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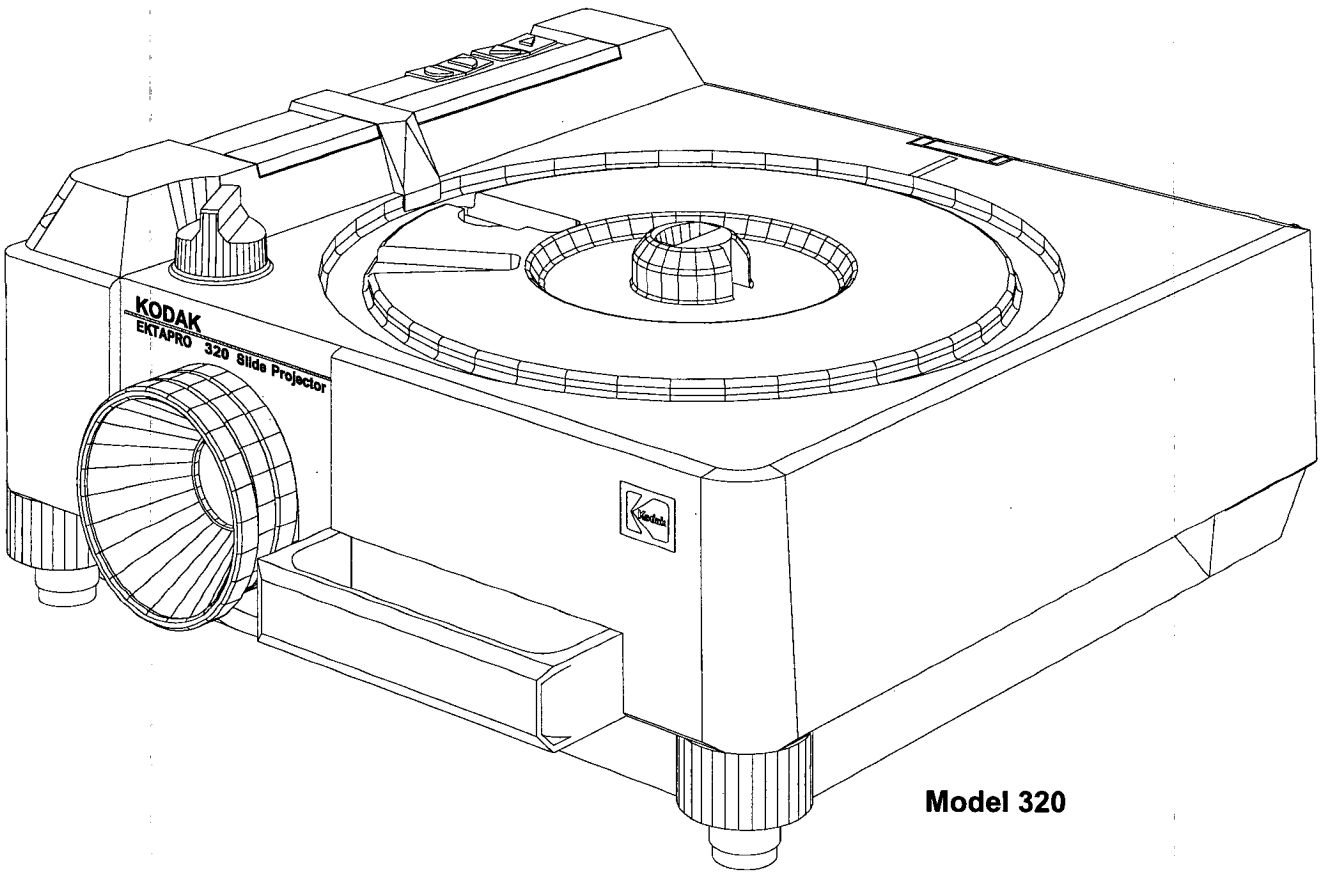
07/97

SERVICE MANUAL

for the

KODAK EKTAPRO Slide Projector

Model 320



Model 320

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ELECTROSTATIC DISCHARGE

CAUTION

This equipment includes parts and assemblies sensitive to damage from electrostatic discharge. Use caution to prevent damage during all service procedures.

Overview

Electrostatic discharge (ESD) is a primary source of

- product downtime
- lost productivity
- costly repair.

While we cannot feel a static charge of less than 3,500 volts, as few as 30 volts can damage or destroy essential components in the electronic equipment. As technology advances, these components will be even more vulnerable to ESD destruction.

Therefore, to maintain and increase productivity and profitability, you must observe ESD guidelines.

Effective ESD control requires the following things.

Awareness

Everyone in your organization should be aware of ESD because partial ESD control is no ESD control at all. Everyone needs to remember that:

- ESD is a primary source of equipment failures and intermittent malfunctions.
- ESD affects productivity and profitability.
- ESD can be controlled.

Action

Everyone from senior management to the evening security crew, must observe ESD guidelines.

- If you repair and maintain electronic equipment, always wear grounding straps and work at ESD protected sites.
- If you work around electronic equipment, keep static generators like plastic trash bags away from sensitive components.
- Observe ESD guidelines everyday. (See the following sections for special tips).
- Remember, effective ESD control is everyone's responsibility:

Every Day

1. Keep trash away from static-sensitive equipment. Plastic materials, such as trash can liners and plastic foam cups, generate the static electricity that damages or destroys electronic components.

2. Look at the label. Static-sensitive components are marked with bright graphic labels. Follow the label directions.

3. Spray the carpet. ESD that is generated when you walk over carpet is a major cause of component destruction. In some cases, especially in low-humidity environments, you may need to periodically spray carpets with an anti-static spray that is available at local stores.

During Maintenance and Repair

1. Wear a grounding strap when you work with static-sensitive components. Always make certain that the clip is attached to a properly grounded, unpainted surface.

2. Use a portable grounding mat if you cannot repair components at an ESD-protected workstation. (Kodak's Customer Equipment Services Division can help you in set up ESD-protected workstations.)

3. Use protective packaging when you transport components from one area to another. Transparent antistatic bags, available from a variety of manufacturers, shield the components from further damage.

1. GENERAL INFORMATION

Service Tools

Use the following tools to repair a KODAK EKTAPRO 320 Slide Projector:

TORX Screw Driversize 206
TORX Screw Driversize 210
TORX Screw Driversize 215 or TORX bits TL-3255
TORX Screw Driversize 220

Logic Probe	TTL/CMOS	
Digital Multimeter	Voltage	5 to 240 V AC 0 to 50 V DC
	Current	1 to 100 mA DC Accuracy: 1% 0,1 to 2 A DC 0,1 to 5 A AC The multimeter should have RMS capability
	Accuracy	1%
Fixture Tool	622 0454	
Ejector Microcontroller	TL 4417	

Safety Precaution

1. Do not operate or repair the projector without proper accessories. Add all COVERS before use to prevent mechanical hazards and electrical shock.

2. Before operating the projector, check the VOLTAGE SELECTOR. Make sure that the correct line voltage is selected.

3. Do not use a damaged POWER CORD. The damaged CORD can cause malfunctions and current leakage or electrical shock.

4. If there is any abnormal noise, smell or smoke during operation, deenergize the projector immediately and contact authorized personal for support.

5. Do not operate the projector in unsafe locations such as outdoors or in wet places. Do not allow liquids, gaseous or solid-state materials to enter the projector.

6. When doing electrical measurements, use an isolation transformer or a leakage current detector in the power line to avoid an electrical shock.

7. Use only original parts from the Parts List to repair the projector (e.g. Fuses).

8. Make sure that the requirements of UL 122 - Splices and Connection - paragraph 13.10 and EN 60 950, section 4.39 are observed. When replacing AC primary components, such as wires, sockets or capacitors , wrap the ends of the wire completely around the terminal before soldering.

Safety Check

NOTE

Check the area around the repaired location.

Make sure that parts and wires have been returned to the correct positions.

Completely assemble the projector before doing an electrical safety test.

The safety tests:

Ground Continuity Test
Insulation Resistance Test
Equivalent Leakage Current Test

Use a safety tester that measures all 3 tests at one time.
Such a test device would be a Mini Tester 0701 N (Manufacturer:Gossen, Germany) or an equivalent device.

Details for safety standards can be found in the regulations:

IEC 380, 435, 950,
UL 478, 1012.

Prerequisites for measurements:

- The projector is energized
- FUSE with VOLTAGE SELECTOR insert
- COVERS in place
- LAMP MODULE installed

Test values for Mini Tester 0701N

- Ground Continuity Test .....< 300 mOHM
- Insulation Resistance Test .....< = 0,5 OHM
- Equivalent Leakage Current .....< = 7 mA

2. INTRODUCTION

The Kodak EKTAPRO Model 320 Slide Projector is a new projector that uses the latest mechanical and electronic technology.

The Projector is designed for standalone applications with 80 SLIDE TRAY´s and a SINGLE LAMP MODULE (EXTRA BRIGHT).

A 300W lamp with 70h lifetime is delivered as standard.

The projector is equipped with a 1-chip MICROCONTROLLER, STEPPER MOTORS, digital and analog circuits. All functions and displays are controlled by the MICROCONTROLLER software.

The modular design is very similar to the current EKTAPRO Models with the exception of the CENTER HUB, SLIDE TRAY MOTOR and the CODER DISC which is eliminated.

A gearwheel and a light barrier are now responsible to generate pulses for the MICROCONTROLLER to control the STEPPER MOTOR of the SLIDE TRAY.

A modified FRAME MECHANISM without the RELEASE LEVER is mounted in the new Model 320.

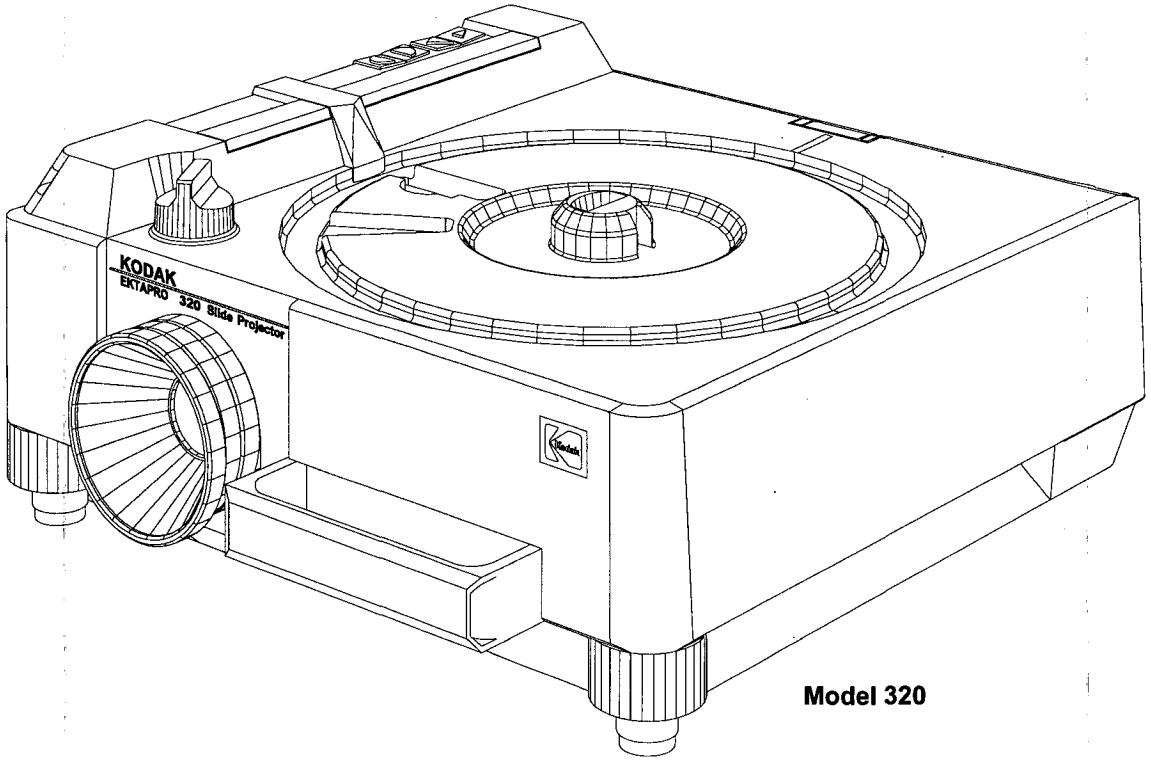
The secondary fuses and the POWER REGULATION BOARD have changed place and are now to find on the MASTER BOARD which is equipped with a new 40 pin DIL MICROCONTROLLER.

The KEYBOARD PCB an the TRAY MOTION PCB are new designed. All PCB´s of the new models are not compatible to the other EKTAPRO models.

Compliance with international safety regulations has been approved.

Projector Model

EKTAPRO Model 320



Model 320

figure 2-1

Features and Functions:

Line voltages	:	120/220/230/240V can be selected by an external VOLTAGE SELECTOR
Line frequency	:	50/60 Hz
Power consumption	:	370 W
Lamp Module single lamp	:	70h FHS 82V/300 W
Slide change time	:	approx. 1s (single step)
m	:	approx. up to 5s (random access)
Focus	:	Manual and electrically
Slide Tray capability	:	80 slides

EKTAPRO Model 320

Adjustable Tray Motion	:	Tool PN 622 0454 has to be used.
Manual elevator mechanism	:	Two height adjustment feet are attached on the front side of the Projector
Remote SOCKET	:	8 pin mini DIN
Slide change buttons	.	A single step will happen after pressing the "Forward" or the "Reverse" button less than 1s. Multiple steps will be done by pressing the "Forward" button more than 1s continuously. A run to the "Zero" position will immediately be done after press and hold the "Reverse" button until the Slide Tray is in "Zero" position

NEW

In case of using a IR Remote Control single steps are possible independent how long the button is pressed.
By press and hold the "Reverse button" on the IR Remote Control fast zeroing is possible.

NEW on Model 320

The SINGLE LAMP MODULE (EXTRA BRIGHT) has no Heat Absorbing Glass installed. Due to the new mirror the light output is increased up to 30%.

Overview

FUNCTIONS/ACCESSORY	320	
SINGLE LAMP MODULE (EXTRA BRIGHT)	X	
AUTOFOCUS	-	
RANDOM ACCESS	X	
KEYBOARD CONTROLLED FOCUS FW/RV	X	
TWIN SOCKET	O	
CABLE REMOTE	O	
IR REMOTE SYSTEM RA	O	
IR REMOTE SYSTEM RA/LP	O	

X = Standard Feature O = Accessory - = not possible

Accessories

SINGLE LAMP MODULE

CAT No. 712 5958

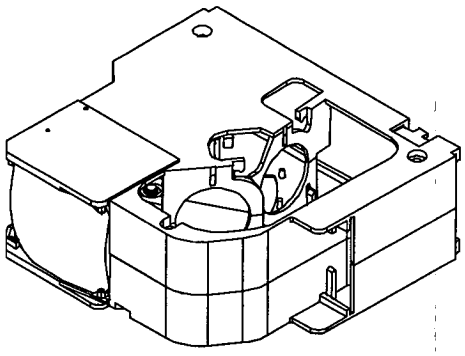


figure 2-2

CABLE REMOTE

CAT No. 712 1080

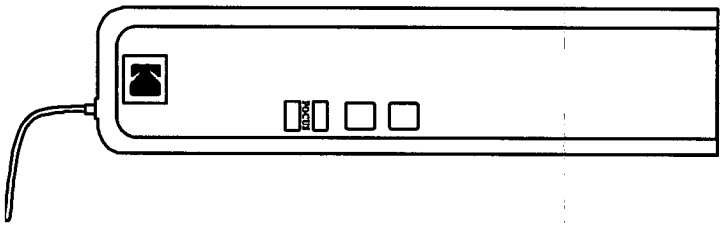


figure 2-3

HEAT ABSORBING GLASS with CLIP

(not installed in Model 320)
CAT No. 717 7140 (6mm thick)
CAT No. 717 7157 (3mm thick)
see NEWSLETTER #3/MAY/1996 page 5

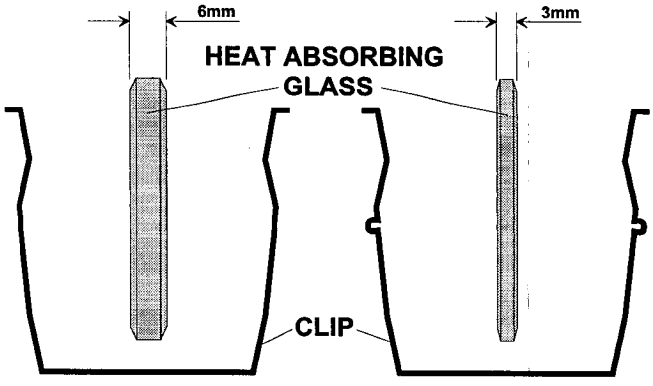


figure 2-4

CONDENSER KIT 4X4 (with CLIP)

CAT No. 714 4967

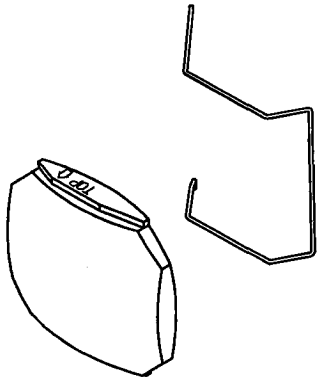


figure 2-5

IR REMOTE System RA (with Random Access)

CAT No. 712 1072

complete with RECEIVER and TRANSMITTER

RECEIVER

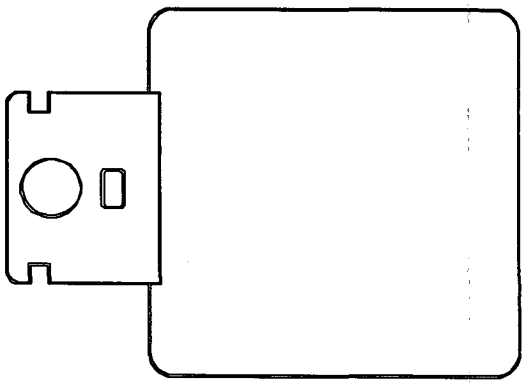


figure 2-6

TRANSMITTER

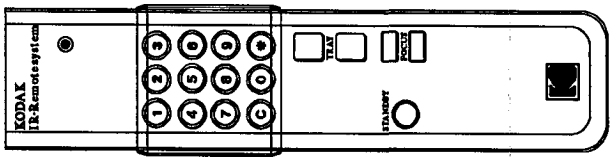


figure 2-7

IR REMOTE System RA/LP (Laser Pointer)

CAT No. 712 1064 **complete with RECEIVER**

TRANSMITTER

RECEIVER as use with IR REMOTE System RA.

