

## Replacement of a picture tube

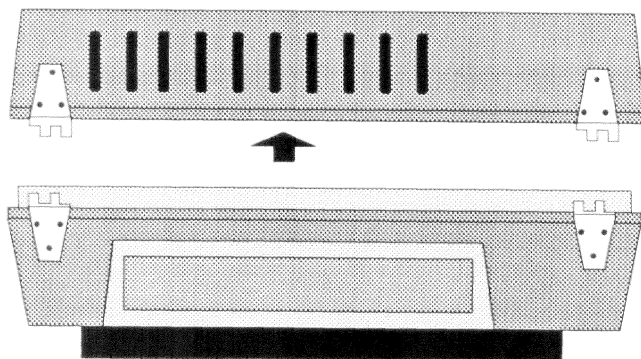
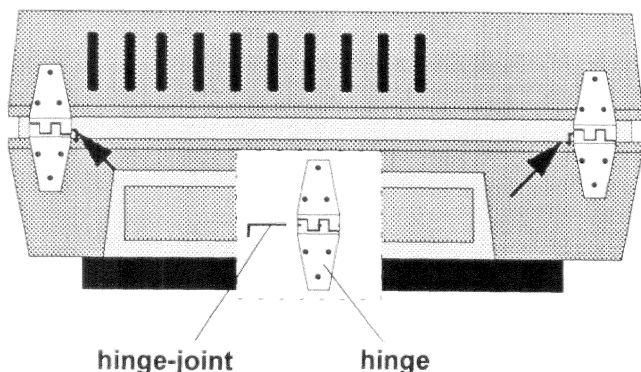
### WARNING: CRT HANDLING

The picture tube encloses a high vacuum and care must be taken not to bump or to scratch the picture tube as this may cause the tube to implode resulting in personal injury and property damage. Shatterproof goggles must always be worn by individuals while handling the CRT or installing it in the projector. Do not handle the CRT by the neck.

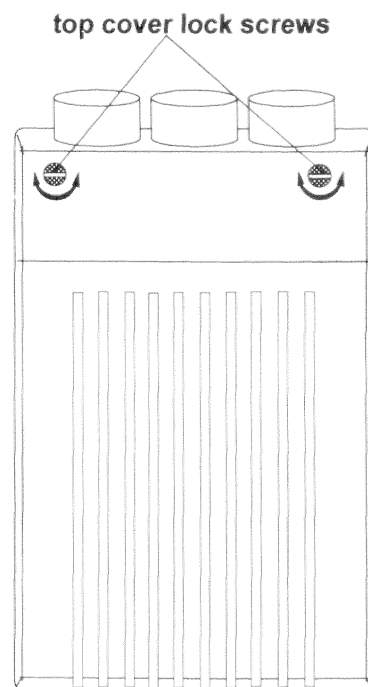
#### I. Removing and disassembling the defective picture tube.

##### 1. Removing top cover of the projector

- Turn both cover lock screws with a screwdriver or a coin a half turn counter clockwise.
- Pull out the hinge-joints of the two hinges.
- Lift up the top cover to remove.



