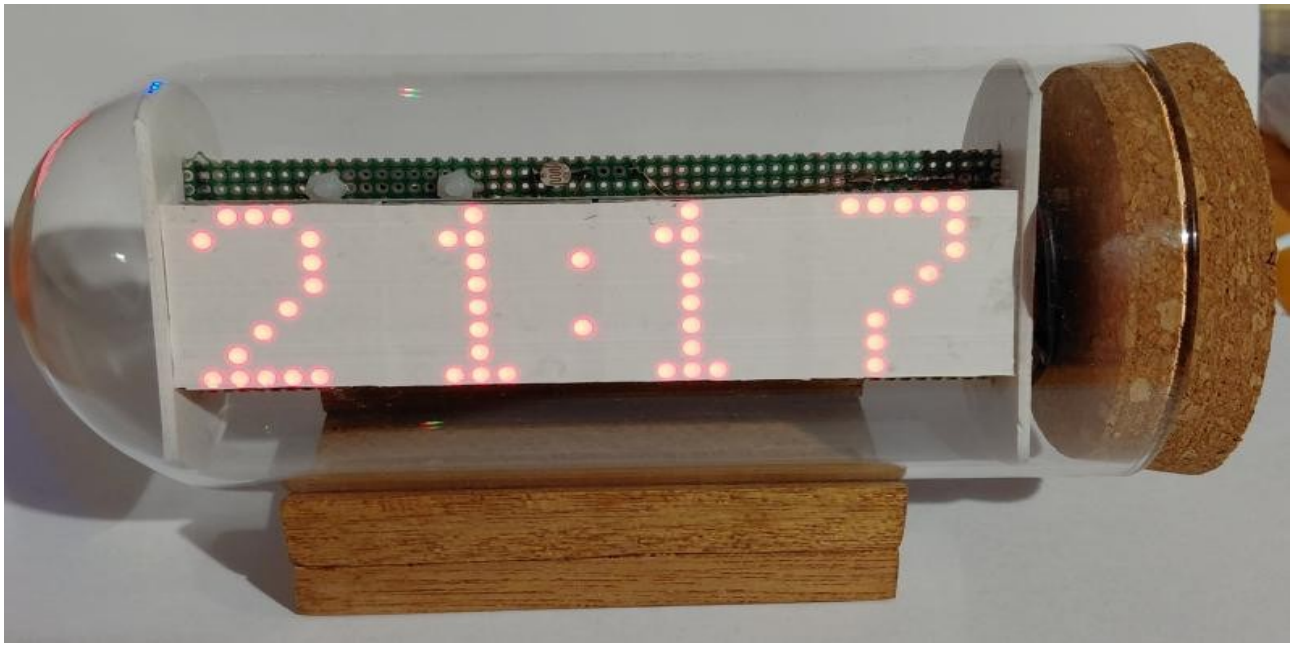
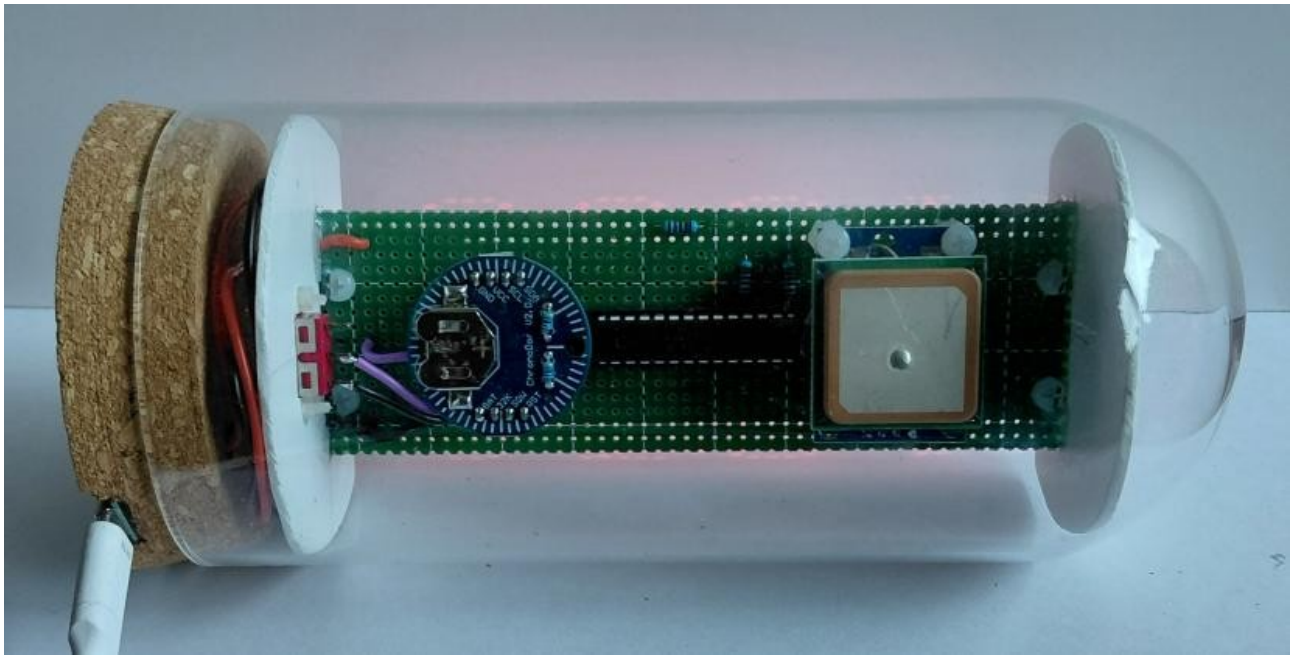
GPS Clock