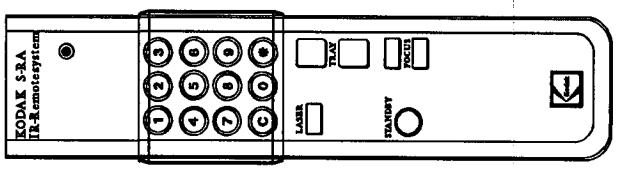


figure 2-8

LENS SUPPORT

CAT No. 715 1335

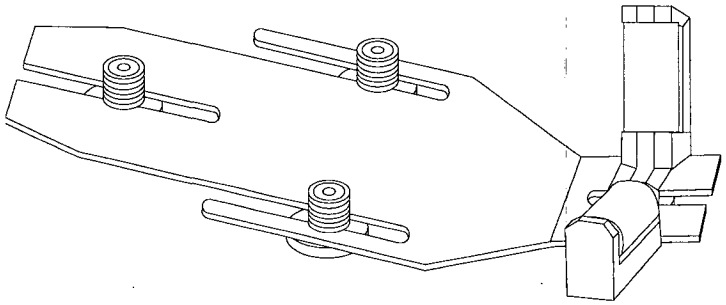
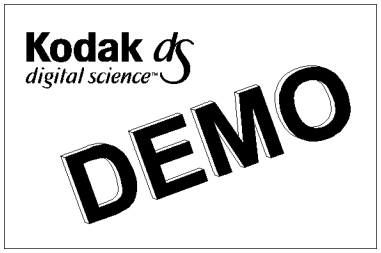


figure 2-9



see NEWSLETTER #3/MAY/1996 page 7

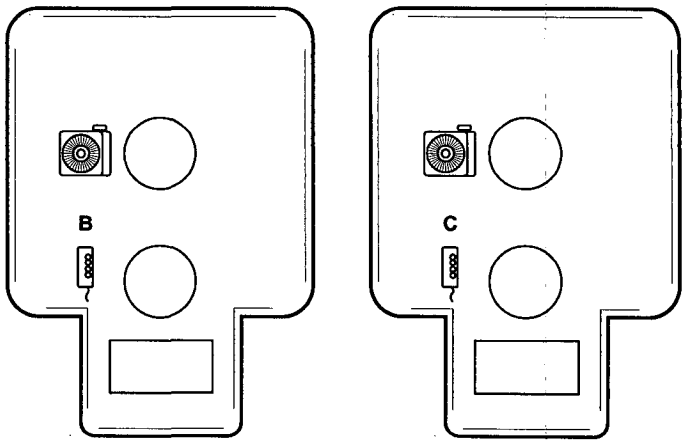


figure 2-10

Specification

Electrical Supply	:	120/220/230/240 V 50/60 Hz
Power Consumption	:	370 W
Dimensions	:	310 x 355 x 145 mm max. (l/w/h) with tray and lens (12.2 x 14 x 5.7 in)
Weight	:	8 500g (18.9 lb)
Slide size	:	24 x 36 mm (0.9 x 1.4 in)
Slide change time	:	approx. 1.2 s
Slide search time	:	approx. 5 s
Slide temperature	:	80°C (176°F) at ambient temperature of 23°C (74°F) with 35h LAMP 60°C (140°F) at ambient temperature of 23°C (74°F) with 70h LAMP 50°C (122°F) at ambient temperature of 23°C (74°F) with 200h LAMP
LAMP (standard)	:	FHS 82V/300W
Operating temperature	:	0°C to 30°C (32°F to 86°F)
Humidity	:	20 to 85% r.H.
Air consumption	:	approx. 700 l/min (20,000 cuft/min)
Approvals	:	VDE
Leveling	:	0° to 18° with internal elevation mechanism 20° max. allowed

LAMPS

Catalog No.	Description	Lifetime
145 2259	EXR 82V/300 W	life time about 35 hours
147 7678	FHS 82V/300 W	life time about 70 hours
145 2143	EXY 82V/250 W	life time about 200 hours

CONNECTORS

Remote SOCKET on Projector (MINI DIN (8pin):

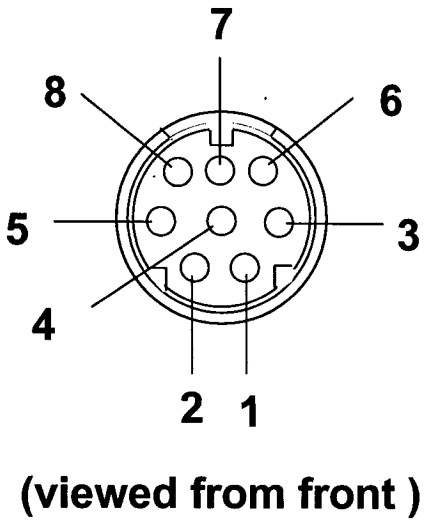


figure 2-11

PIN No.	Signal	NEW: Closer to GND with simple contacts
1	12 VDC	
2	GND	GND
3	Signal 1 (LSB)	
4	Signal 2	Focus
5	Signal 3	Focus
6	Signal 4	Slide Reverse
7	Signal 5 (MSB)	Slide Forward
8	Interrupt	Needs a short cut to GND

12 V DC =
average value between 7.2 and 14.5 V DC

The table above shows the pin (**PIN No.**) connections for CABLE and IR REMOTE CONTROL in column **Signal** and for a remote unit with mechanical closing contacts in column **Closer to GND**.

NOTE

A new feature of the EKTAPRO Model 320 is that the projector can be controlled by simple closing contacts. The schematic in figure 2-12 shows a simple CABLE REMOTE CONTROL.

WARNING !!!

Do not use such a REMOTE CONTROL in other EKTAPRO Models, because the MASTERBOARD will be damaged.

SCHEMATIC for simple CABLE REMOTE CONTROL only MODEL 320

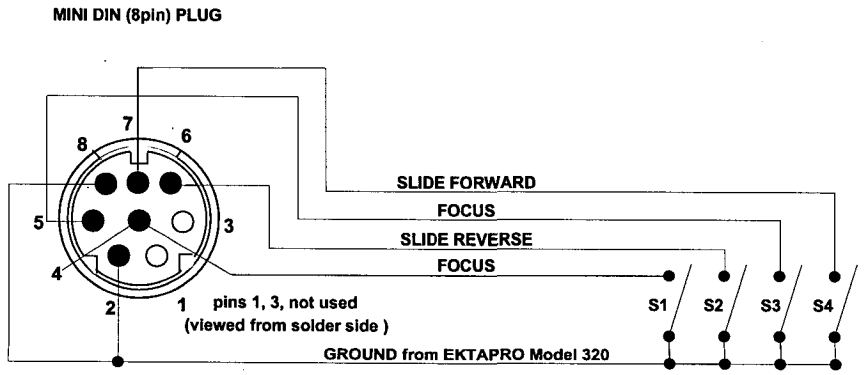


figure 2-12

3. THEORY GUIDE

Block Diagram

All functions of the projector are controlled by a MICROCONTROLLER (PIC16C74A with a 4k EPROM) on the MASTERBOARD.

Located around the MICROCONTROLLER on the MASTERBOARD there are the inputs, outputs and drivers.

The block diagram (figure 3-1) shows of the functions of the EKTAPRO Model 320.

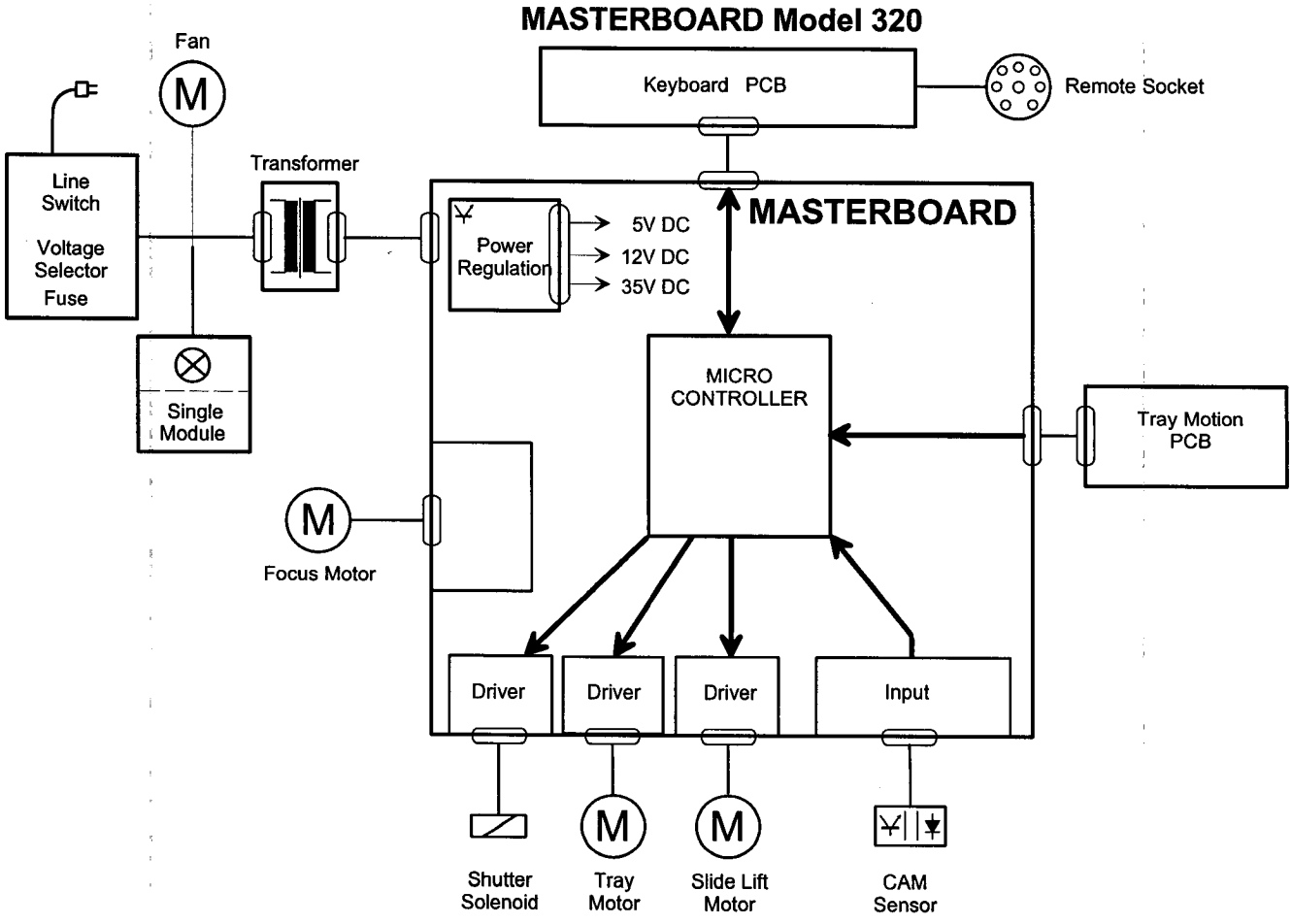


figure 3-1

Microcontroller Unit

The main device on the MASTERBOARD is the 8-bit MICROCONTROLLER unit PIC16C74A for the EKTAPRO Model 320 from Microchip Technology.

This MICROCONTROLLER has a microprocessor, timer, memory, analog/ digital converter and input/output ports on one chip. Compared to a standard processor, where for each item a peripheral IC is necessary.

This MICROCONTROLLER with its on-chip software controls all functions of the projector plus peripheral circuits.

The main features of the MICROCONTROLLER are:

- 33 bi-directional I/O lines
- 192 bytes of RAM
- serial communication interface system
- 8 channel A/D converter
- 4K X 14 EPROM
- 3 timer/counters
- 2 Capture/Compare/PWM modules

The following block diagram shows the internal MICROCONTROLLER functions.

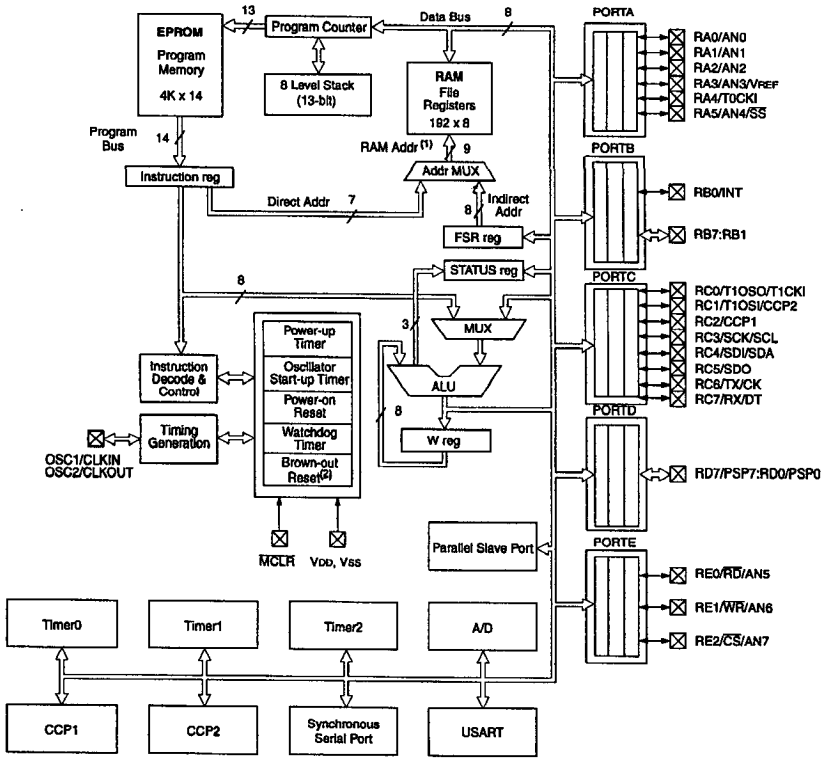


figure 3-2

Description of Functions

Power Supply

The PROJECTOR POWER SYSTEM consists of a

- POWER INPUT ASSEMBLY with POWER ON/OFF SWITCH, PRIMARY FUSE HOLDER and VOLTAGE SELECTOR
- TRANSFORMER
- POWER REGULATION and SECONDARY FUSES are on the MASTERBOARD PCB

The TRANSFORMER supplies the following voltages:

Primary voltage outputs:
81 VAC LAMP voltage for Model 320

Safety Extra Low Voltage outputs:
10 VAC for +5V DC and +12V DC unregulated
26 VAC for 36 VDC unregulated,

The POWER REGULATION on the MASTERBOARD contains:

- EMI Capacitor
- 2 rectifiers and 1 regulator

The output voltages and signal are:

- 36 VDC capacitor- (36 VDC) for MOTOR´s, solenoid
- 12 VDC unregulated for remote control
- 5 VDC regulated for logic and MICROCONTROLLER

Details can be obtained from circuit diagrams and the following block diagram.