**Fig.2**



**Fig.1**

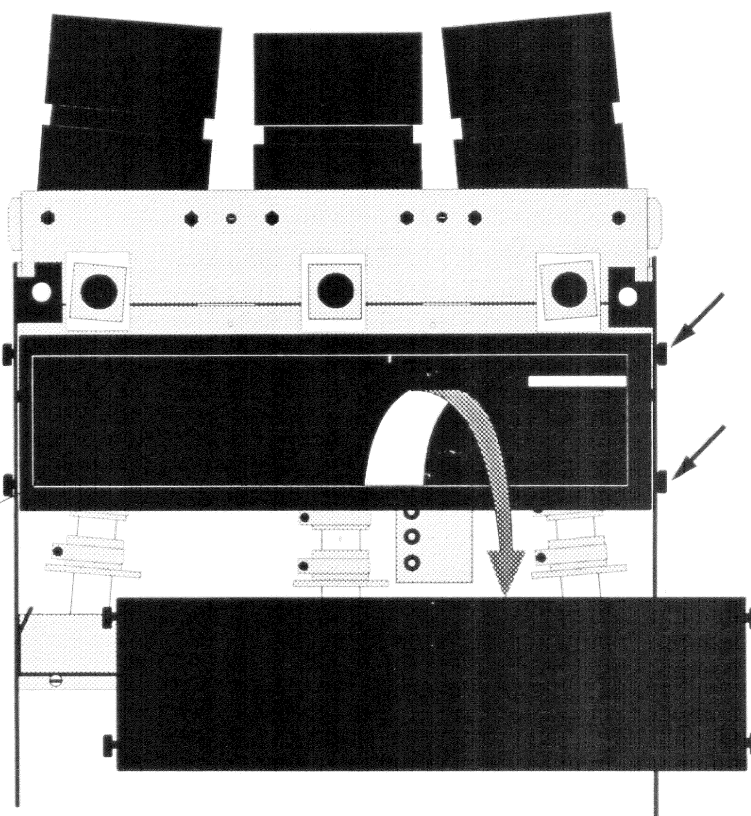
## 2. Removing Controller module

- Loosen the retaining screws on both sides of the Controller module.
- Rotate the Controller module towards the backside of the projector and slide the module out the metallic frame.
- Put the module on the module rack.

retaining  
screws

Controller  
module

**Fig.3**



## 3. Removing upper metallic plate, securing the three CRT-lens blocs

- Remove the 16 screws, holding upper plate to main frame.
- Remove the 6 bolts, holding CRT-lens blocs to upper plate.
- Remove upper metallic plate.

## 4. EHT lead disconnection

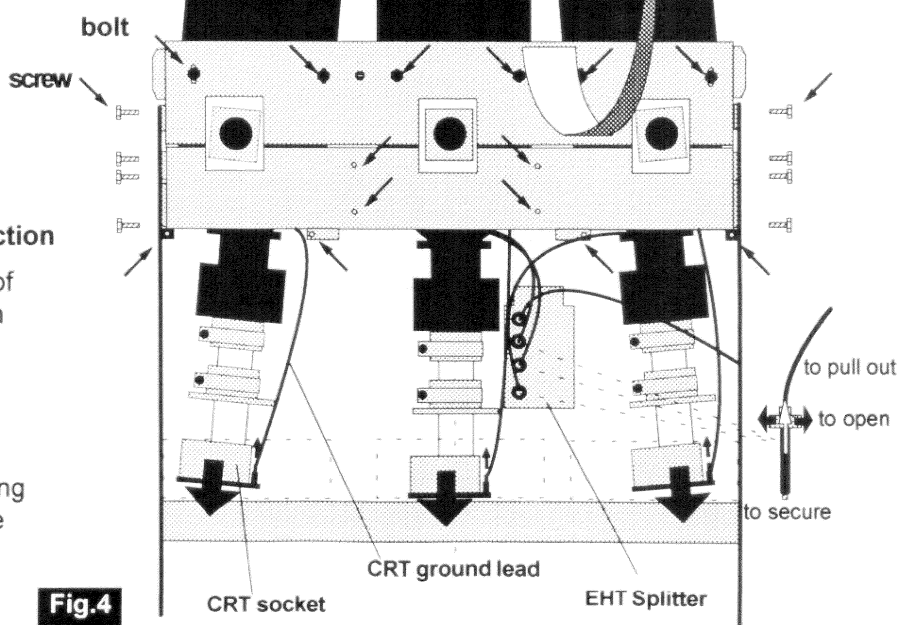
Pull out the EHT lead of the defective picture tube from the EHT splitter.

