DISSERTATION

Cool Science

ausgeführt am Atominstitut

der Technische Universität Wien
Fakultät für Physik

unter der Anleitung von
Univ.Prof. Dipl.-Ing. Dr.techn. Gorge Hammond
und
Projektass. Dr.rer.nat Rodney MacKay MSc.
Projektass. Dr.techn. Dr.techn. Dr.techn. Dipl.-Ing.
Samantha Carter

durch

Daniel Jackson

Matrikelnummer: 9-18-27-15-21-36

Stadionallee 2
1020 Wien

Wien, am 27.03.2020

"The Setesh guard's nose drips."
Teal'c

Contents

1 Electron beam setup **1**
1.1 Charatarization of a working CRT 1
1.2 High Voltage Power Supply HVPS 3
1.3 CRT wiring 3
1.4 Heater 4

Todo list **5**

References **6**

1 Electron beam setup

1.1 Charatarization of a working CRT

HAMEG HM507 oscilloscopes were used for testing purposes. These contain a D14-363GY/123[1] CRT hereinafter abbreviated as 'D14', 'tube', or 'CRT'. Although the HM507 has only a bandwidth of 0 MHz to 50 MHz, which is not sufficient for the hyperfine splitting frequency of 461.7 MHz of ^{39}K, it was used nevertheless because of its simple construction and availability. A schematic view of the device is shown in fig. 1.1 with the back pin arrangement in fig. 1.2.

The voltages and currents of the necessary pins to drive the CRT were measured using a 2.5 kV probe with an attenuation ratio of and are summarized in table 1.1. It was not possible to measure pin g3 directly. Therefore a HVPS (section 1.2) was used to set a voltage and the beam diameter was observed. The best focus was achieved with a voltage of -1.813×10^3 V .

http://www.to

model number

1:100 or 100:1

current?

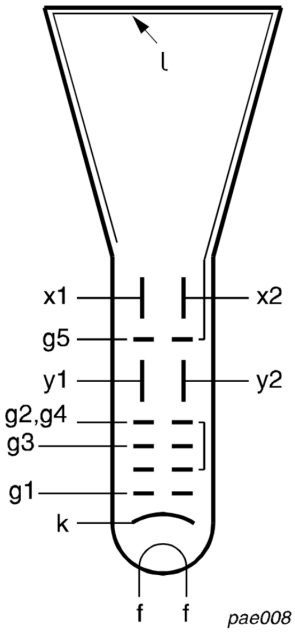

Figure 1.1: Electrode configuration (from [1])

how to cite figure

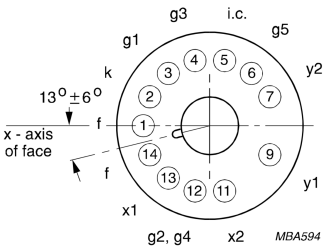

Figure 1.2: Pin arrangement, bottom view (from [1])

how to cite figure

Table 1.1: D14-363GY/123 CRT pin measurements

number	pin	voltage/V	current/µA
1	f	-1.99×10^3	86.6×10^3
2	k	−2.00	−7.6
3	g1	−2.03	0
4	g3	-1.813×10^3	-
5	i.c.	71.7	0.1
6	g5	64.0	7.2
12	g2, g4	71.0	0
14	f	-1.97×10^3	-86.2×10^3

1.2 High Voltage Power Supply HVPS

To produce high DC voltages to drive the CRT, 4 HCP 14-6500[2] power supplies were used. They were named 'HVPS 1' to 'HVPS 4' and can provide up to ±6.5 kV DC and 2 mA. To connect the output to the CRT pins, BNC cables were refitted with a save high voltage (SHV) connector on one side while on the other end the BNC connector was kept. The output was measured with a 6 kV probe and the ripple was determined to be between 116 mV and 204 mV. The breakdown voltages is around 3 kV.

find exact valu
big yellow prob

somewhere 2-4
exact value

1.3 CRT wiring

A schematic of the supplied power is shown in fig. 1.3. A small AC or DC voltage is necessary to drive the heater filament. This part of the setup is explained in section 1.4.