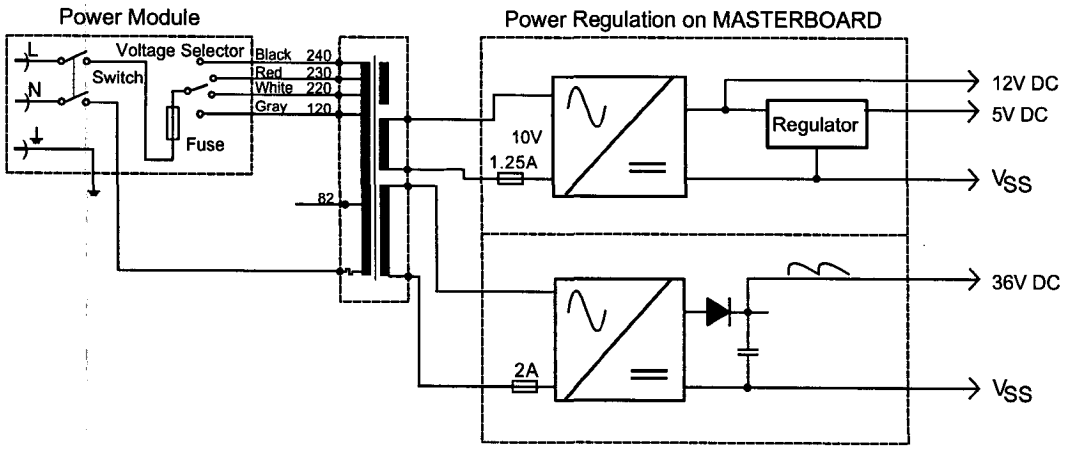


figure 3-3

Switch On / Initialize Procedure

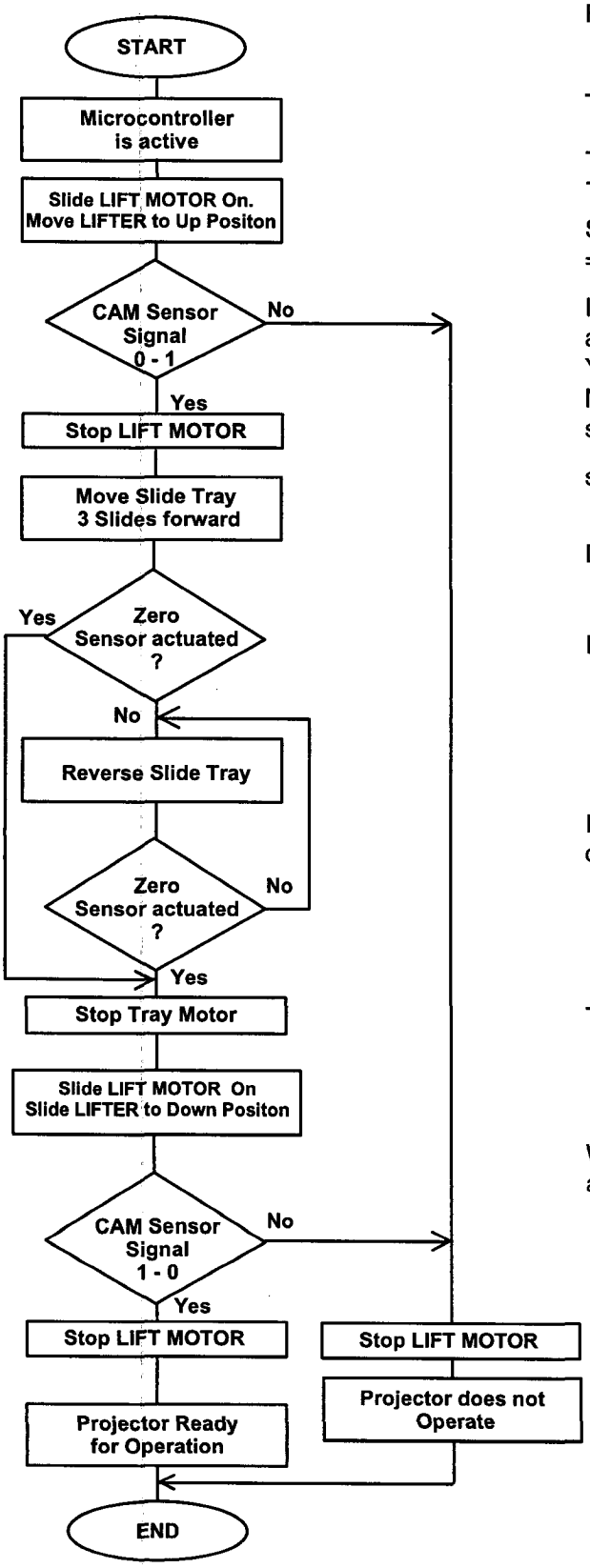


figure 3-4

Projector Status: Mechanic position is not known
Projector is energized

The MICROCONTROLLER starts the initialization routine:

- load the look-up tables
- completes a Hardware reset

SLIDE LIFT MOTOR rotates clockwise (max. of 805 steps = one SLIDE LIFTER cycle).

If SENSOR SIGNAL changes from not actuated to actuated, the SLIDE LIFTER is in up position.
Yes = Start tray MOTION.
No = Begin a failure routine, after it has advanced 805 steps without sensor signal change.

slide tray moves forward 3 slides.

Details about tray motion can be obtain from page 3-9.

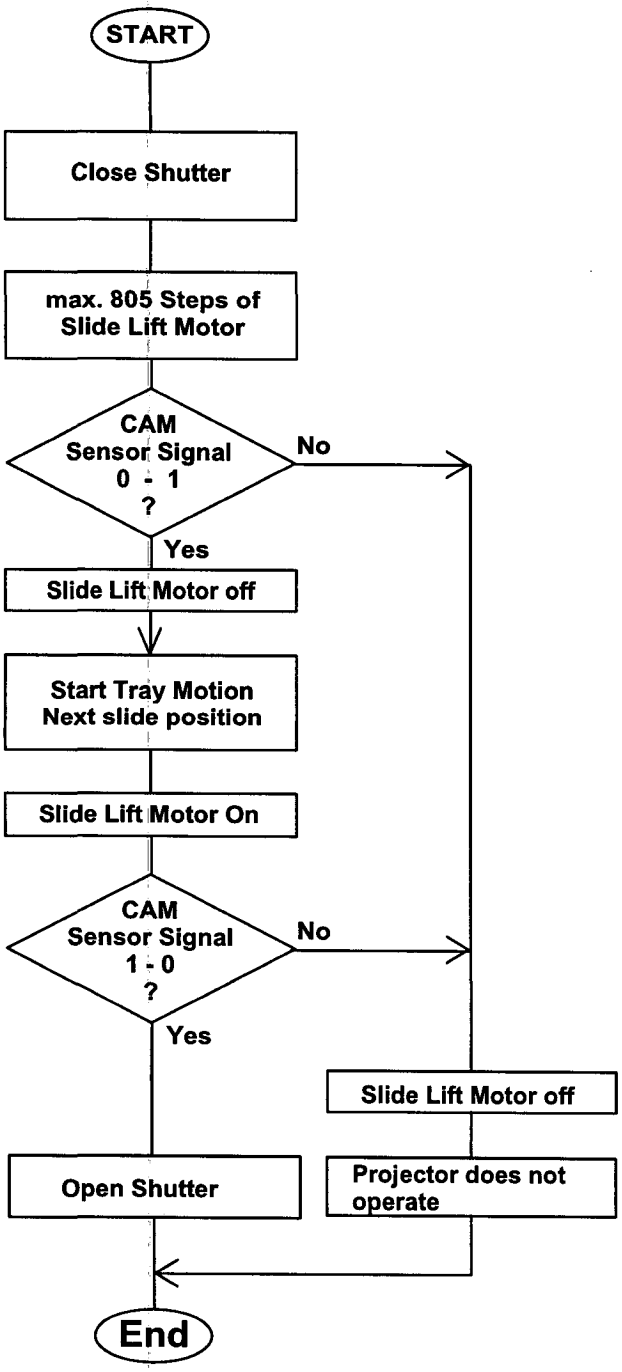
If the ZERO SENSOR is not actuated, the tray reverses

If the ZERO SENSOR is not actuated, the slide tray continues to advance.

The SLIDE LIFT MOTOR moves clockwise.

When the CAM SENSOR changes from actuated to not actuated, the LIFTER is in the down position.

Slide Change Sequence



Projector Status:

- SLIDE LIFTER down
- SHUTTER is open
- SLIDE is in GATE
- LAMP is energized

Start: "Forward"/"Reverse" BUTTON is pressed.

The SHUTTER SOLENOID is deenergized.

The SLIDE LIFT MOTOR rotates clockwise to move the SLIDE LIFTER up (max. 805 steps = one SLIDE LIFTER cycle).

The SLIDE LIFTER is in the up position when the CAM SENSOR signal changes from not actuated to actuated.

If no: the failure routine begins after 805 steps a without signal change.

If yes: Starts the tray Motion. See page 3-10.

For details see page 3-10.

The SLIDE LIFT MOTOR moves clockwise to move SLIDE LIFTER down. The MOTOR stops when signal changes from actuated to not actuated.

The slide is projected.

figure 3-5

Tray Motion

The STEPPER MOTOR is responsible for the slide tray movement. To move the tray one slide forward or reverse 47 steps are necessary.

The TRAY MOTION CONTROL PCB contains one optical sensor, for the Zero Position LEVER.

This PCB sends a signal to the MICROCONTROLLER:

- Tray zero-position signal in case the tray is in the zero position

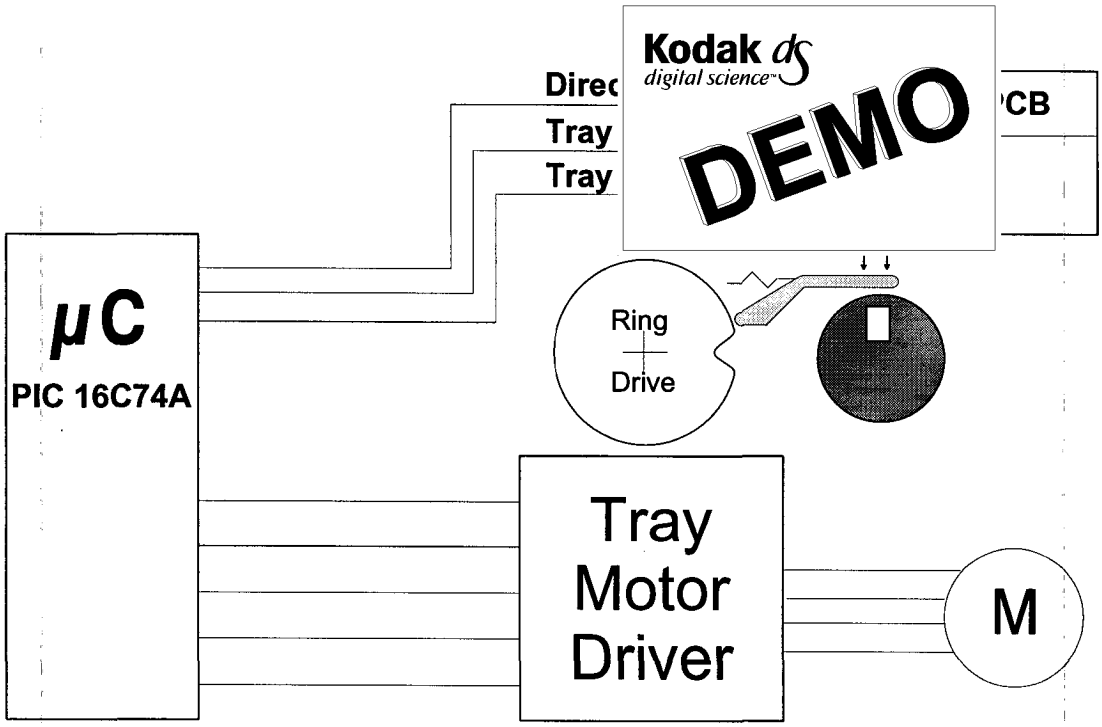
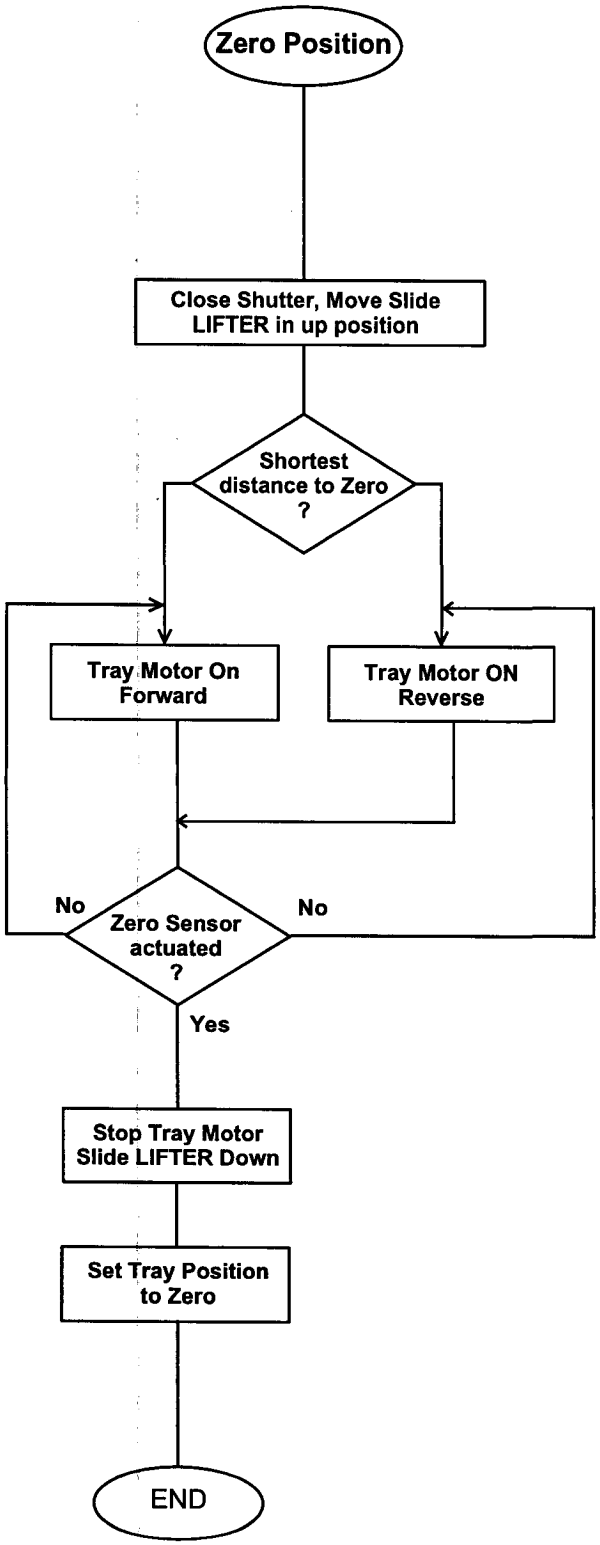


figure 3-6

Tray Motion Sequence:

a) Go To Zero Position

Projector Status: - Energized



The MICROCONTROLLER selects shortest distance to the zero position.

The TRAY MOTOR is energized.

The TRAY MOTION CONTROL delivers a step signal for each MOTOR step.