GPS-synchronized-clock

Simple clock that always shows the correct time. GPS reception required.

Selection between summer time and winter time must be done manually.

Only a few components and easy to build even on a breadboard

Built around an ATMEGA328P chip or board

To fit the glass dome, use an Arduino Mini Pro 5V version

or

ATMEGA328P chip supply voltage 5V

The LED matrix is not 3.3V compatible.

When using the ATMEGA328P chip, use the following settings:

Bootloader: "No bootloader"

Clock: "Internal 8MHz"

No impact on your finances

Ideal for Arduino beginners

Serial communication

I2C communication

SPI communication

Analog input

Digital input

Interrupt subroutine

Use of a 2-dimensional array

Beautiful end result

Specifications

The clock synchronizes with the GPS receiver every hour (if satellite reception is available). Always the correct time.

Line 80 van GPS_klok.ino

```
#define UTC_OFFSET      1
```

Enter your local UTC_OFFSET here

Summer/winter time can be easily selected with a switch.

Automatic display intensity based on ambient light.

Easy to install and inexpensive.

Parts

1x Arduino bord met ATMEGA328P
of
1x ATMEGA328P

1x DS3231SN ChronoDot V2.0 + 2x R4K7 >> R1/R2
https://nl.aliexpress.com/item/1005009332338476.html?spm=a2g0o.productlist.main.2.75333802dqmLMH&algo_pvid=2c384a74-2384-4a96-950e-c35de5cb4fa8&algo_exp_id=2c384a74-2384-4a96-950e-c35de5cb4fa8-1&pdp_ext_f=%7B%22order%22%3A%225%22%2C%22eval%22%3A%221%22%7D&pdp_npi=4%40dis%21EUR%214.69%212.34%21%21%2138.51%2119.25%21%40211b6c19175363709046583363432%2112000048781236369%21sea%21BE%21924161374%21X&curPageLogUid=JFnu30FcKDPL&utparam-url=scene%3Asearch%7Cquery_from%3A

1 x CR1225 voor ChronoDot V2.0
https://www.netwerkkabelshop.nl/camelion-cr1225-bp5-lithium-knoopcel-batterij?sqr=cr1225

1x NEO-7M met antenne
https://nl.aliexpress.com/item/1005007175919889.html?spm=a2g0o.productlist.main.3.3e5e16b5VFbpEV&algo_pvid=adbeae3c-4e04-4cfa-bd0f-96d03d9617db&algo_exp_id=adbeae3c-4e04-4cfa-bd0f-96d03d9617db-2&pdp_ext_f=%7B%22order%22%3A%222038%22%2C%22eval%22%3A%221%22%7D&pdp_npi=4%40dis%21EUR%211.34%211.34%21%21%2111.04%2111.04%21%4021039a5b17536374796012318ee9d1%2112000039706177745%21sea%21BE%21924161374%21X&curPageLogUid=BAHXqFwy2k1M&utparam-url=scene%3Asearch%7Cquery_from%3A

