Leave menu

1. Main Menue
- 1.1 New game
  - 1.1.1 New game? ← YES NO →
- 1.2 Game level
  - 1.2.1 Tournament level
  - 1.2.2 Flash level
  - 1.2.3 Time/ move
- 1.3 Engine
  - 1.3.1 UCI-engine
  - 1.3.2 Mephisto
  - 1.3.3 engine options
  - 1.3.4 BT-test
  - 1.3.5 MoSlo-test
  - 1.3.6 back to main menu
- 1.4 Game/ position
  - 1.4.1 save game
  - 1.4.2 check board
  - 1.4.3 Home. ← position →
  - 1.4.4 clear board
  - 1.4.5 add figure
  - 1.4.6 remove figure
  - 1.4.7 load game
  - 1.4.8 replay game
  - 1.4.9 back to main menu
- 1.5 Settings
  - 1.5.1 Libraries
  - 1.5.2 board/ lcd
  - 1.5.3 communication
  - 1.5.4 system
  - 1.5.5 back to main menu
- 1.6 Turn off
- 1.7 Leave menu

1.2 Game level
- 1.2.1 Tournament level
  - 1.2.1.1 40 moves in 5 minutes
  - 1.2.1.2 40 moves in 15 minutes
  - 1.2.1.3 40 moves in 20 minutes
  - 1.2.1.4 40 moves in30 minutes
  - 1.2.1.5 40 moves in 45 minutes
  - 1.2.1.6 40 moves in 1 hours
  - 1.2.1.7 40 moves in 1,5 hours
  - 1.2.1.8 40 moves in 2 hours
  - 1.2.1.9 40 moves in 2,5 hours
  - 1.2.1.10 **back to game level**
- 1.2.2 Flash level
  - 1.2.2.1 Game in 3 minutes
  - 1.2.2.2 Game in 5 minutes
  - 1.2.2.3 Game in 10 minutes
  - 1.2.2.4 Game in 15 minutes
  - 1.2.2.5 Game in 30 minutes
  - 1.2.2.6 Game in 45 minutes
  - 1.2.2.7 Game in 1 hours
  - 1.2.2.8 Game in 1,5 hours
  - 1.2.2.9 Game in 2 hours
  - 1.2.2.10 Game in 2,5 hours
  - 1.2.2.11 **back to game level**
- 1.2.3 Time/ move
  - 1.2.3.1 5 seconds
  - 1.2.3.2 10 seconds
  - 1.2.3.3 15 seconds
  - 1.2.3.4 30 seconds
  - 1.2.3.5 1 minutes
  - 1.2.3.6 2 minutes
  - 1.2.3.7 3 minutes
  - 1.2.3.8 15 minutes
  - 1.2.3.9 30 minutes
  - 1.2.3.10 1 hours
  - 1.2.3.11 3 hours
  - 1.2.3.12 4 hours
  - 1.2.3.13 9 hours
  - 1.2.3.14 **back to game level**
- 1.2.4 back to main menu

1.3 Engine
- 1.3.1 UCI-engine
  - 1.3.1.1 Colossus
  - 1.3.1.2 Colussus2008b
  - 1.3.1.3 Crafty
  - 1.3.1.4 Critter
  - 1.3.1.5 Cyclone xTreme
  - 1.3.1.6 DeepSjeng c't
  - 1.3.1.7 Doch 1.3
  - 1.3.1.8 Dragon
  - 1.3.1.9 Fruit
  - 1.3.1.10 Glaurung
  - 1.3.1.11 Houdini
  - 1.3.1.12 Komodo
  - 1.3.1.13 Mephisto Gideon pr
  - 1.3.1.14 Naum
  - 1.3.1.15 Protector
  - 1.3.1.16 Rebel (Prodeo)
  - 1.3.1.17 RoboLito
  - 1.3.1.18 Scorpio
  - 1.3.1.19 Shredder Classic 4
  - 1.3.1.20 SOS
  - 1.3.1.21 Spike
  - 1.3.1.22 Spike 1.4
  - 1.3.1.23 Stockfish 1.6.3
  - 1.3.1.24 Stockfish 1.7
  - 1.3.1.25 Stockfish 1.8
  - 1.3.1.26 Stockfish 2.0.1
  - 1.3.1.27 Toga II 1.0 SE
  - 1.3.1.28 TwistedLogic
  - 1.3.1.29 WildCat
  - 1.3.1.30 **back to engine**
- 1.3.2 Mephisto
  - 1.3.2.1 MM IV
  - 1.3.2.2 MM V (5.1)
  - 1.3.2.3 **back to engine**
- 1.3.3 engine options
  - 1.3.3.1 GUI-Book
  - 1.3.3.2 Ponder
  - 1.3.3.3 **back to engine**
- 1.3.4 BT-test
- 1.3.5 MoSlo-test
- 1.3.6 back to main menu