The ZERO SENSOR delivers a signal if the position is reached

The position is reached. The TRAY POSITION in memory set to zero.

figure 3-7

b) Go to next slide position

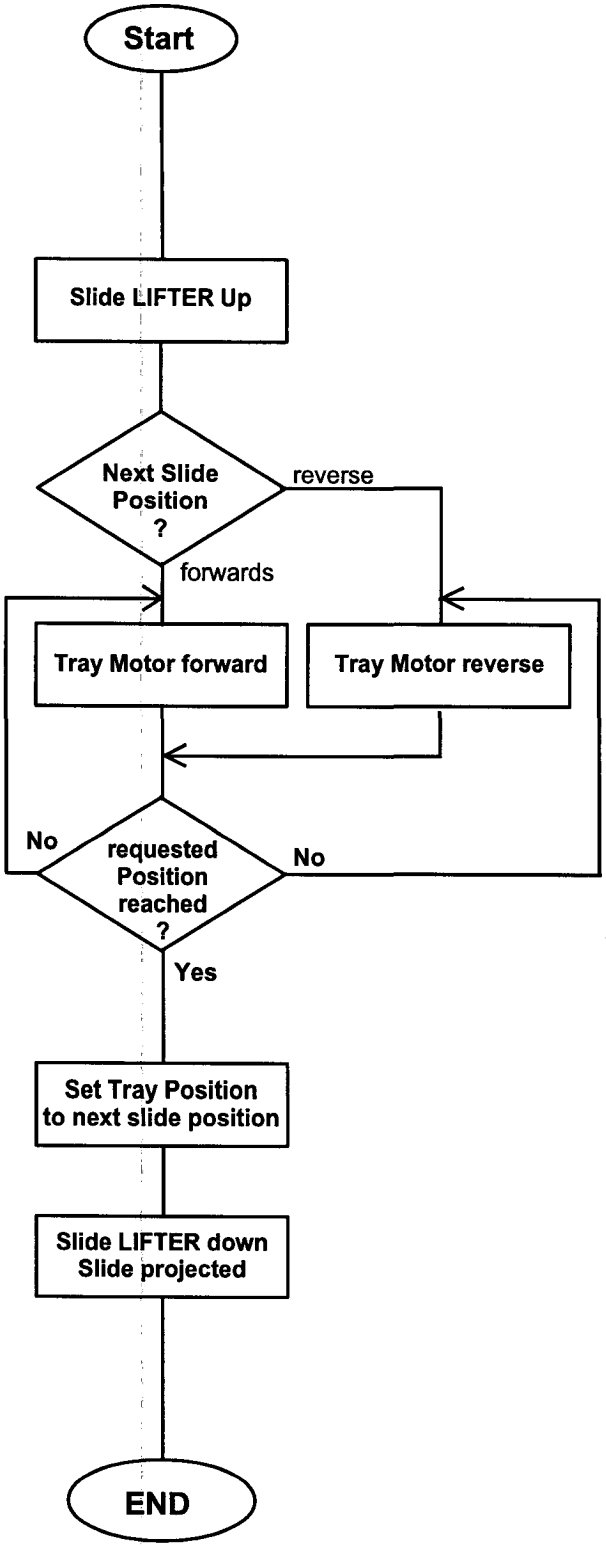


figure 3-8

Projector Status: There is a slide in the gate and it is projected.

Start action: The forward or reverse BUTTON is actuated or next slide is selected with RANDOM ACCESS.

See Slide Change Sequence, page 3-7.

RANDOM ACCESS: The MICROCONTROLLER selects shortest distance to the next slide.

The MICROCONTROLLER energizes the TRAY MOTOR for 47 steps (80 tray).

For RANDOM ACCESS: The TRAY MOTOR is on until the position is reached.

For FORWARD/REVERSE BUTTONS:

- tray moves only for one slide
- slide is projected
- if transport button is still pressed, a slide is lifted up and the tray moves until button is released but stops at the ZERO POSITION.

The SLIDE LIFTER Down procedure starts.
For details, see Slide Change Sequence.

Focus

There are different possibilities to get a crisp and clear focused image on the screen.

1. Use the FOCUS KNOB. In this case the LENS will be moved inside the LENS CARRIER, while the LENS CARRIER still keeps his position.
2. Use the FOCUSING BUTTONS either on the KEYBOARD of the PROJECTOR or on the REMOTE CONTROL. In this case the LENS and the LENS CARRIER are moving together. The focus range is limited, and depends on the ECCENTRIC of the FOCUS MOTOR (approx. 8mm = 0.3 in.).

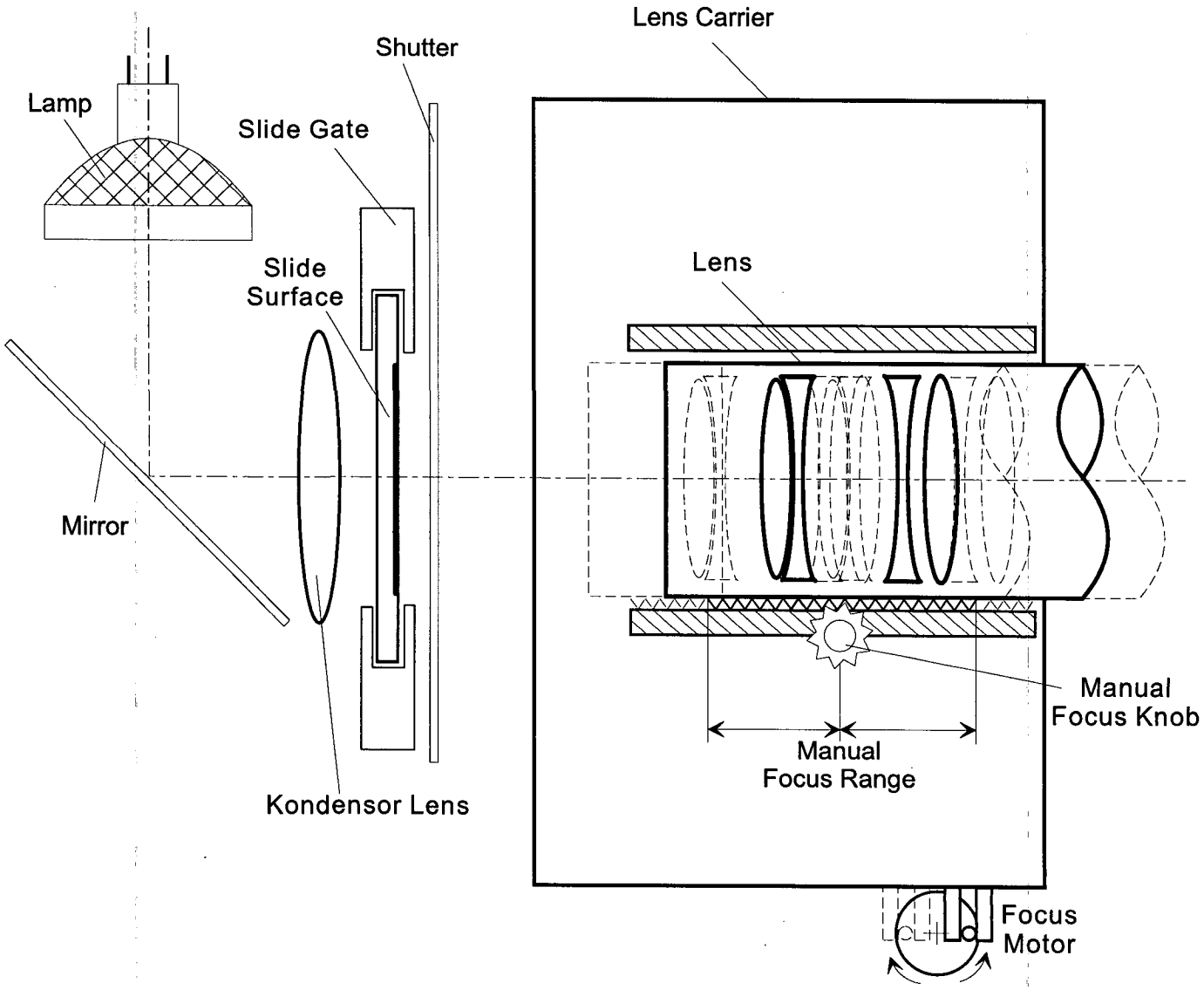
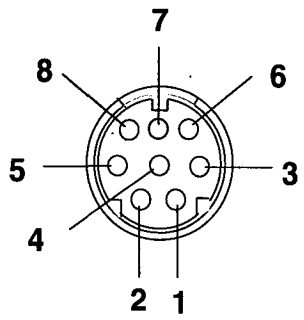


figure 3-9

Remote Control

Type Mini DIN



(viewed from front)

figure 3-10

Pin No.	Signal
1	12 VDC
2	GND
3	Signal 1 (LSB)
4	Signal 2
5	Signal 3
6	Signal 4
7	Signal 5 (MSB)
8	Interrupt

12 VDC = average value between 7.2 VDC and 14.5 VDC

Because of the microprocessor, the REMOTE CONTROL also works with digital signals on the TTL level. RANDOM ACCESS is also available through a REMOTE CONTROL receptacle.

The data is sent parallel as a 5 bit code from the CABLE REMOTE or the IR RECEIVER to the projector (Keyboard PCB) with an interrupt signal.

The example shows the binary code 10000. The code 10000 is for FORWARD.

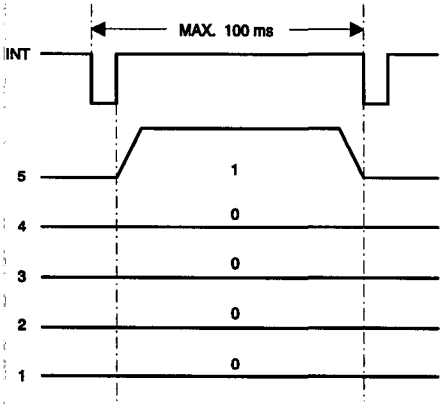


figure 3-11

When a button on the REMOTE CONTROL is pressed, the INT signal is low with a maximum value of 1 µ s. Then it becomes high again. After that the data transmission begins.

Since the focus and tray motion signal consist of only one 5 bit data word the slide position values are always sent as three successive 5 bit data words.

For example:

Slide No. 3 = decimal 20 20 23 , binary 10100 10100 10111
Slide No. 140 = decimal 21 24 20 , binary 10101 11000 10100

List of Remote Control Commands:

Key/Function	Command decimal	Command binary 5 4 3 2 1
Slide forward	16	1 0 0 0 0
Slide backwards	8	0 1 0 0 0
Focus forward	4	0 0 1 0 0
Focus backwards	2	0 0 0 1 0
Standby	1	0 0 0 0 1
Key 1	21	1 0 1 0 1
Key 2	22	1 0 1 1 0
Key 3	23	1 0 1 1 1
Key 4	24	1 1 0 0 0
Key 5	25	1 1 0 0 1
Key 6	26	1 1 0 1 0
Key 7	27	1 1 0 1 1
Key 8	28	1 1 1 0 0
Key 9	29	1 1 1 0 1
Key 0	20	1 0 1 0 0
Clear	Internal	
Enter	3 words internal	

4. DISASSEMBLY/ASSEMBLY

UPPER HOUSING

1. Remove the LAMP MODULE.
2. Remove the KNOB.
3. Remove the 4 SCREWS.
4. Remove the UPPER HOUSING.

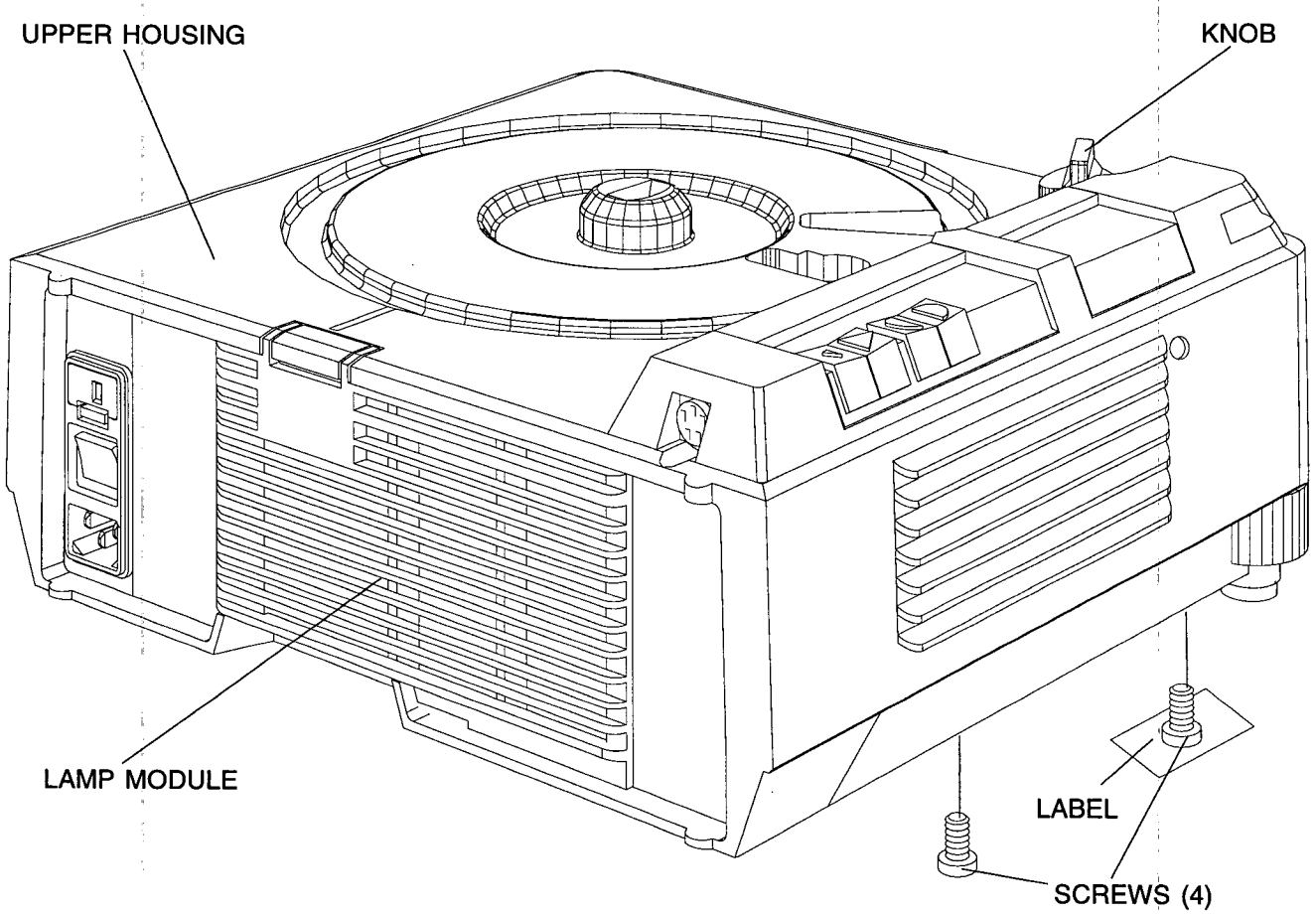


figure 4-1

BUTTONS and COVER PLATES

1. Remove the UPPER HOUSING. See page 4-1.

2. Remove the small COVER PLATE.

3. Loosen the HOLDING CLIP and remove the large COVER PLATE.

4. If needed, change the 4 BUTTONS.

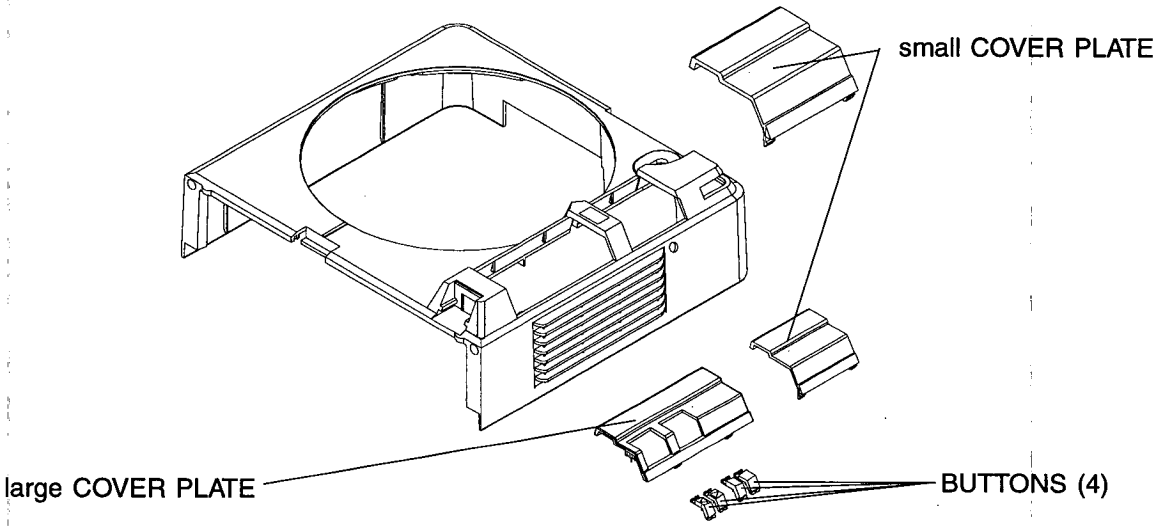


figure 4-2

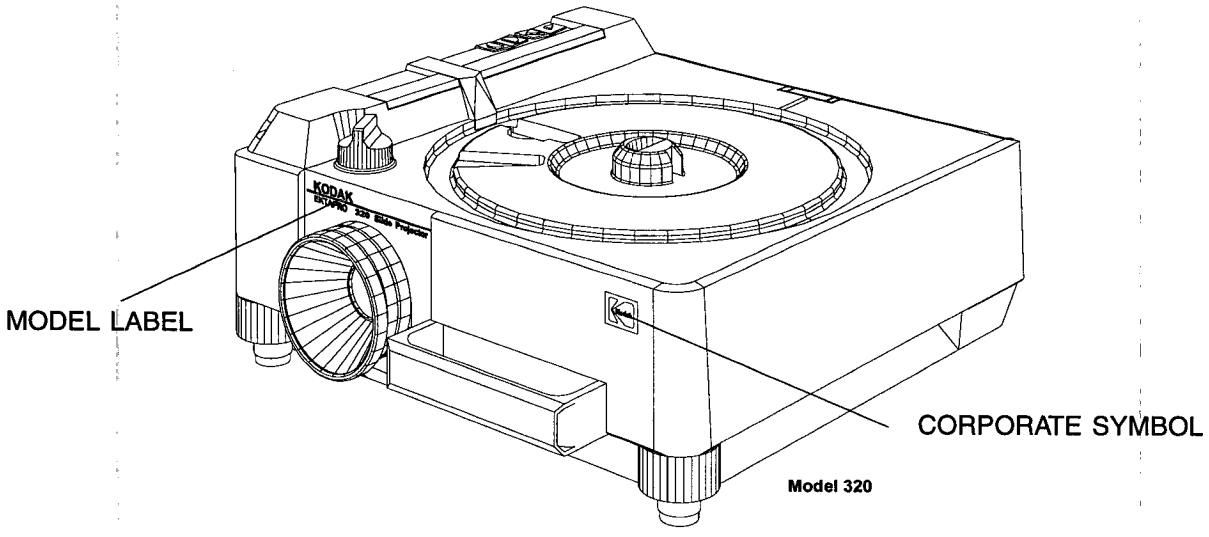


figure 4-3

5. *If necessary, replace* MODEL LABEL.