1x MAX7219 Dot Matrix module
https://nl.aliexpress.com/item/1005005855156717.html?gps-id=pcStoreLeaderboard&scm=1007.22922.271278.0&scm_id=1007.22922.271278.0&scm-url=1007.22922.271278.0&pvid=3fe1b220-b1d7-4e2f-b5e3-d1e34e24bb32&_t=gps-id%3ApcStoreLeaderboard%2Cscm-url%3A1007.22922.271278.0%2Cpvid%3A3fe1b220-b1d7-4e2f-b5e3-d1e34e24bb32%2Ctpp_buckets%3A668%232846%238114%231999&pdp_ext_f=%7B%22order%22%3A%22870%22%2C%22eval%22%3A%221%22%2C%22sceneId%22%3A%2212922%22%7D&pdp_npi=4%40dis%21EUR%211.81%211.81%21%21%212.08%212.08%21%40210390c917536376260361998e258a%2112000034586876016%21rec%21BE%21924161374%21XZ&spm=a2g0o.store_pc_home.smartLeaderboard_2003967183209.1005005855156717&gatewayAdapt=glo2nld

4x R10K

1x LDR
https://nl.aliexpress.com/item/1005007463254941.html?spm=a2g0o.productlist.main.5.6ae2fcecZH1UEF&algo_pvid=b9d35416-3c93-4f23-bfcd-35de0e45df83&algo_exp_id=b9d35416-3c93-4f23-bfcd-35de0e45df83-4&pdp_ext_f=%7B%22order%22%3A%2263%22%2C%22eval%22%3A%221%22%7D&pdp_npi=4%40dis%21EUR%213.44%212.15%21%21%2128.27%2117.70%21%40210384b217536377355288146ebdfc%2112000040858660182%21sea%21BE

%21924161374%21X&curPageLogUid=Sqlee3HwjHsM&utparam-url=scene%3Asearch%7Cquery_from%3A#nav-specification

1x ON/OFF schakelaar >> zomertid / winter tijd

1x glazen stolp 18cm x 8cm
https://nl.aliexpress.com/item/1005003248974462.html?spm=a2g0o.productlist.main.2.7b426oPW6oPWpP&algo_pvid=2d75ec80-ec9f-4ddf-8adc-22a1df8dcbd1&algo_exp_id=2d75ec80-ec9f-4ddf-8adc-22a1df8dcbd1-1&pdp_ext_f=%7B%22order%22%3A%22174%22%2C%22eval%22%3A%221%22%7D&pdp_npi=4%40dis%21EUR%213.59%213.59%21%21%2129.48%2129.48%21%402103856417536380090745199eb900%212100004069918311 9%21sea%21BE%21924161374%21X&curPageLogUid=zXQY1aUUsCZe&utparam-url=scene%3Asearch%7Cquery_from%3A

Note regarding the glass dome:
I ordered three, and all three arrived in good condition.

1x Power Supply 5V.
MAX7219 Dot Matrix module is NIET 3.3V compatibel.

Connections

GPS

VCC	>>	+5V
GND	>>	GND
RX	>>	3
TX	>>	4

DS3231SN

VCC	>>	+5V
GND	>>	GND
SDA	>>	SDA (18 / A4)
SCL	>>	SCL (19 / A5)

+5V ----<R10K>-------- 2 (INT0)
|
SQW

PC board ChronoDot V2.0

R1	>>	4K7
R2	>>	4K7

DOT MATRIX DISPLAY

VCC	>>	+5V
GND	>>	GND
CLK	>>	13
CS	>>	10
DIN	>>	11

SWITCH ZOMER / WINTER

GND ----| |---- 14 (A0)
N.O.

Contact open	>>	summer time
Contact close	>>	winter time

LDR

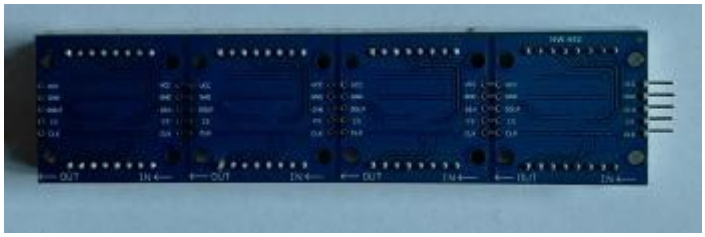
+5V ----<LDR>---------<R10K>---- GND
|
15 (A1)

Some building tips

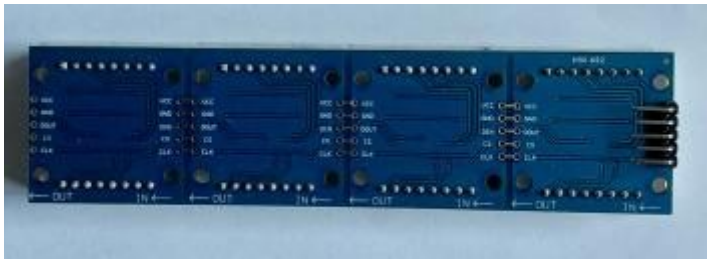
Dot matrix display

To save space, remove the installed pin header and install a new one, rotated 180°. See images below.