Additional UCI Engines can be added on your own, simple and easy.

1.4 Game/ position
- 1.4.1 save game
- 1.4.2 check board
- 1.4.3 Home. ← position →
- 1.4.4 clear board
- 1.4.5 add figure
- 1.4.6 remove figure
- 1.4.7 load game
- 1.4.8 replay game
- 1.4.9 back to main menu

1.5 Settings
- 1.5.1 Libraries
  - 1.5.1.1 seelct main book
  - 1.5.1.2 tournamet book
  - 1.5.1.3 **back to settings**
- 1.5.2 board/ lcd
  - 1.5.2.1 Referee On
  - 1.5.2.2 Option Score off
  - 1.5.2.3 PV turned on
  - 1.5.2.4 switch board
  - 1.5.2.5 demo modus
  - 1.5.2.6 no board
  - 1.5.2.7 lcd off
  - 1.5.2.8 sound
    - 1.5.2.8.1 All sounds on
    - 1.5.2.8.2 sound engine
    - 1.5.2.8.3 all sounds off
    - 1.5.2.8.4 Move announcem.
    - 1.5.2.8.5 **back to board/lcd**
  - 1.5.2.9 **back to settings**
- 1.5.3 communication
- 1.5.4 system
- 1.5.5 back to main menu
- 1.6 Turn off
- 1.7 Leave menu

Mysticum, the versatile
Here you can see clearly the wide variety represented by the Mysticum. A great chess companion has been realized which will provide endless playing fun while using various UCI Engines available.

1.	**Main menue**
1.1	New game
1.2	Game level
1.3	Engine
1.4	Game/ position
1.5	Settings
1.6	Turn off
1.7	Leave main menu

1 Main menu

Selection of options can be handled by the push-buttons ▲ ▼and ◄►. You can confirm selection with OK .

1.1 New game

You can start a new game with this option. If the figures are on their home position this is option is not available. If figures are missing you will be guided which one needs to be placed where. Once all figures are on their home position the leds on the board will flicker to confirm readiness and you can start to play a new game. Please check as well description on page 17.

1.2 Game level

There are plenty of levels available and they can be selected by choosing four different groups: **Tournament level**, **flash level**, **time for each move and Mephisto Level** if an Mephestio engine has been opened.

1.2.1 Tournament level

BHere you can select how much time will be available to play in total 40 moves. As an option you have **40 moves in 5 minutes** up to **40 moves in 2,5 hours**. If 40 moves have been done the chess computer will add same selection for next 40 moves. Mysticum will handle the available time individual

1.2.2 Flash level

Here you can decide on the total time of a game. Optional are **3 minutes** up to **2,5 hours** for a game**.**

1.2.3 Time / move

You can define the duration for a move. Mysticum offers the variety of **5 seconds** up to **9 hours** for the next move.

1.2.4 Mephisto Level (optional)

This level is only available if a Mephisto engine has been loaded. The original levels can be selected.

1.3 Engine

This is a remarkable option of the Mysticum. If you select a different engine the actual status of the game will be transferred to the new engine. This may take a while due to the method of copying each move step by step.