CENTER HOUSING

1. Remove the UPPER HOUSING. See page 4-1.

2. Release the HOLDING CLIP at the KEYBOARD and remove the PCB.

3. Release the HOLDING CLIP at the TRAY MOTION PCB and remove the PCB.

4. Remove the SPRING and the ZERO LEVER. See figure 4-5.

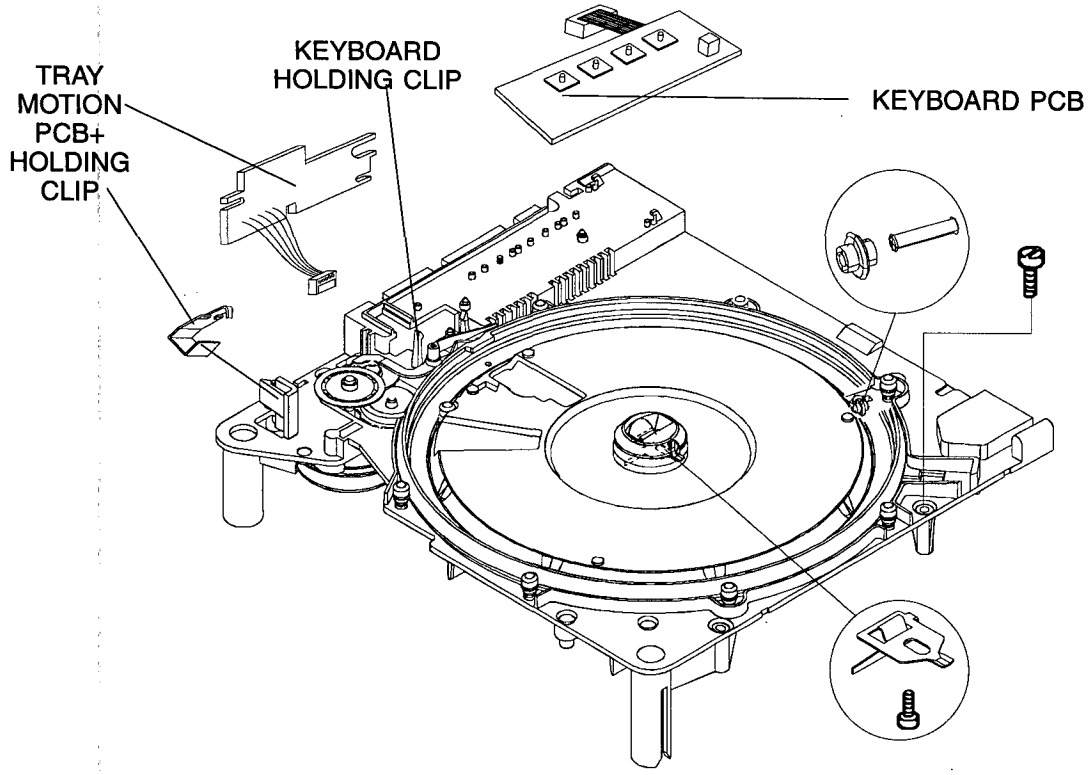


figure 4-4

5. Remove the 8 RETAINERS and 8 ROLLERS. See figure 4-5.

6. Remove the DRIVE RING. See figure 4-5.

7. Remove the 3 SHAFT ROLLERS and the 3 BEARING ROLLERS. See figure 4-5.

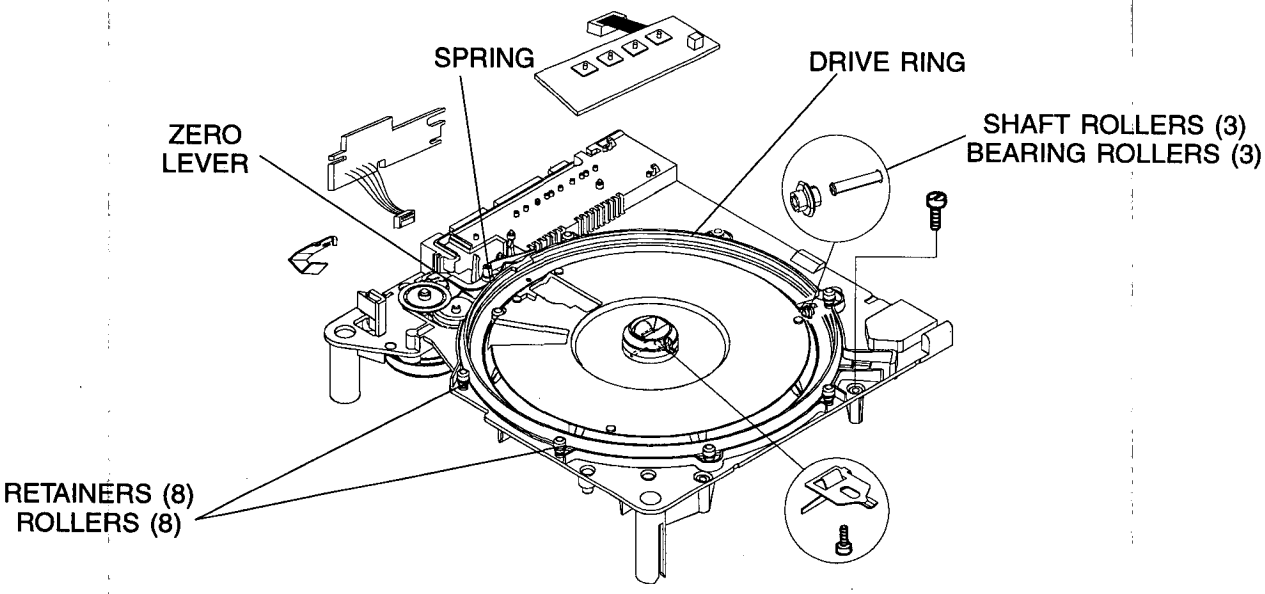


figure 4-5

8. Remove the 2 GEAR WHEELS.

9. Remove the 4 SCREWS.

10. Remove the CENTER HOUSING.

11. Remove the SCREW and the LATCH

12. Remove the 2 SCREWS and the MOTOR.

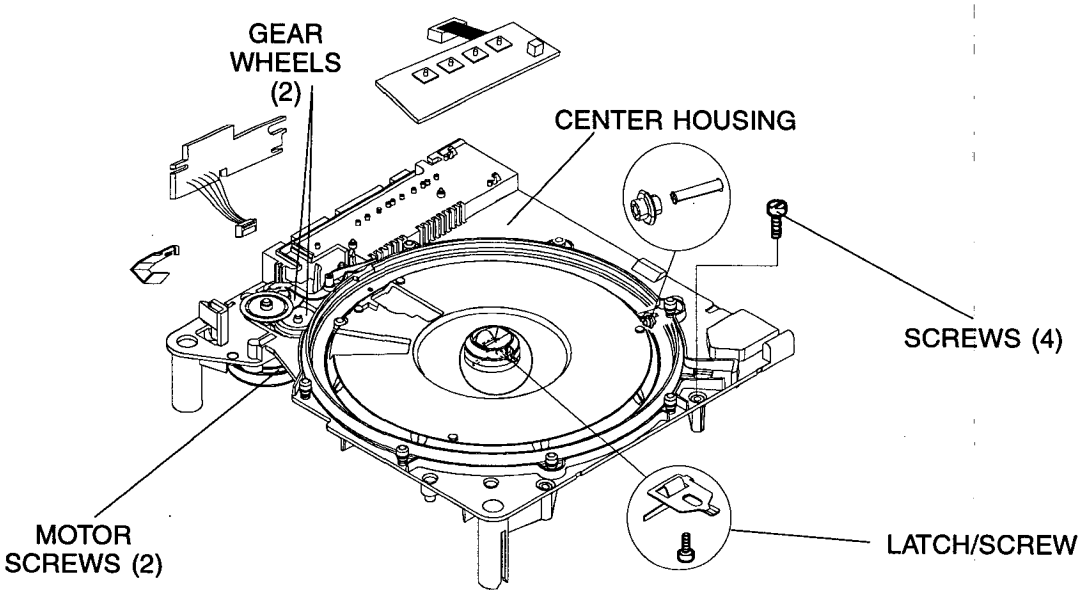
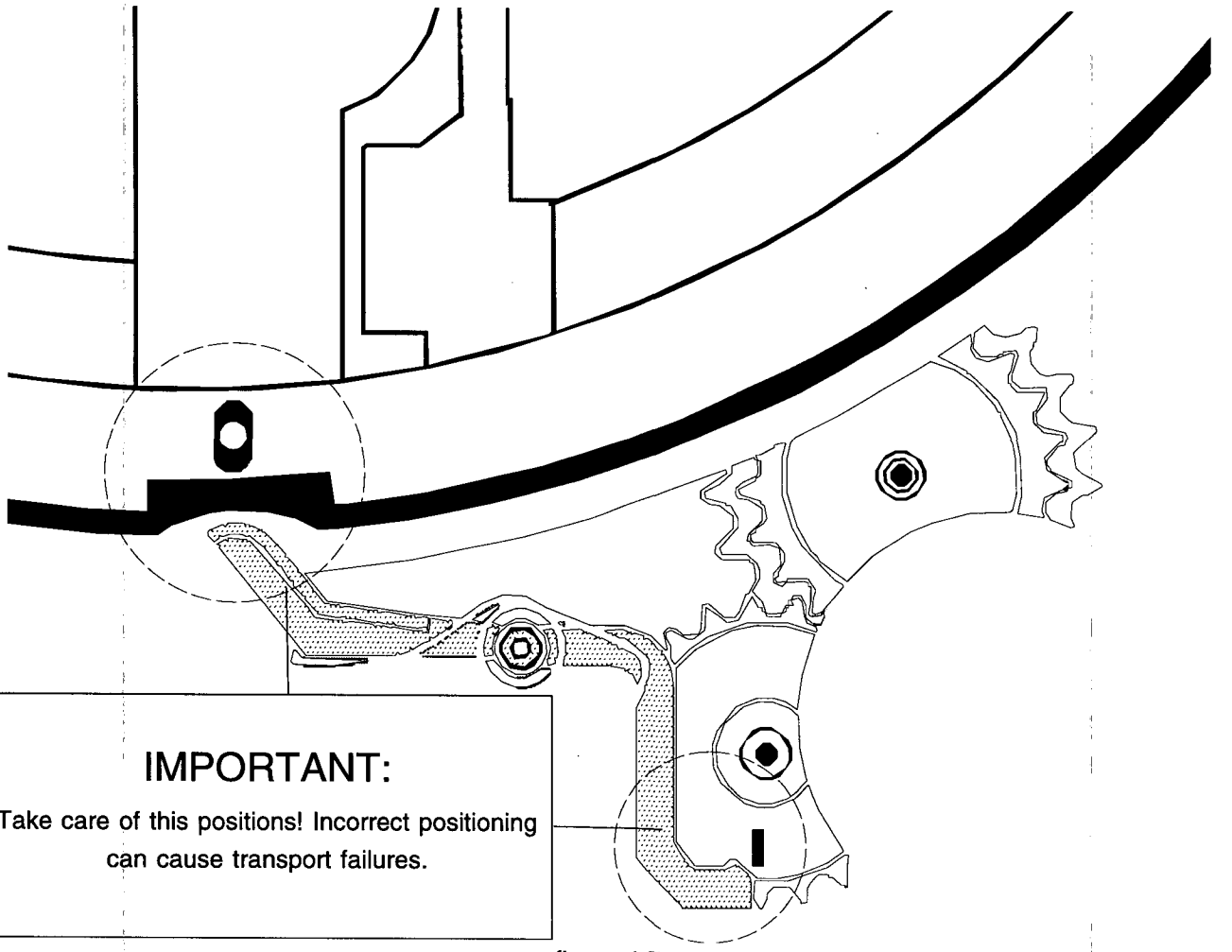


figure 4-6



IMPORTANT:

Take care of this positions! Incorrect positioning can cause transport failures.

figure 4-7

FAN, KEYBOARD PCB and TRAY MOTION PCB

1. Remove the UPPER HOUSING. See page 4-1.

2. Remove the CENTER HOUSING. See page 4-3.

3. Remove the FAN.

4. Disconnect the FAN MOTOR.

5. Disconnect the KEYBOARD PCB.

6. Disconnect the TRAY MOTION PCB.

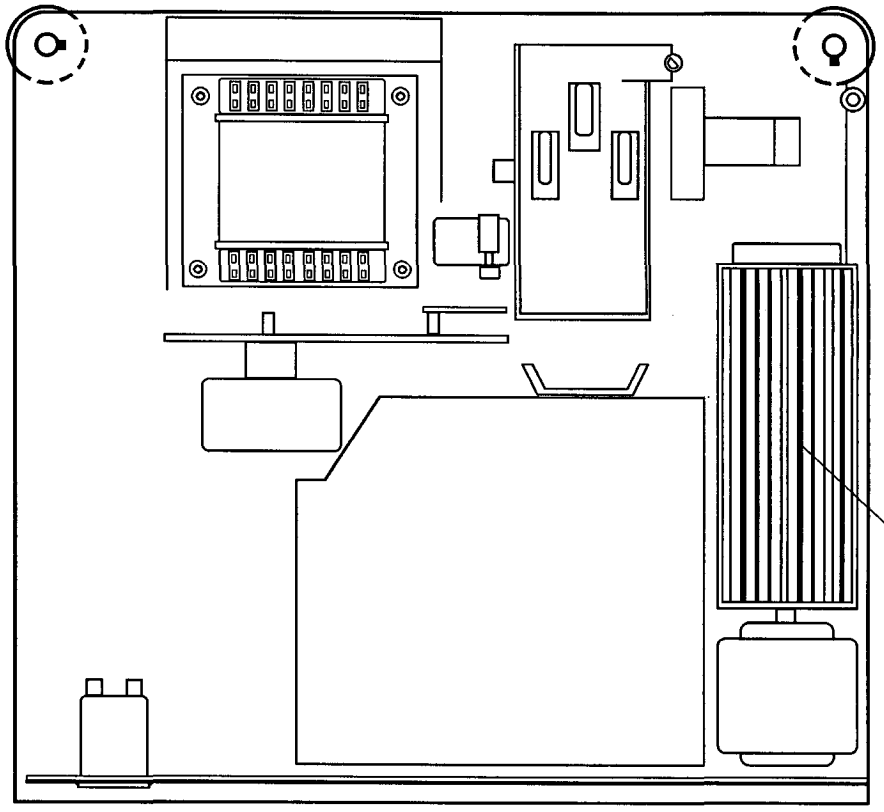


figure 4-8

NOTE:

Do not clean the FAN with compressed air because the fan wheel could be damaged!

NOTE

When placing the FAN in the LOWER HOUSING, insert the FAN as shown in figure 4-9.