Origineel



Gedraaid



The plastic circles used to keep everything in place are made of

Foamalux Light PVC wit DIY 2mm

Available in Belgium at
Gamma
Brico

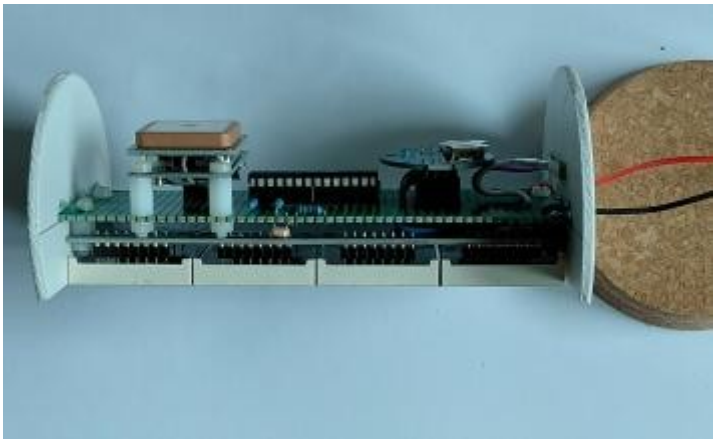
Plaat 0.5m x 1m x 2mm

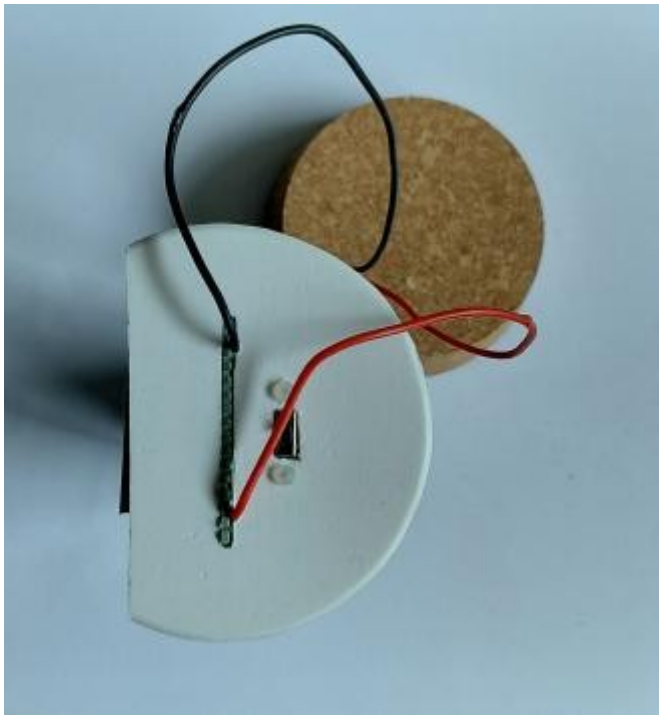
Linker cirkel	diameter	72mm
Rechter cirkel	diameter	75mm