## 5. CRT ground lead disconnection

Pull out the ground lead plug of the defective picture tube from the its CRT module.

## 6. CRT module removal

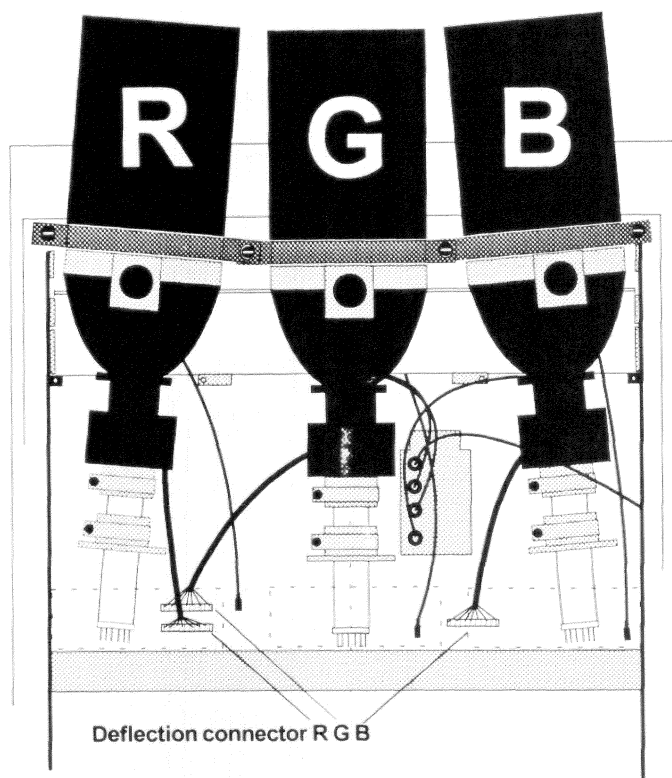
Disconnect the socket of the defective picture tube by pulling back the CRT socket off of the end of the CRT.



**Fig.4**

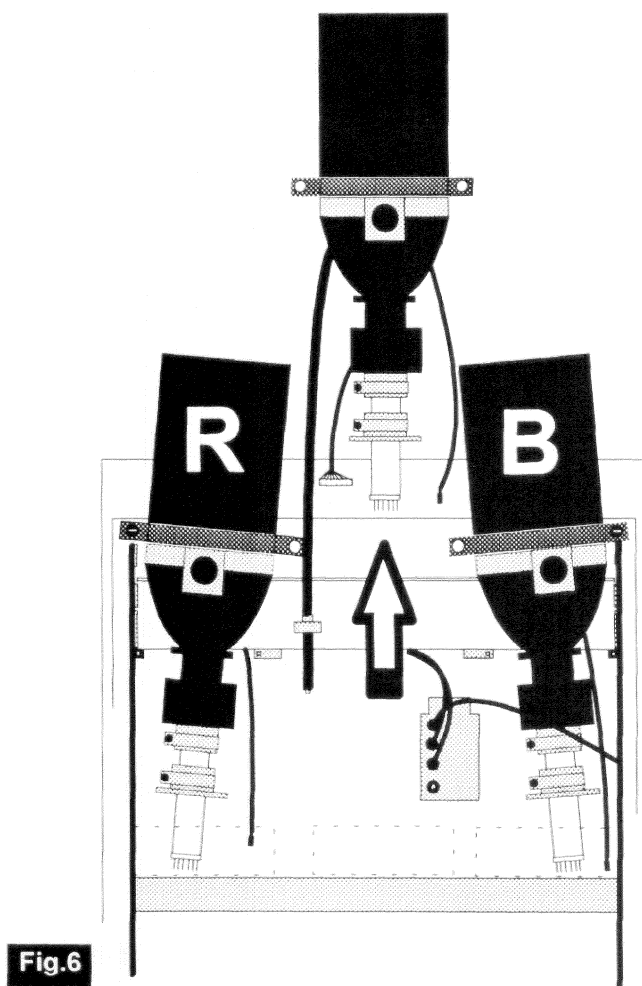
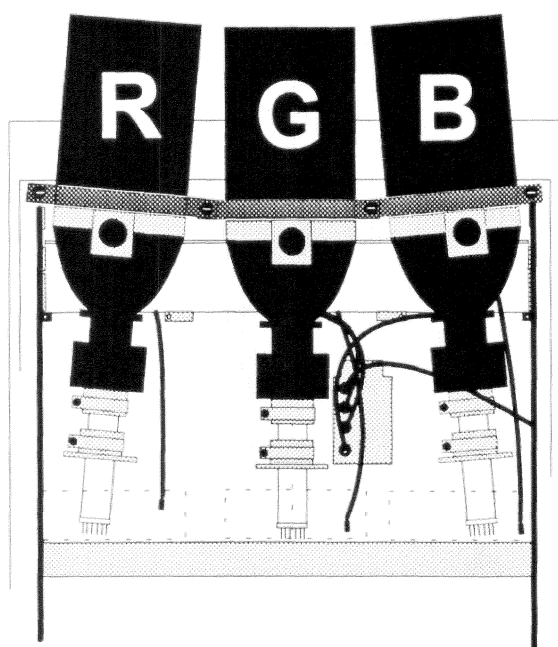
## 7. Disconnecting the deflection connector