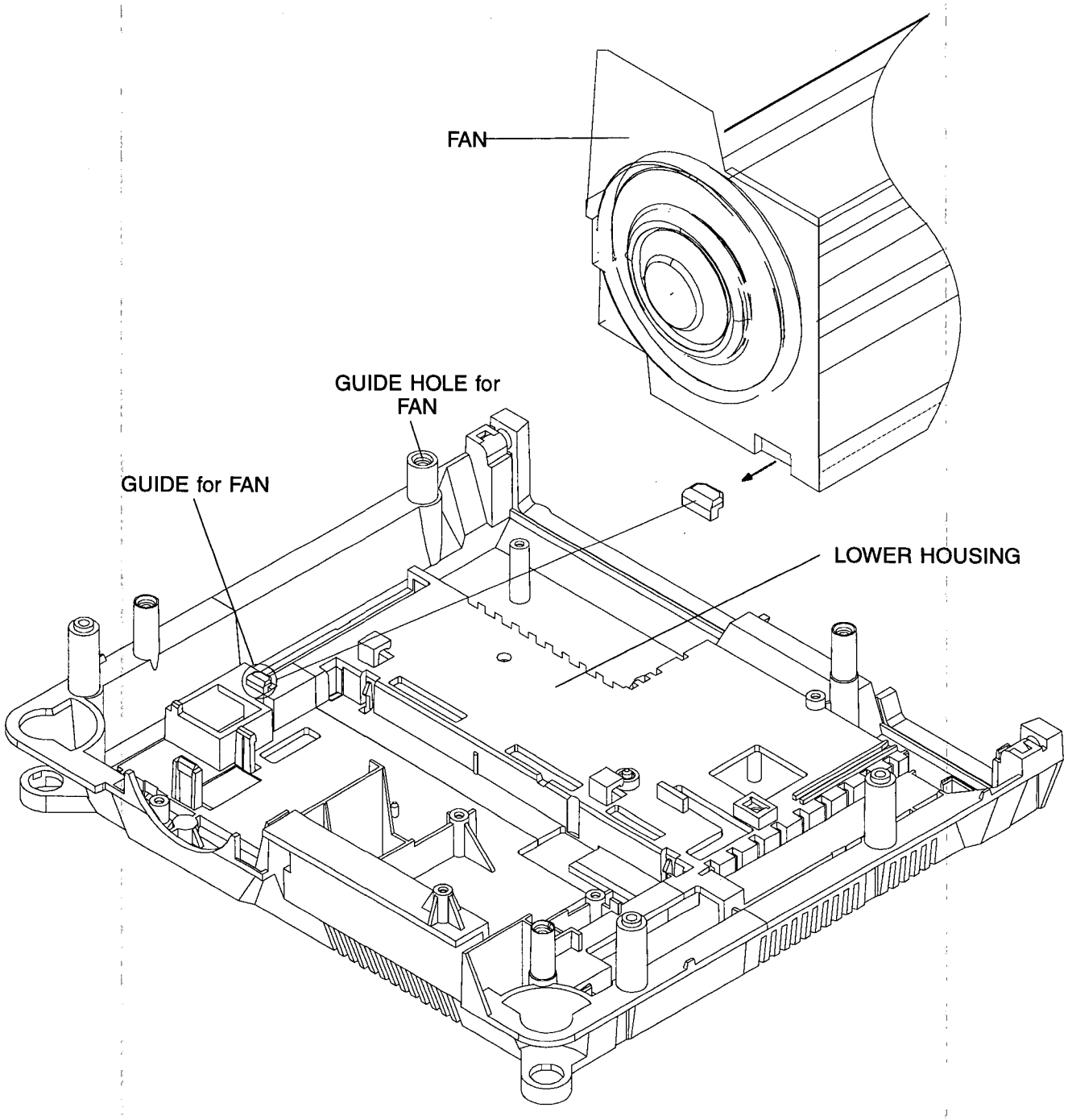


figure 4-9

TRANSFORMER and BACK PLATE ASSEMBLY

NOTE

It is easier to remove the complete TRANSFORMER and BACK PANEL ASSEMBLY at the same time, to avoid needless removals.

1. Remove the UPPER HOUSING. See page 4-1.
2. Remove the CENTER HOUSING. See page 4-3.
3. Remove the 4 SCREWS from the TRANSFORMER.
4. Remove the NEUTRAL WIRE at the MECHANISM FRAME and the LAMP HOUSING ASSEMBLY.
5. Remove the TRANSFORMER and the BACK PLATE ASSEMBLY.
6. If needed, install new assemblies.

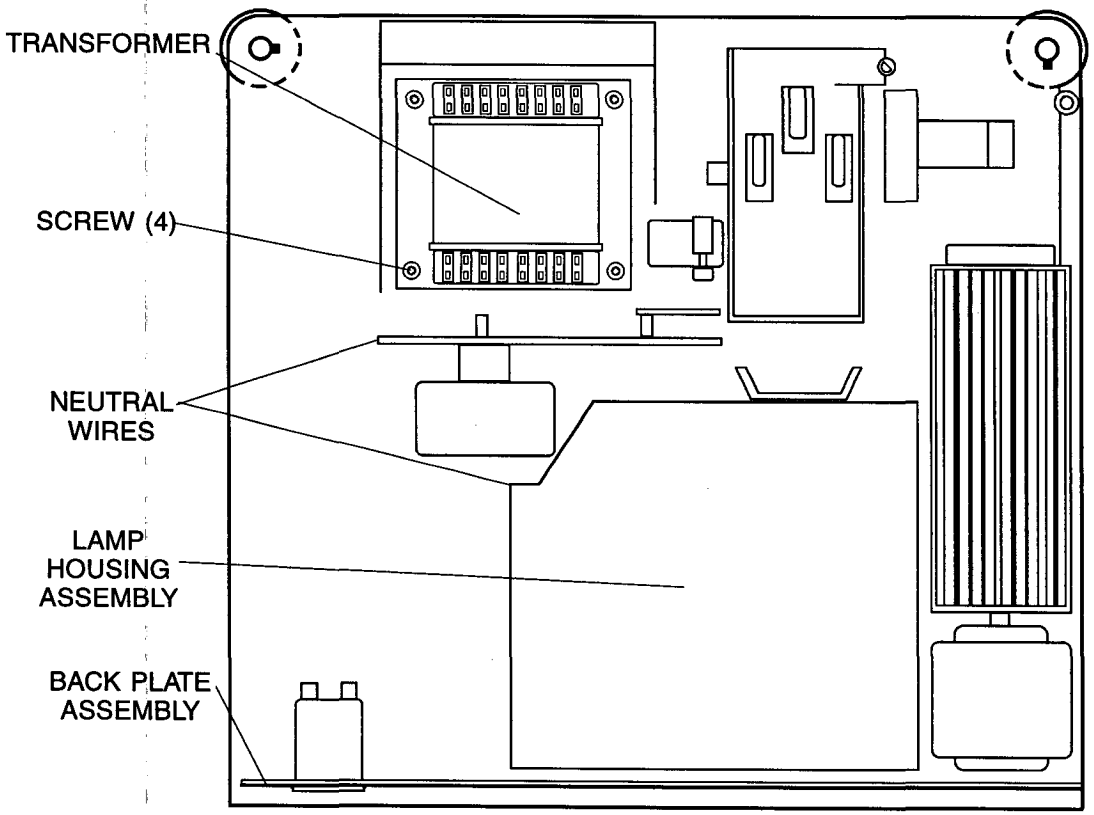


figure 4-10

MECHANISM FRAME and LENS MOUNT

1. Remove the UPPER HOUSING. See page 4-1.

2. Remove the CENTER HOUSING. See page 4-3.

3. Remove the 4 SCREWS and the TRANSFORMER. See page 4-8.

4. Remove the SCREW and disconnect the NEUTRAL WIRE.

5. Lift the MECHANISM FRAME and LENS MOUNT and remove the 3 CONNECTORS J 2, J 12, J 13.

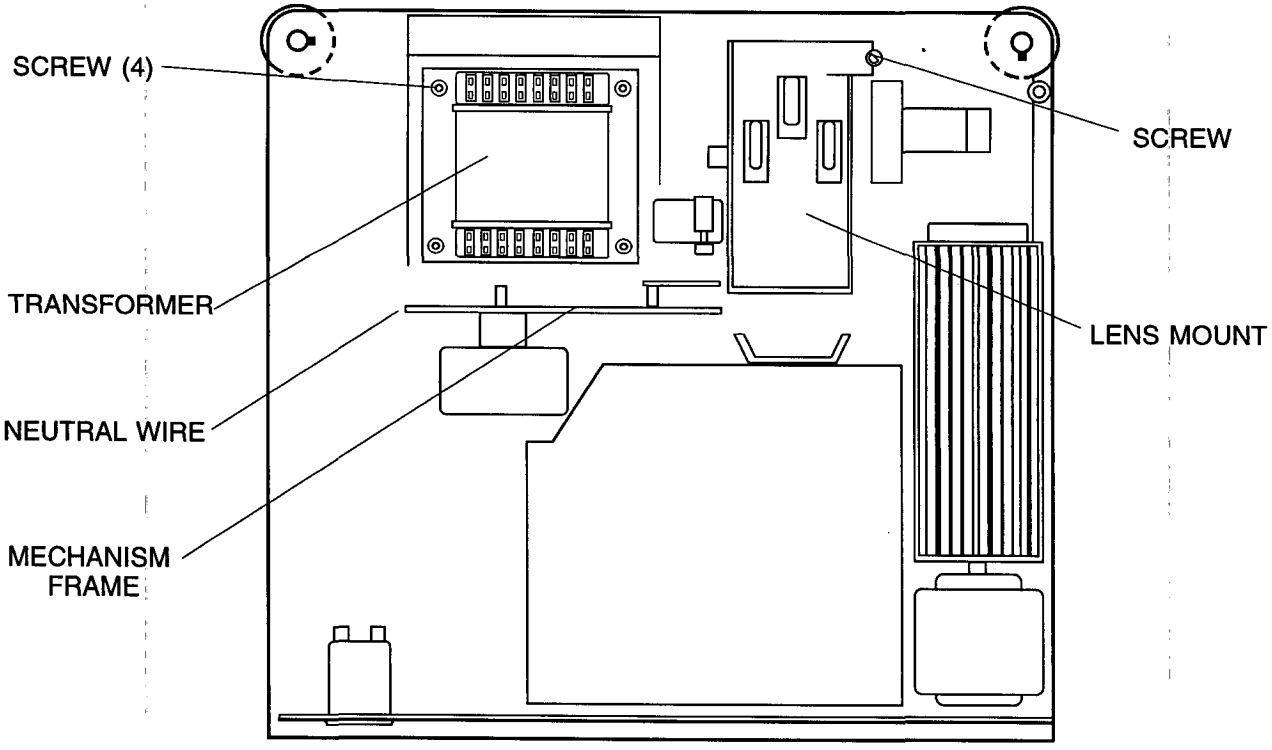


figure 4-11

LENS MOUNT

1. Remove the UPPER HOUSING. See page 4-1.

2. Remove the CENTER HOUSING. See page 4-3.

3. Remove the 4 SCREWS and the TRANSFORMER. See page 4-8.

4. Remove the MECHANISM FRAME and LENS MOUNT. See page 4-9.

5. Remove the SPRING.

6. Remove the LENS MOUNT from the MECHANISM FRAME.

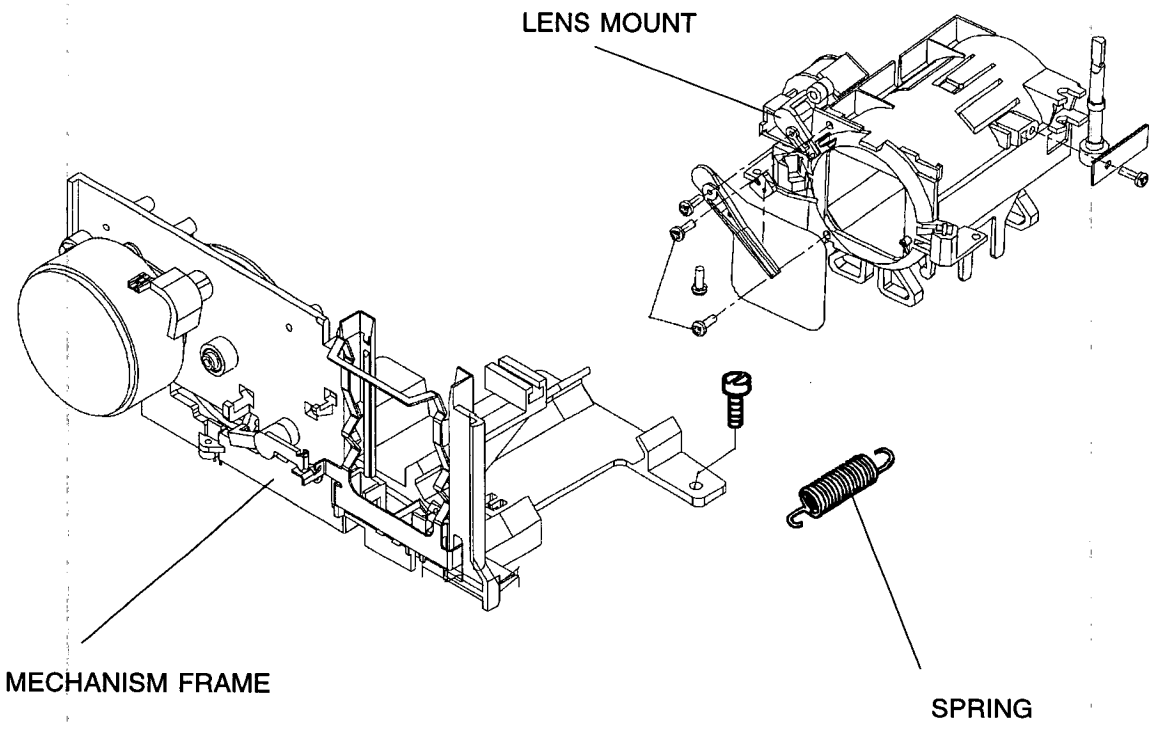


figure 4-12

7. Remove the SCREW, PLATE and the SHAFT.

8. Remove the SCREW, SHUTTER and the SHOCK ABSORBER.

9. Remove the SCREW and the MAGNET.

10. Remove the 2 SCREWS and the SPRING.

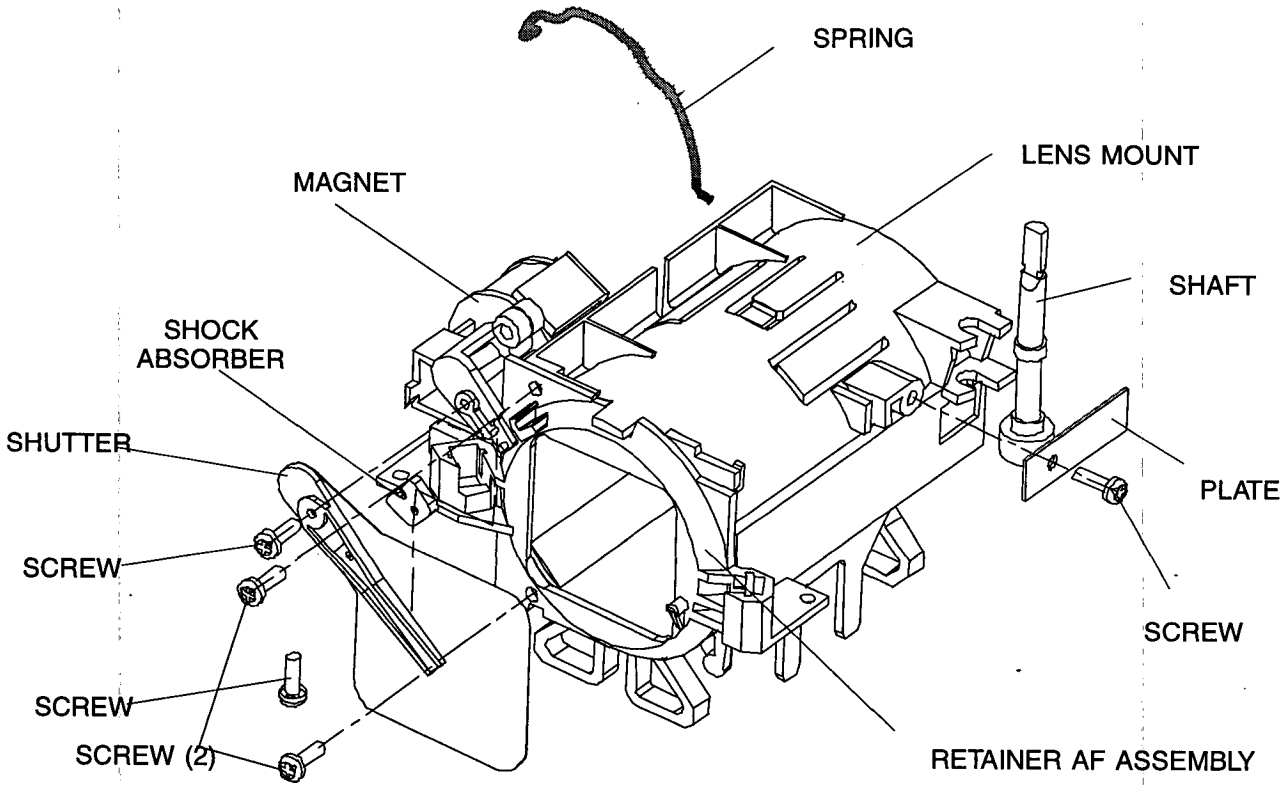


figure 4-13

SHUTTER

If the SHUTTER has to be replaced and the COVER MECHANISM FRAME is provided with the small recess, the SHUTTER has to be bent first. Otherwise it might touch the COVER MECHANISM FRAME.