1.3.1 UCI-engines

With this selection you are able to access all UCI engines (Universal Chess Interface) which have been installed on the folder "Engine". Following rules apply:

Each engine has an own sub- folder beneath folder called „Engine". The selected file (.exe), needs to have same description like the folder itself i.e.: "D::\Mysticum\Engine\ Rebel(Prodeo)". The file needs to be called „Rebel(Prodeo).exe" . This allows to access a variety of executable files in the folder „Engine".

The Mysticum-Software compares the names of folder and .exe-files which will show up only if they are identical. Based on this rule it is possible to work as well with WB2UCI-adapter. With support of the WB2uci.eng-file it opens the required engine. This means that the WB2UCI.exe needs to be named with same scheme. In our example Rebel(Prodeo).exe is in reality the WB2UCI-adapter which will call the file Prodeo.exe. Rebel(Prodeo).exe will show up only if the folder has been named Rebel(Prodeo).

1.3.2 Mephisto

Hegener+Glaser AG manufactured years ago the most popular chess computers. Based on the Emulator MESS (Multiple Emulator Super System) Ralf Schäfer could generate a variety of some popular versions of the Mephisto-series which can be loaded onto the Mysticum: Mephisto III-S Glasgow; Mephisto Rebel 5; Mephisto MM IV; Mephisto MM V (5.0 and 5.1); Mephisto Amsterdam; Mephisto Dallas, Dallas16, Dallas32, Mephisto Roma32. Ed Schroeder, programmer of various Mephisto-modules, allows the usage of his software versions MM IV and MM V for free. All other versions need to be copied from existing ROMs !

Please check the individual licence agreements

… 1.3.2 Mephisto (Continuing from previous page)
While loading the mephisto emulation you will be asked if the original clock rate should apply (use original clock rate ◄ YES or ► NO)

Excursion: Selecting the original clock rate of an emulation
While selecting ◄ YES, the game level selected will use the clock rate of the Mephisto chess computer to make the playing strength comparable. The calculation speed of the Mephisto 32Bit can be compared with an old 486er VIA CPU starting with 600 MHz. If you select ► NO the computer's clock rate will be taken and this is nowadays of course much more powerful. The real speed depends on the clock rate of the computer plus hardware used (memory, hard drive, …) Nevertheless the emulation needs lots of system resources and therefore it is not that easy to compare. Ie.: the emulation of MM IV (original 5 MHz) will reach on a 1.000 MHz mainboard only 16-18 MHz, which is still much better. You can use software tools like CPUID or MoSlo to reduce the speed to make the playing strength comparable. Based on this option the Mysticum offers as one of a few magnificent new and existing possibilities to play against older chess programs or ...you can get a chance to win against them*smile

1.3.3 Engine options
Here you can select the options of the current engine playing. As usual you can select via the ▲ and ▼ keys and confirm later selection via OK. If there is only **Yes** or **NO required** use the ▲ for **YES** and ▼ for **NO**. If you change an option of the emulation is this effective for all engines emulated. At the moment you have the option of PONDER and GUI book.

1.3.3.1 GUI-Book
With all engines you have the option to use the GUI-book. Especially if the engine doesn't offer an own book please set the option to TRUE (YES). The program will select the first moves out of the book (check the variety on menu option 1.5.1).
Attention: if the selection GUI-book = True has been made the universal book will be selected instead of the engines own book (if it has an own) To have the engine playing with it's own book please select
"Own book" = **TRUE** and GUIBuch = **FALSE.**