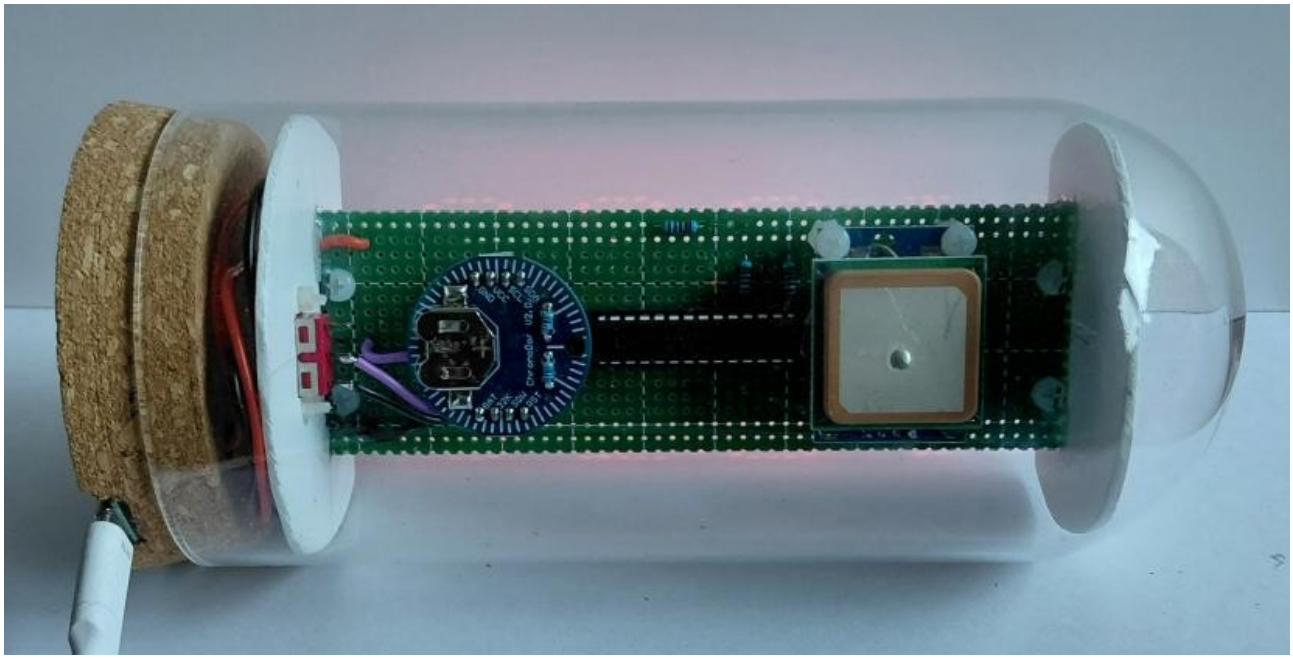
This can easily be cut with scissors.

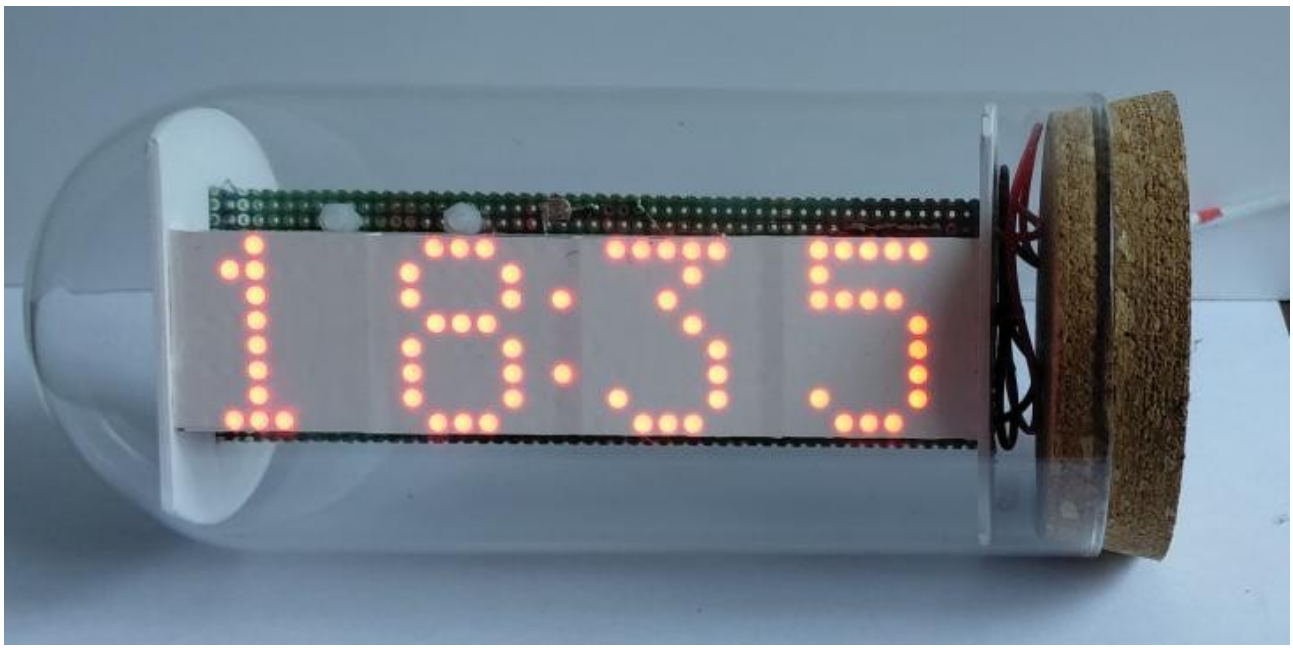
ChronoDot V2.0
Place 4K7 resistors in positions R1 and R2

Some pictures of everything together








18:35

For program see:

https://github.com/thieu-b55/GPS-synchronized-clock

That's it,
greetings and have fun building,

thieu-b55
augustus 2025