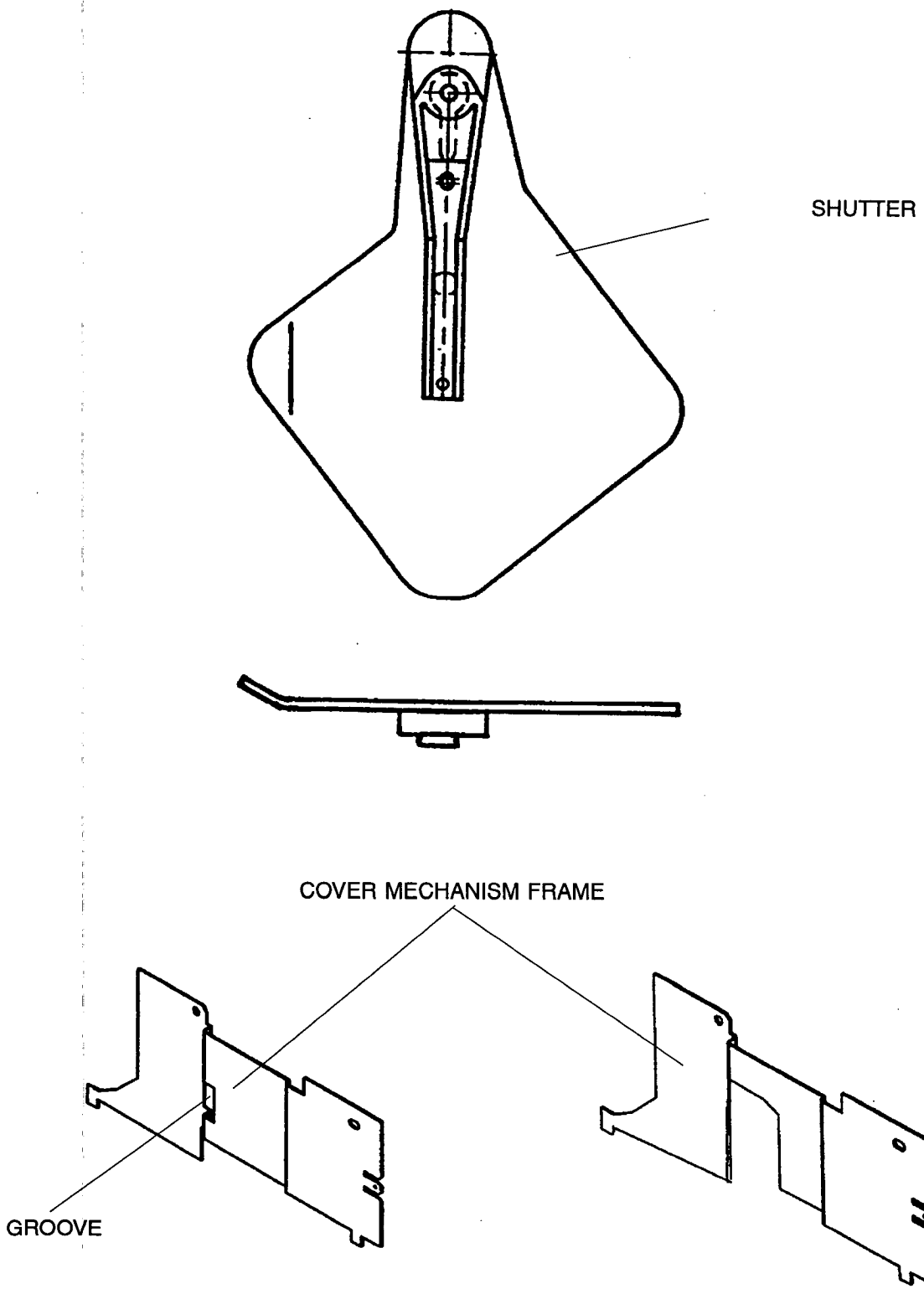


figure 4-14

MECHANISM FRAME

1. Remove the UPPER HOUSING. See page 4-1.

2. Remove the CENTER HOUSING. See page 4-3.

3. Remove the 4 SCREWS and the TRANSFORMER. See page 4-8.

4. Remove the MECHANISM FRAME and LENS MOUNT. See page 4-9.

5. Remove the SPRING and LENS MOUNT. See page 4-10.

6. Remove the 2 SCREWS, 2 WASHERS and the COVER MECHANISM FRAME.

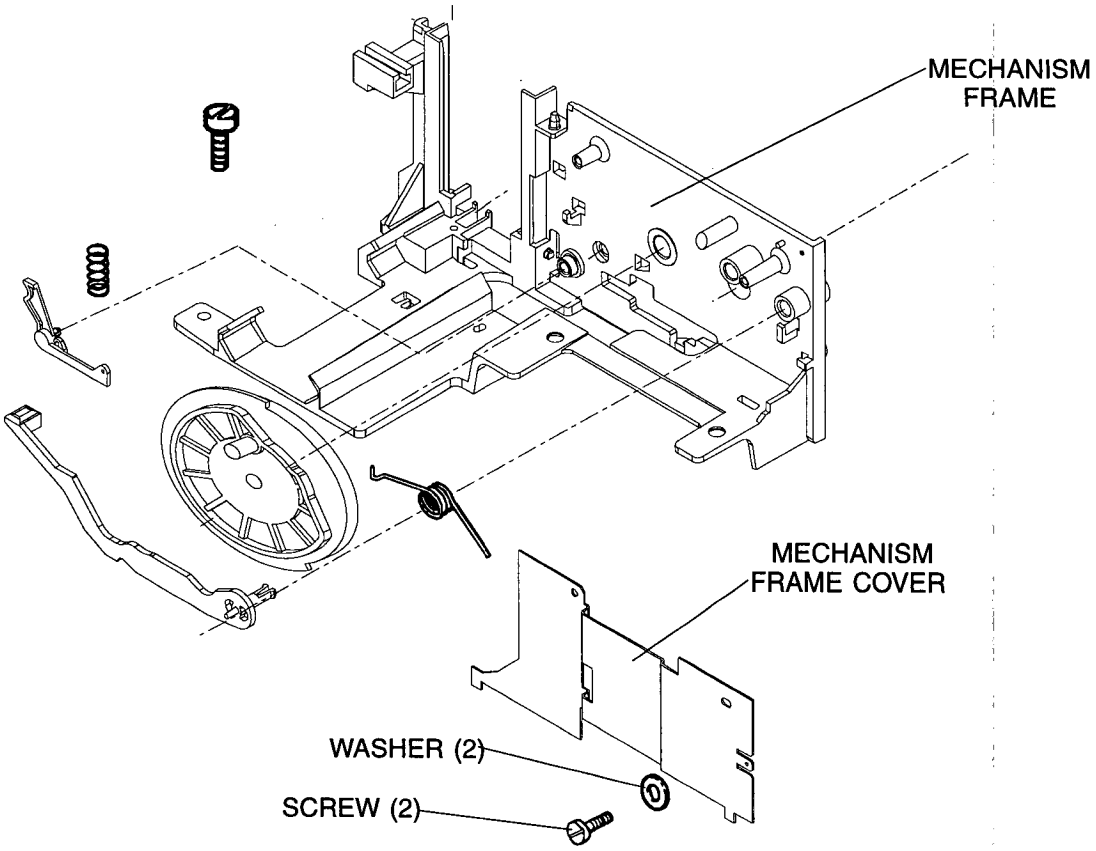


figure 4-15

7. *Remove* the LEVER, SLIDE LIFTER and the 2 SPRINGS.

8. Remove the SPRING, SLIDE REGULATION LEVER and the CAM.

NOTE

After the assembly of the parts, align the CAM so that the SLIDE LIFTER is in the lowermost position.