1.3.3.2 Ponder
Mysticum will use your thinking time to analyse the status and tries to find his own best move.

1.3.3 BT-analysis
If you select this option the engine will start the analysis BT2630 and BT2450. Those have been developed by Hubert Bednorz and Fred Toenissen and they measure the tactical capability of the engine and are quite common. Test will be started by raising up any figure. The position of the figures doesn't matter. Mysticum will analyze on his own and present finally his results.
The BT2450 test measures the time the computer requires to find the best solution out of thirty positions. If the solution can't be found within 15 minutes (900 seconds) for each position, test result is 900 seconds.
This result is the same even if the computer will find the best move within 15 minutes but selects out of all choices a different move.
The test result will be evaluated based on the complete time of all 30 positions based on the formula: BT = 2.450 - 2x total time (time in minutes) or BT = 2.450 - total time / 30 (time in seconds). The value evaluated is somehow comparable with the international ELO values. You need to be aware that the BT2450 test only evaluates the tactical skills of the program. An improved version is the BT 2630 test. Base value here is 2.630 in the formula and it includes seven additional positions. The results will be stored in a file „BT_Test_<name of engine>.txt" gespeichert.
The test will require many hours….

Excursion: engines
a chess engine is a computer program that analysis positions and decides on the best moves on it's own. Most chess engines do not have their own graphical user interface (GUI) but are rather applications that communicate with a GUI like the Mysticum. This allows the user to play against multiple engines like in our case. Well done ….

1.4 Game/ Position
Load a current game, stored; save current environment plus many more features...

1.4.1 Save current game
The current game can be stored within the database „Partiesammlung.pgn". If demo mode has been selected this will be executed automatically.
Prior to saving the game, you need to enter name of the player. Name of the mysticum-motor is a preset but can be changed as well. To write down the name use the push-buttons▲ and ▼ to select the proper character. Upper kex and lower key plus cecial characters and numbers can be selected one after the other.By using the keys ◄ and ► you access previous or next character.
With the ● [START/ STOP/ ESC] button you can rename file. The [OK] -key confirms data entry. After name has been entered Mysticum likes to know game result which can be choosen with ▲ and ▼ keys (1-0, 1/2-1/2, 0-1). The game can be opened later once again with function **1.4.7 load game**

1.4.2 Check board
LCD-display represents 4 rows of the board. You can scroll up and down with the ▲ and ▼ keys. the black figures are blinking compared to the white figures. A blinking **S** in the upper right corner indicates black figures, a non blinking **w** on the bottom right corner represents the white figure.

1.4.3 Home Position -> Pos.
There are two ways to enter a new setup. Starting from the home position is the best way to setup an individual position. You will be asked to set up the home position on both sides. Then lift one figure and place it to target position. If you don#t position the lifted figure and lift one other, Mysticum interprets that the first figure has been removed from the board and waits where the second will be placed. You can confirm setup completed by pushing the [OK] key. Mysticum will ask several questions regarding the game which are dependant from it's setup. ie: case is the white king is placed on **e1** and white rook on **h1**, question will be if castling is still possible or if the king / rook has been moved.
It is recommended to check the setup with the function (1.4.2 check board)

1.4.4 Clear board
Here you can enter a new starting position.First remove all figures and you will be guided to the following function **1.4.5 Add a figure**.

1.4.5 Add a figure
display shows possible figures which can can be added. With the ◄ and ► keys you can select figures required. Choose the color with the ▲ and ▼. Then place the figure on it's position. Proceed as before until the setup is completed. With ● [START/ STOP/ ESC] you can end the setup procedure.

1.4.6 Remove a figure
Simply remove a figure and confirm setup with the ● [START/ STOP/ ESC] key. If the king is missing, Mysticum will call up "1.4.5 Add a figure" - function.

1.4.7 Load a game
Ny seleting this function, Mysticum will load the internal database "Partiesammlung.pgn". It is editable with a word editor. Saved games can be opened also with other chess programs like Fritz!. By selecting **"Load a game"** first game stored will be shown. display presents name of the player and result of the game. Info ★ indicates an open not finalized game.
By moving up and down with ▲ and ▼ keys you can select the desired game. Confirm seelction with ● [START/ STOP/ ESC] and game gets loaded. Mysticum supports now the manual setup on the chessboard.

1.4.7 Replay a game
You seelct a game which then gets loaded. Continue with the manual setp of figures - Mysticum will present first move of the game.
By hitting the ● [START/STOP/ESC] key next move will be shown. The replay can be stopped with the [OK] and you can continue to play starting from this position.