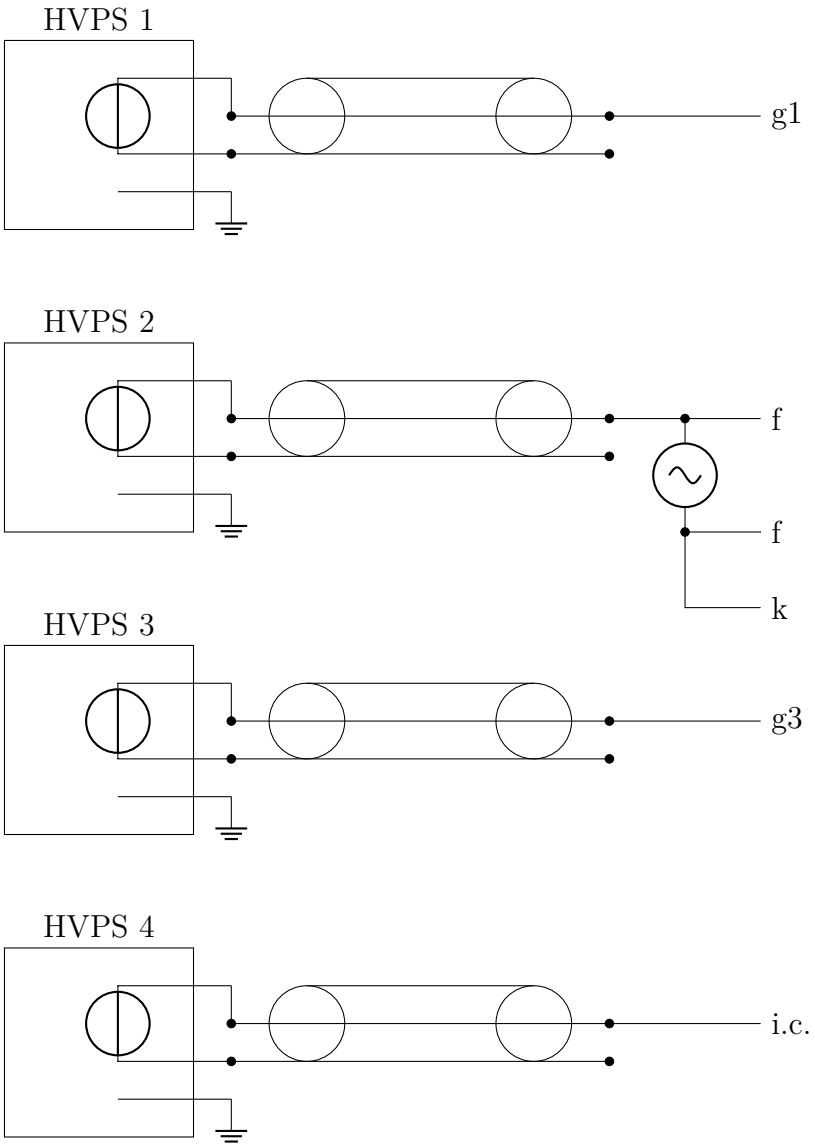

Figure 1.3: Schematics of supplying CRT pins with power.

1.4 Heater

Heater Wie sieht der Innen aus? CRT Mount ??

Todo list

- http://www.tobiastiecke.nl/archive/PotassiumProperties.pdf 1
- model number 1
- 1:100 or 100:1 1
- current? 1
- how to cite figure 2
- how to cite figure 2
- find exact value of big yellow probe 3
- somewhere 2-4, find exact value 3

References

[1] Frank Philipse. *D14363GY123*. URL: https://frank.pocnet.net/sheets/186/d/D14363GY123.pdf (visited on 03/10/2020).

[2] FuG Elektronik GmbH. *HVPS Series HCP*. URL: https://www.fug-elektronik.de/wp-content/uploads/pdf/Datasheets/EN/HCP_data_sheet.pdf (visited on 03/23/2020).