Pull out the deflection connector of the defective picture tube from main frame



## 8. Removing defective CRT

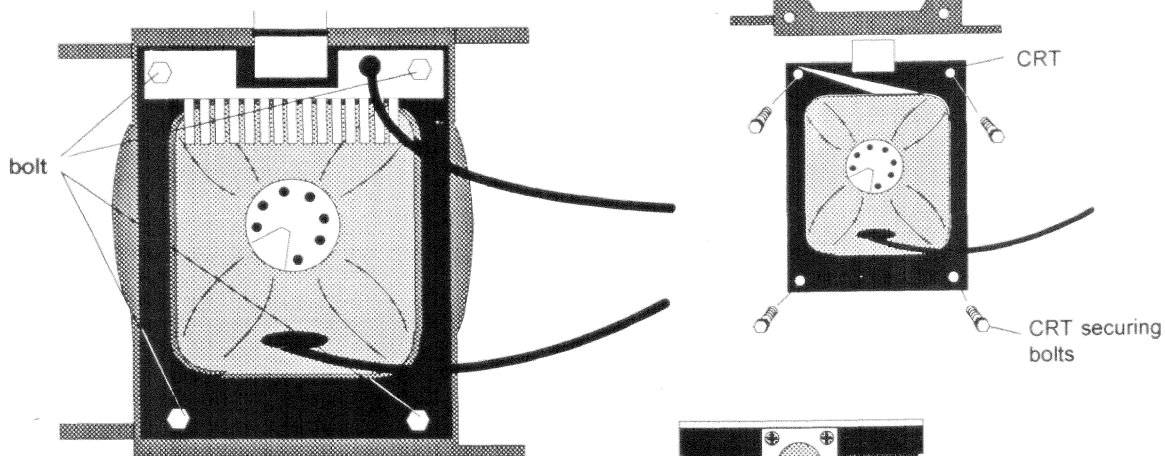
- Turn out the rod on both sides of the defective picture tube.
- Take out the complete unit, lens-mounting bloc-picture tube.