1.4.8 Replace a game
Asa game been loaded you can replace this one now with the new position.
A tännchen: Old version gets lost!

1.5 Settings
Here you can control the main settings.

1.5.1 Selection of book:
Not all engines do have an own opening book. For that reason Mysticum offers a variety of libraries (GUI-book). This database has been created by using ProDeo 1.2 and can be updated with same version. All books are usually stored in the folder „books" of the mysticum root folder. If an engine should make use of the library you need to activate the function for each engine individual. Please activate the GUI-book with TRUE (YES). The setting will be kept until you change it again. There are two categories of libraries "Main library" and "tournament library".

1.5.1.1 Select main book:
elo2500, gambit, mainbook, mysticum und **super**.
1.5.1.2 Select tournament book:
aljechin, CaroKann, classc, französisch, gambit, königsgambit, modern, mysticum, pirc, sharp, sizilianisch, skandinavisch, solid, spanisch sowie **tourbook.**
The tournament books have always priority. If there is no comparable position found, the main book will be consulted

1.5.2 Board / LCD:
Change settings concerning chess board and lcds

1.5.2.1 Include Referee:
With this function Mysticum takes over function as a referee and checks the moves on their legitimacy plus evaluates complete position. the referee modus can be recognized by the underscore _ right to the number of moves visible in the 4th row of lcd. The engine calculates the current situation endless and shows it's rating plus possible moves recommended.If you have selected MultiPV on a value higher than 1 the engine will display many options which can be scrolled with the ▲ and ▼ keys. It is recommended to deactivate MultiPV if you play against the mysticum engine because many engines do not play their best moves and may select then a bad move.

1.5.2.2 Option Turn off score:
This feature deactivates to display current options and evaluation of position, while mysticum does his next move

1.5.2.3 PV on the board On/Off:
Switch on or off of this function to take the first choice of calculated move by the engine while it's the computers turn and still thinking.

1.5.2.4 Switch board:
You can determine how to setup the chess board
1.5.2.4.1 White on the bottom (A1-H2) - standard
1.5.2.4.2 Black down (A8-H7) Brett gedreht
1.5.2.4.3 automatic (colors will be changed after each game)
1.5.2.4.4 Engine always at the top
By selecting 1.5.2.4.4, the engine plays always from the top independent of it's color. This means if the engine owns the white figures Mysticum will play from the top and the white home position is a8-h7.
If the engine plays the black figures all is standard (white starts with home position a1-h2; black figures on a8-h7)

1.5.2.5 Demo modus:
by selection of this feature and confirming with 🔴 [START/STOP/ESC], Mysticum plays against itself without moving figures on the board. This modus can be stopped with the push-button ▲. The final move will be calculated and this end the demo modus.

1.5.2.6 Without board:
Here you can switch off the board (indication with leds and checking of reeds). This function makes sense if a mysticum engine plays against an external device via bluetooth. Both devices send their moves automatically!

1.5.2.7 LCD off:
This selection turns the lcd off. Hit any key to switch it on again.

1.5.2.8 Sound:
You can influence usage of the computer loudspeakers:
1.5.2.8.1 all sounds on: If the engine presents his next move or you execute your move a short beep confirms action.
1.5.2.8.2 Sound engine: Only sounds will be generated depending on the engines move. ie:.: make a move, checkmate, Give-up, u.s.w.
1.5.2.8.3 all sounds off: switch off all sounds (not recommended)
1.5.2.8.4 Announce moves: This presumes that the mysticum sub-folder "sounds" includes "Sounds" Wav-files. Function can be switched on or off.

1.5.3 Communication:
Communication focus mainly on Bluetooth.

1.5.3.1 Bluetooth switched on:
Enables the connection to external devices like. Arena on a separate computer or CEBoard on a PocketPC. both programs support the Novag-system, which is emulated by the Mysticum.
A tännchen: WIf this function has been turned on but no bluetooth connection can be confirmed you should deactivate the function. Reason is that the application might freeze under this circumstance. Mysticum my connect also with a serial cable (Nullmodemkabels) Please assign Bluetooth on it''s nominated Com port. usually COM-Port 1.

