



TECHNISCHE
UNIVERSITÄT
WIEN

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 25.03.2020

“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
	Todo list	4
	References	5

1 Electron beam setup

chapter about electron beam setup

Charakterisierung der intakten CRT -> Frank

Charakterisierung HVPS -> Frank

Skizze inkl. externe Power Supplies, wie wird die CRT betrieben?

Heater Wie sieht der Innen aus? CRT Mount ??

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.

<http://www.to>

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 $-1.813 \times 10^3 \text{ V}$.

model number

1:100 or 100:1

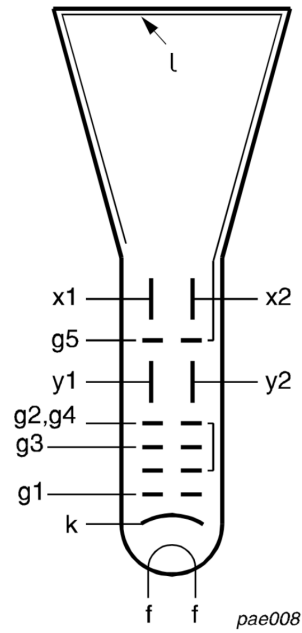


Figure 1.1: Electrode configuration (from [tubedata])

how to cite figure

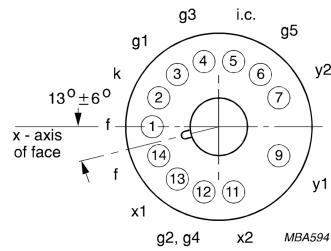


Figure 1.2: Pin arrangement, bottom view (from [tubedata])

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 $\pm 6.5 \text{ kV}$ 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 value
big yellow prob

somewhere 2-4,
exact value

Todo list

1

<div> <div></div> <div> http://www.tobiastiecke.nl/archive/PotassiumProperties.pdf </div> </div>	<div> <div>1</div> <div>2</div> </div>
<div> <div></div> <div>model number</div> </div>	<div> <div>1</div> <div>3</div> </div>
<div> <div></div> <div>1:100 or 100:1</div> </div>	<div> <div>1</div> <div>4</div> </div>
<div> <div></div> <div>how to cite figure</div> </div>	<div> <div>2</div> <div>5</div> </div>
<div> <div></div> <div>how to cite figure</div> </div>	<div> <div>2</div> <div>6</div> </div>
<div> <div></div> <div>find exact value of big yellow probe</div> </div>	<div> <div>3</div> <div>7</div> </div>
<div> <div>1</div> <div> <div></div> <div>somewhere 2-4, find exact value</div> </div> </div>	<div> <div>3</div> </div>

2 References

- 3 [1] Frank Philipse. *D14363GY123*. URL: <https://frank.pocnet.net/sheets/186/d/D14363GY123.pdf> (visited on 03/10/2020).
4
- 5 [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
6 03/23/2020).

39