## 8. Disassembling the CRT unit

### Removing the CRT from its support

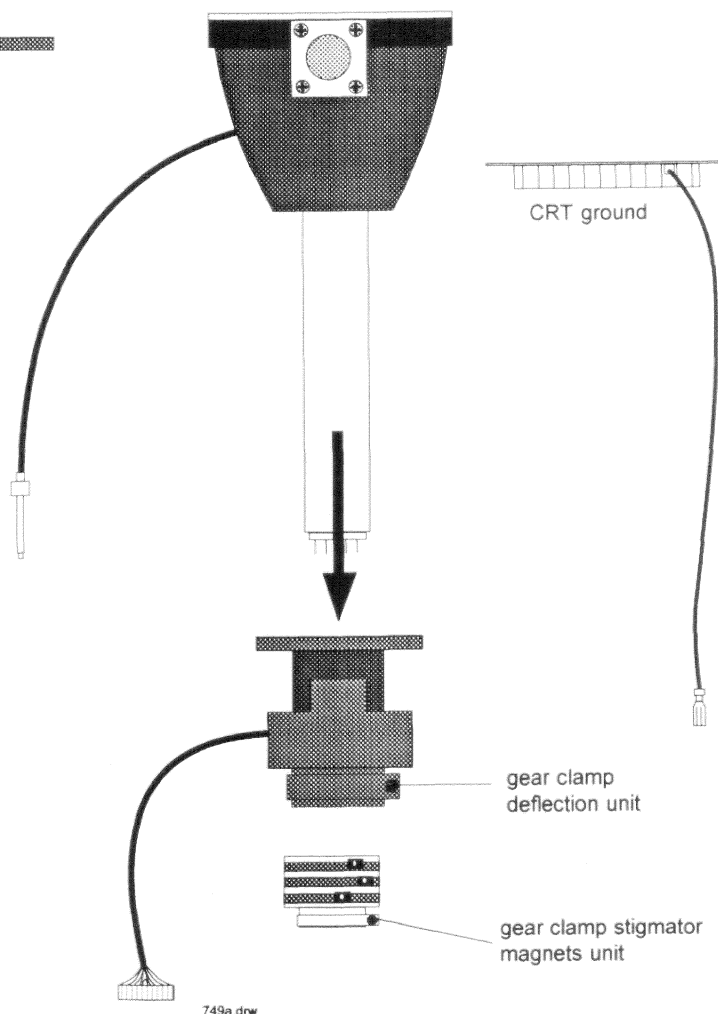
- Remove the four bolts, holding the picture tube to the support.
- Remove the picture tube from its support.



**Fig.7**

### Removing the deflection unit and the stigmator

- Loosen the gear clamp of the stigmator magnets unit and slide the unit off of the end of the CRT.
- Loosen the gear clamp of the deflection unit and slide the unit off of the end of the CRT.



**Fig.8**

## II. Placement of the new picture tube.

### 1. Assembling the picture tube unit (fig.8)

Remount the deflection (fully against the picture tube) and the stigmator unit on the picture tube neck and secure the respective gear clamp.

### 2. Mounting the picture tube in its support (fig 7)

- Place the picture tube in its support.
- Put the CRT ground unit on its place.
- Secure the assembly with the four bolts.

### 3. Mounting the lens-picture tube unit in the main frame (fig 6)

Place the unit in the main frame and secure the position with the two rods.

### 4. Remounting the upper metallic plate (fig 4)

- Place the plate on its place and secure with the 16 screws.
- Re-insert the bolts, holding the support blocks to upper metallic plate.

### 5. Reinstalling the electrical connections (fig 4-5)

- Remount the CRT module on the picture tube.
- Reinstall the CRT ground connection.
- Reinstall the deflection connection.
- Reinstall the EHT connection.

### 6. Put the controller module on its place (fig 3)

### 7. Proceed to the alignment of the replaced picture tube

For the Red and the Blue picture tube, start with the adjustment of the projection angle. (refer to the installation manual of the projector)

### III. Picture tube alignment

#### Introduction

Before starting the alignment of the new picture tube, the projector must warm up for at least 15 minutes at a medium brightness and contrast.

If a set of three tubes must be replaced, it is advisable to start with the replacement of two tubes first, the red and blue, and using the green as a reference.

Proceed then with the replacement of the green tube, using now one of the other colours tubes as a reference.