1.5.3.2 bluetooth port:
With this function you determine the com port for data exchange via bluetooth.

1.5.3.2 WB Protokoll:
without function

1.5.4 System:
Main settings for the system

1.5.4.1 Date:
Change the system date, using ▲ ▼ or ◄ ► keys

1.5.4.2 Adjust the time:
Change the system time, using ▲ ▼ or ◄ ► keys.

1.5.4.3 Language:
Select system language . Following options are available: german, english, french and spanish.

1.5.4.4 Evaluation Game "on":
Mysticum adjust his own playing strength to yours. Function is only available if the loaded engine supports „UCI_LimitStrength". Following engines offer this feature: **Hiarcs 12** und **13**, **Shredder 12** sowie **DeepSjeng c't.** If this option is selected for the first time you can enter a self evaluation based on an ELO-value. A higher ELO value will cause the engine to play stronger. The value can be entered only once! For the first twenty games mysticum uses a formula to adjust quick to your playing strength. Starting after the twentieth game you will gain 16 points for a win or will get those points taken away if the game is lost. If this function is enabled you will be recognized prior each new game. If a **New game** has been selected but previous has not been completed Mysticum will evaluate based on the position who would win.
-0.99 up to +0.99 Points will be evaluated as a remis.

1.5.4.5 Gaviota TB ein:
Based on this function the engine Gaviota and its tablebase will be consulted and if the position is found in the database the GUI takes over the game. Base is that the other engines need to come on their own to the starting position. Gaviota takes over and this enables to improve for some engines their playing strength for the finals.

1.5.4.6 CPUID ein/aus:
Here you can adjust the multiplication of computers system tact. Attention! solely for VIA Nehmiah, AMD Geode oder Atom N270@1.6GhZ usable.
Usage at own risk - not recommended! 😈

Question and answers (hardware and software)

?
Which .Net version do I need?

The mysticum software requires .Net version 2.0. Windows 8.1 has the versio .Net 3.5 available which is compatible to .Net 2.0
Regarding the ChesssLab software programmed by Carsten Meyer you need .Net Version 4.52.

?
.Net 3.5 can not be installed on windows 7 or 8/8.1, error message: Error: 0x800F081F or 0x800F0906?

Main reasons are problems with the windows security updates KB2966826, KB2966827 oder KB2966828.
I could resolve the problem by completing all updates of windows

?
The OLED display stays dark after start of application; Initialisation not possible.

Please check first if all wires have been soldered proper and are connected in the right order between mysticum circuit
board and display.. If dome connections do not look good, re-solder them. Please check as well which application you have started.
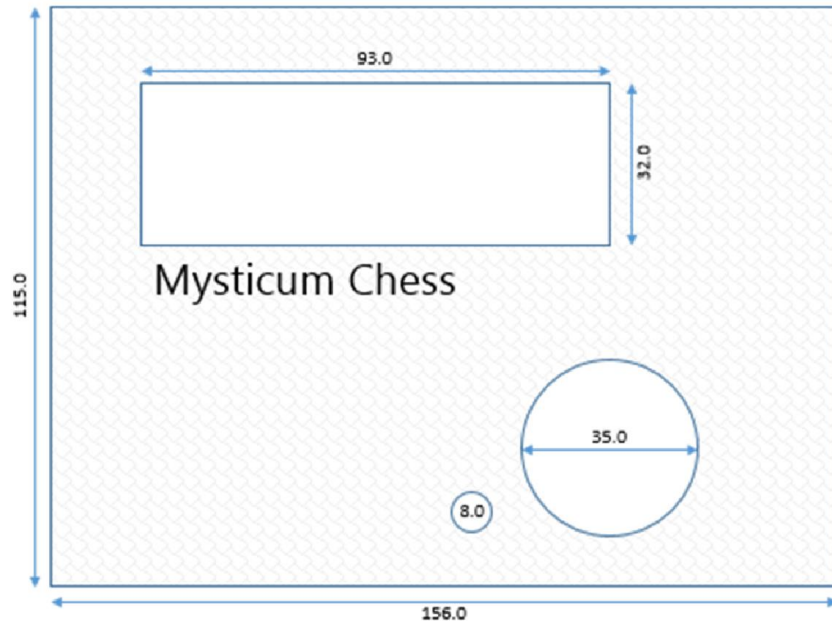Guidos application is working only with one OLED/ Lcd display. Carstens software can utilize two screens.
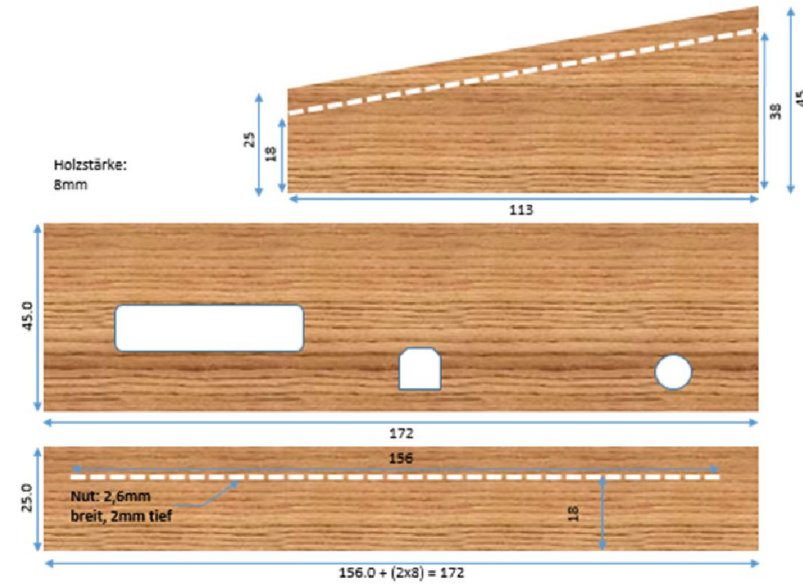
?
Voltage stabilizer gets hot

Most probably the issue is a short circuit closeby the tantal condensators. Please do a visual inspection and check
contacts with a multimeter.
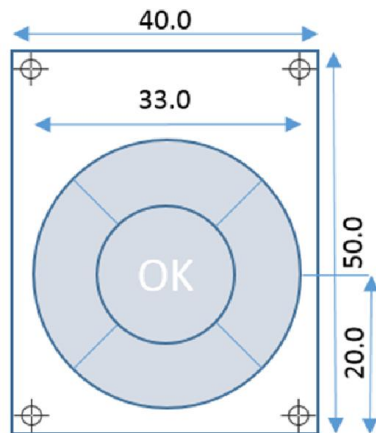
.

The mysticum trapped in a wooden box (key measures)

Front cover aluminium plate anodized (top view)

Mysticum Chess

Wood Housing for mysticum

Holzstärke: 8mm

Nut: 2,6mm breit, 2mm tief

156.0 + (2x8) = 172

Navimec Cursor module (top view)

OK

Newhaven NHD-0420DZW (top view)