#### A. Replacement of a complete set of three tubes

Apply an external crosshatch pattern at 15 kHz or use the internal crosshatch.

Align the optical and electrical focus of the tube.

Rotate the deflection yoke until the horizontal lines of the crosshatch are levelled on the screen.

Tighten now carefully the screw of the gear clamp of the deflection yoke.

Centre the picture on the CRT faceplate (refer to installation manual).

Note: alignment of the stigmators will change again its position, if so, realign raster centring.

#### B. Replacement of one or two tubes

In such case, the remaining tube can be used as a reference for centring and positioning of the new tubes.

#### C. Adjustments applicable to the three tubes

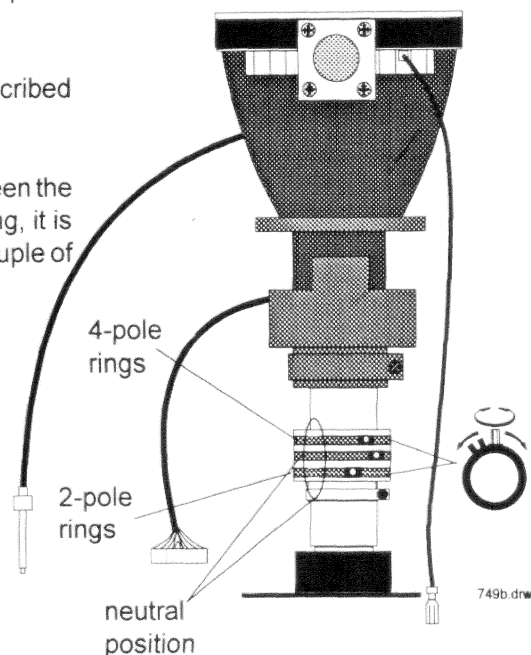
##### Preparation

- proceed to quick optical lens focusing (refer to the installation manual of the projector).
- proceed to random access adjustment mode and selects 'Focusing'.  
Adjust for the replaced picture tube the midpoint focus at 50 and the top/bottom/left/right at 0.
- adjust the 2-pole and 4-pole magnetic rings on the CRT neck in their neutral position (see illustration on next page).
- select a source that will generate a field of small dots and crosshairs.

##### Adjustment of the stigmators (4-pole magnet ring closest to the deflection yoke)

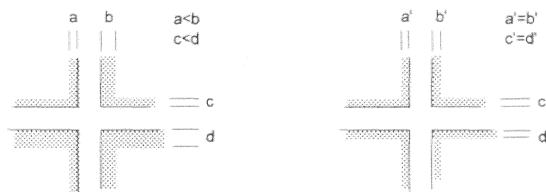
- lower the brightness and increase the contrast.
- overdrive the midpoint focus by adjusting the right arrow key of the RCU for the respective CRT.
- adjust the four pole rings until the defocused dots are circular.

- realign the electrical and optical focus.
- re-position the raster as described earlier.
- due to mutual influence between the stigmators, focus and centring, it is advised to repeat above a couple of times.



#### Adjustment of the 2-pole magnets (the rings closest to the CRT socket)

- underdrive the electronic focus by adjusting the left arrow key of the RCU for the respective CRT.
- adjust the 2-pole magnets rings by rotating one or both up to a point where the 'shading' of both sides of the vertical and horizontal lines is equal (see figure).



- realign the electrical and optical focus.
- repeat the alignment of the stigmators if necessary, as both adjustments (stigmator and 2-pole magnets) influence each other.

#### Re-alignment of the image width coil(s)

- decrease the contrast and increase the brightness to reveal the background raster.
- refer to sheet 'Deflection switching module 76 2121' in this manual for the alignment of the image width coils.

Note:

When only one tube has been replaced, you can use the image width of one of the other tubes as a reference, and obviously limit the adjustment to the core of the corresponding replaced tube.