HELLO
DEAR CHESSFRIEND

connections of Newheaven display

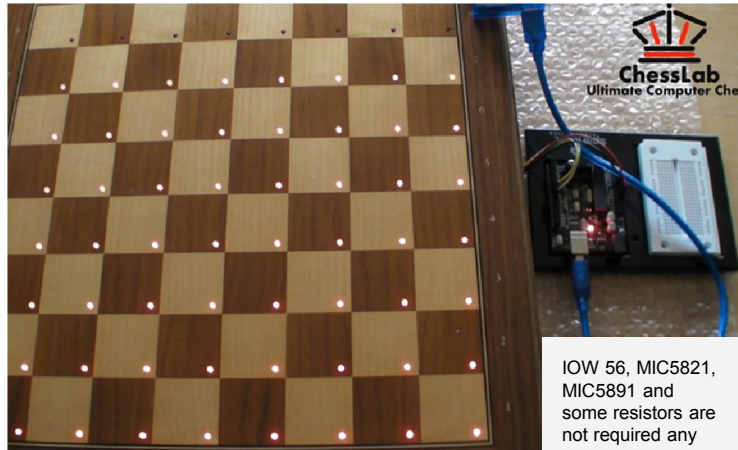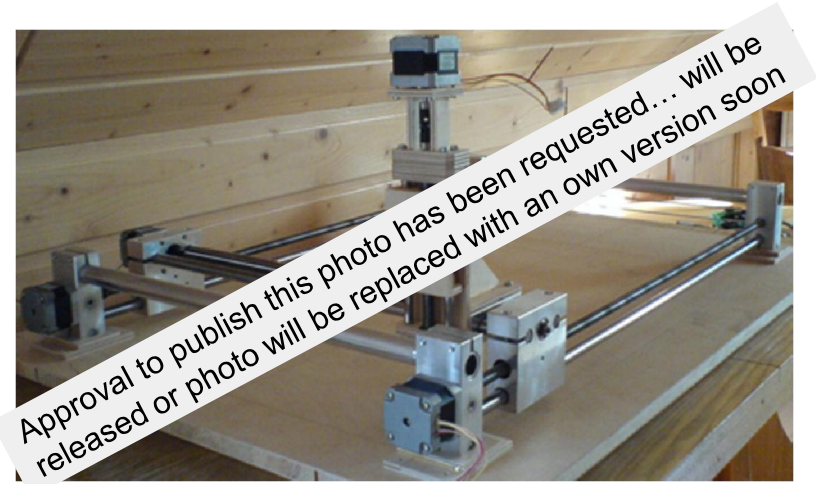| VCC | RS | E | 1 | 3 | 5 | 7 | NC |
| GND | NC | R/W | 0 | 2 | 4 | 6 | NC |

the mysticum story continues ..example of ongoing developments

Based on current technical possibilities we have innovative possibilities which are worthwhile to use for this project. Here you get some insights on what Carsten is currently working on:

IOW 56, MIC5821, MIC5891 and some resistors are not required any longer

ChessLab AVR
 …. cheaper alternative compared to the IOWarrior based solution. With the first results we are encouraged to achieve step by step a powerful 100.- Euro chess computer solution.

Approval to publish this photo has been requested… will be released or photo will be replaced with an own version soon

DIY - CNC milling machine
(this layout or similar - example taken from the internet)
 …. for a better processing / drilling holes for the Leds into the chess board

ATMEL ATmega
 …. will this be the replacement for the brave IO Warrior? The resolution to this mysticum will be described soon here…

Stay tuned!

SMD Leds, multi-color
…. replaces the 3/ 5mm leds and offer additional possibilities for visualization: introduction of possible moves once a figure has been lifted; indications for check and checkmate etc.

links and contact details

additional informations can be found …

Michael Langs Webpage:	Generic Homepage about his hobby	Link
Michael Langs Forum	Forum regarding latest news concerning mysticum	Link
Carsten Meyer	Google+ Page	Link
Michael Powell	Google+ Page or mail	Link
Segor	supplies ie.: IO-Warrior module, leds, reeds, etc.	
Reichelt	supplies ie: resistors, navimec module, wires etc	
Mouser	OLED Display for reasonable price compared to other sources	Link
Pollin	supplies ie: resistors, navimec module, wires etc	
Meder	Infos regarding reeds	Link
Supermagnets	source for neodym magnets with technical details	Link
TOP UCI-Engines	Webpage with lots of engines for own download	Link
Chess o.k.	Webpage with additional choice of engines for download	Link
Joes Chessblog	great Infos and additional download options	Link
Schaeffer AG	Acryl or aluminium Frontplate and front plate designer for free	Link
German Manual	this document translated to german language	Link