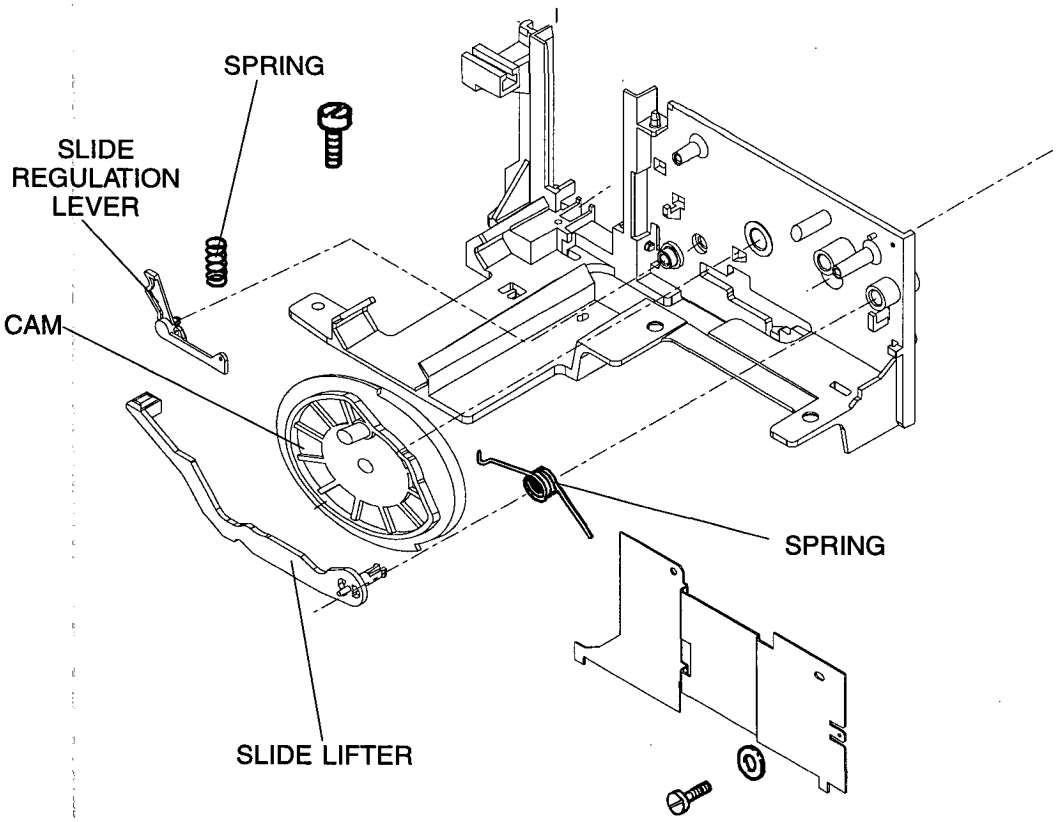


figure 4-16

8. Remove the LEVER and the SPRING.

10. Remove the SPRING and the PRESSURE PAD.

11. Remove the 2 SCREWS, the CAM and the SHUTTER SENSOR ASSEMBLY.

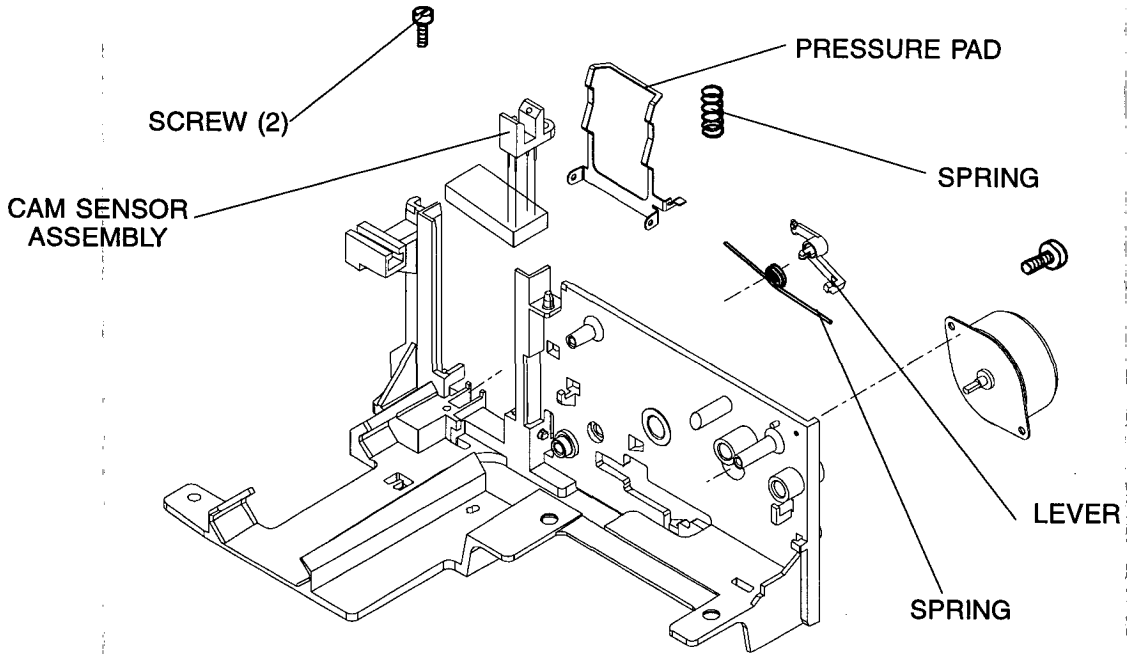


figure 4-17

12. Remove the 2 SCREWS and the MOTOR.

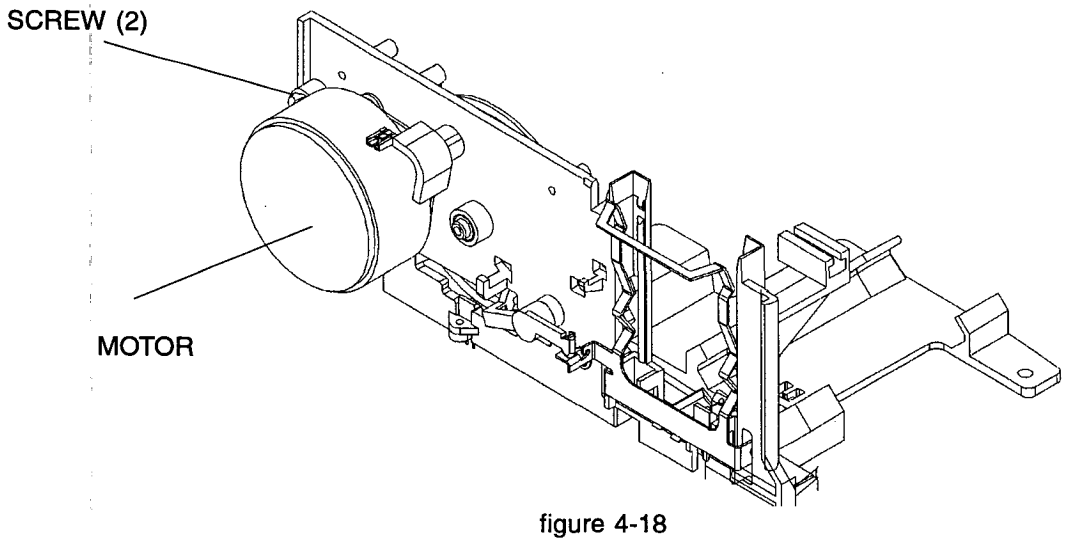


figure 4-18

FOCUS MOTOR

1. Remove the UPPER HOUSING. See page 4-1.

2. Remove the CENTER HOUSING. See page 4-3.

3. Remove the FAN, KEYBOARD PCB, and TRAY MOTION PCB. See page 4-6.

4. Remove the 4 SCREWS and the TRANSFORMER. See page 4-8.

5. Remove the MECHANISM FRAME and LENS MOUNT. See page 4-9.

6. Remove the SPRING, the FOCUS MOTOR and the RUBBER PAD.

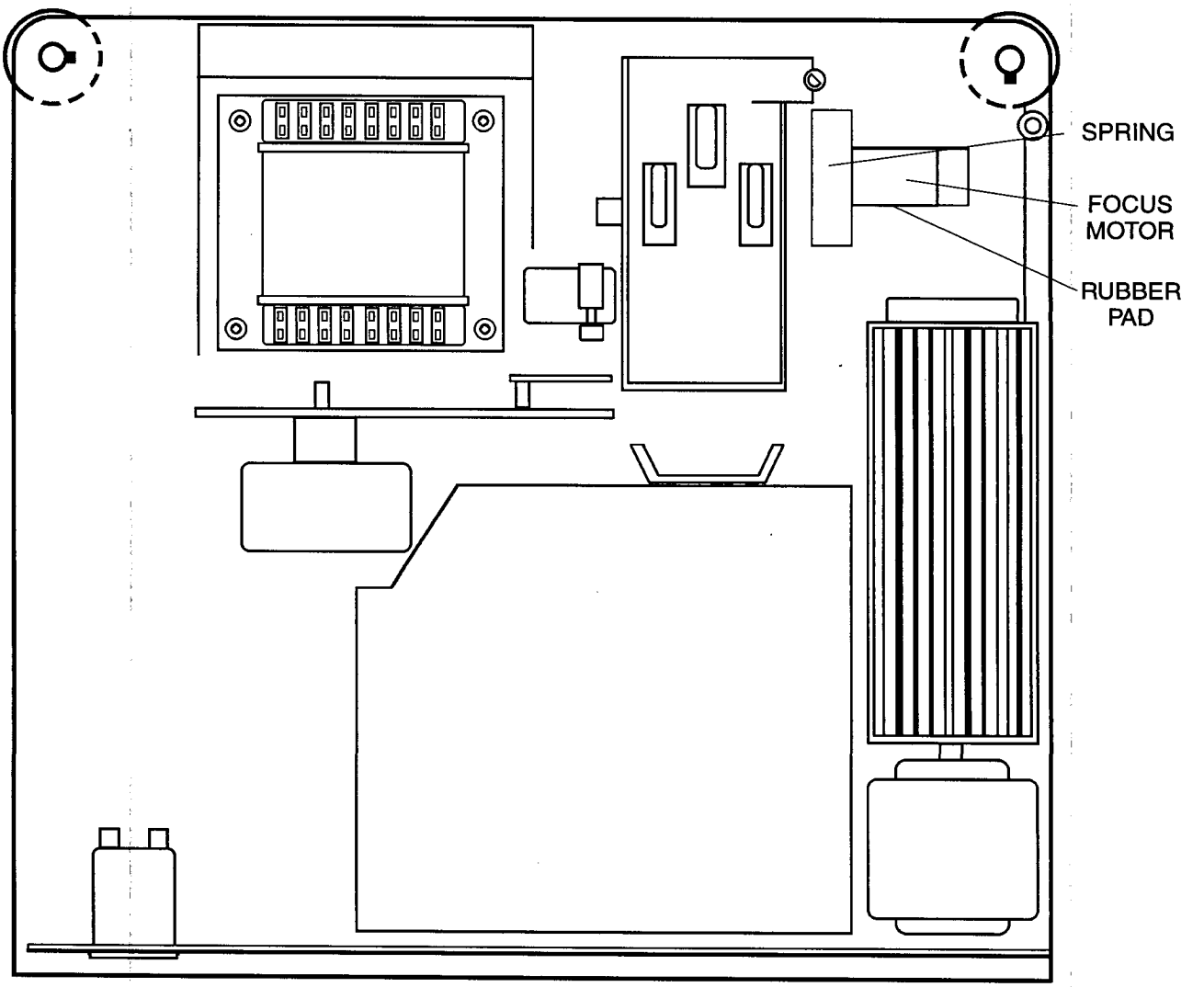


figure 4-19

Master Board PCB including MICROCONTROLLER

1. Remove the SCREW and the COVER on the bottom side of the projector.

2. Disconnect all CONNECTORS from the MASTER PCB.

3. Remove the MASTER PCB.

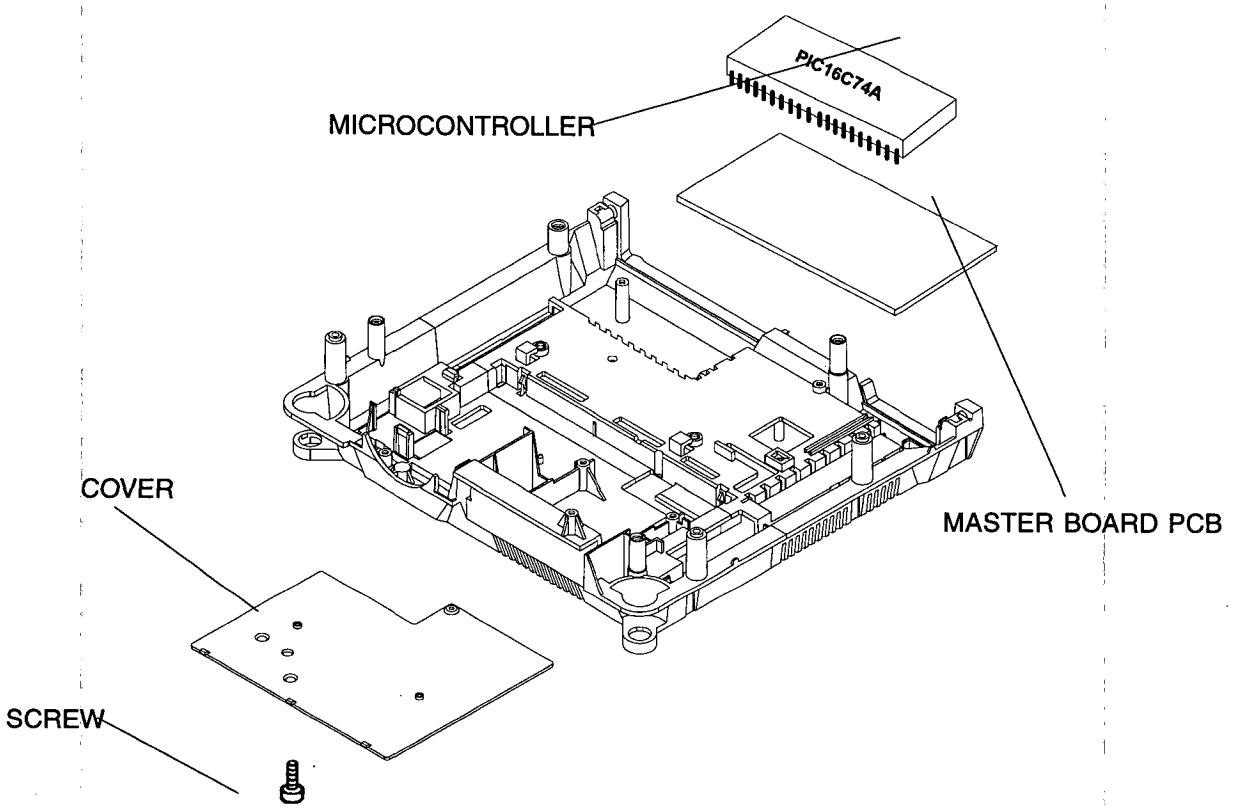


figure 4-20

NOTE

The MASTERBOARD PCB is mounted with the component side down!

Master Board PCB Connectors

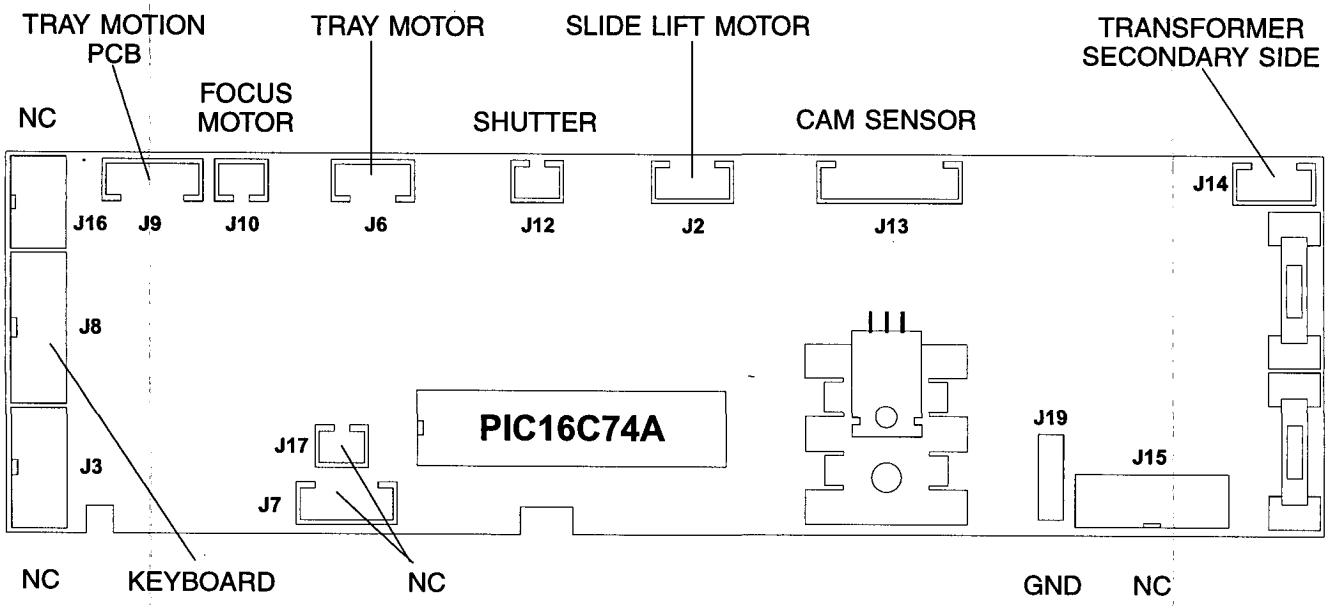


figure 4-21

CAUTION

During the assembly take care that all CONNECTORS are correctly plugged in!

LOWER HOUSING

1. Remove the UPPER HOUSING. See page 4-1.

2. Remove the CENTER HOUSING. See page 4-3.

3. Remove the FAN, KEYBOARD PCB and TRAY MOTION PCB. See page 4-6

4. Remove the TRANSFORMER, POWER SUPPLY PCB and BACK PANEL ASSEMBLY. See page 4-8.

5. Remove the MECHANISM FRAME and LENS MOUNT. See page 4-10.

6. Disconnect all CONNECTORS from MASTER PCB. See page 4-18:

7. Remove the 2 SCREWS and the LAMP HOUSING ASSEMBLY.

8. Remove the HANDLE.

9. Remove the 2 ELEVATOR RETAINERS, the right and left ELEVATOR KNOB, the right and left ELEVATOR and the 2 RUBBER FEET.

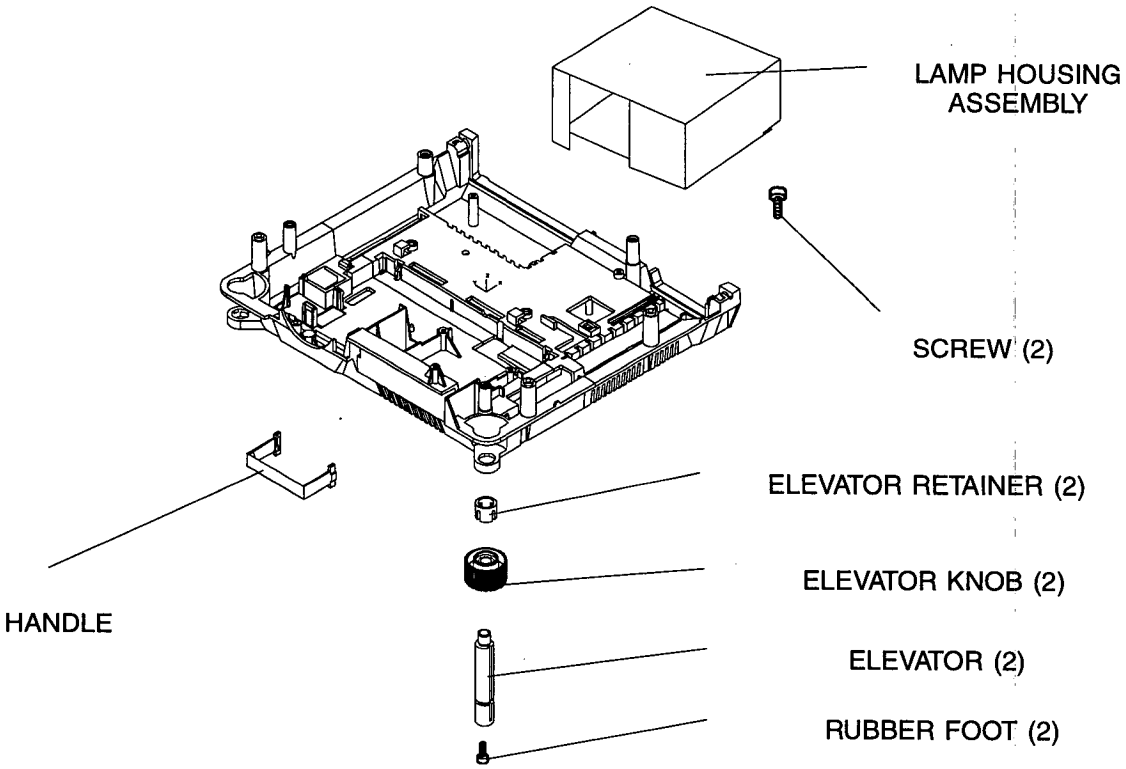


figure 4-22

SINGLE LAMP MODULE

1. Remove the LAMP MODULE from the PROJECTOR.

2. Lift the EJECTOR LEVER . The defective LAMP will eject from the LAMP SOCKET ASSEMBLY.

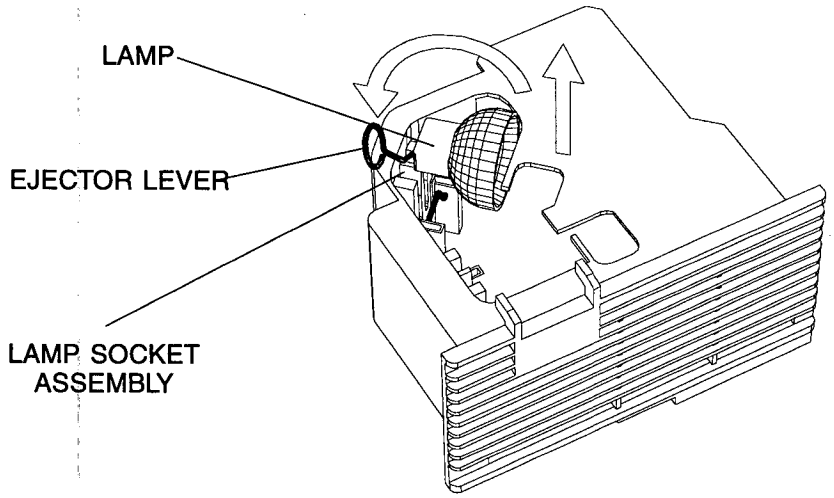


figure 4-23

3. Remove the CLIP and the CONDENSER LENS.

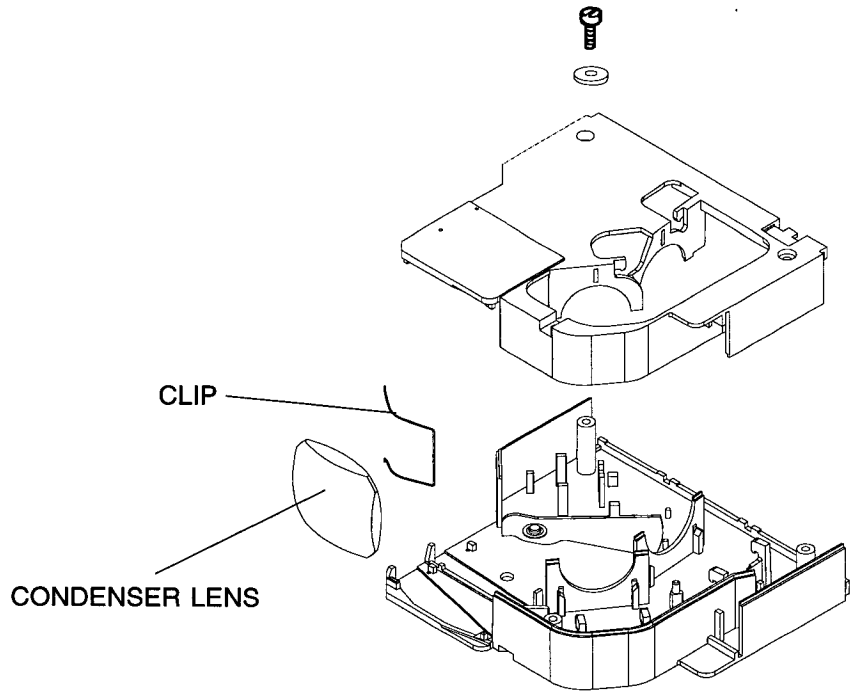


figure 4-24

4. Remove the 3 SCREWS, the 2 WASHERS and the LAMP HOUSING.

5. Remove the GRILL PLATE the HOOK, the SPRING and the LAMP MODULE LABEL.

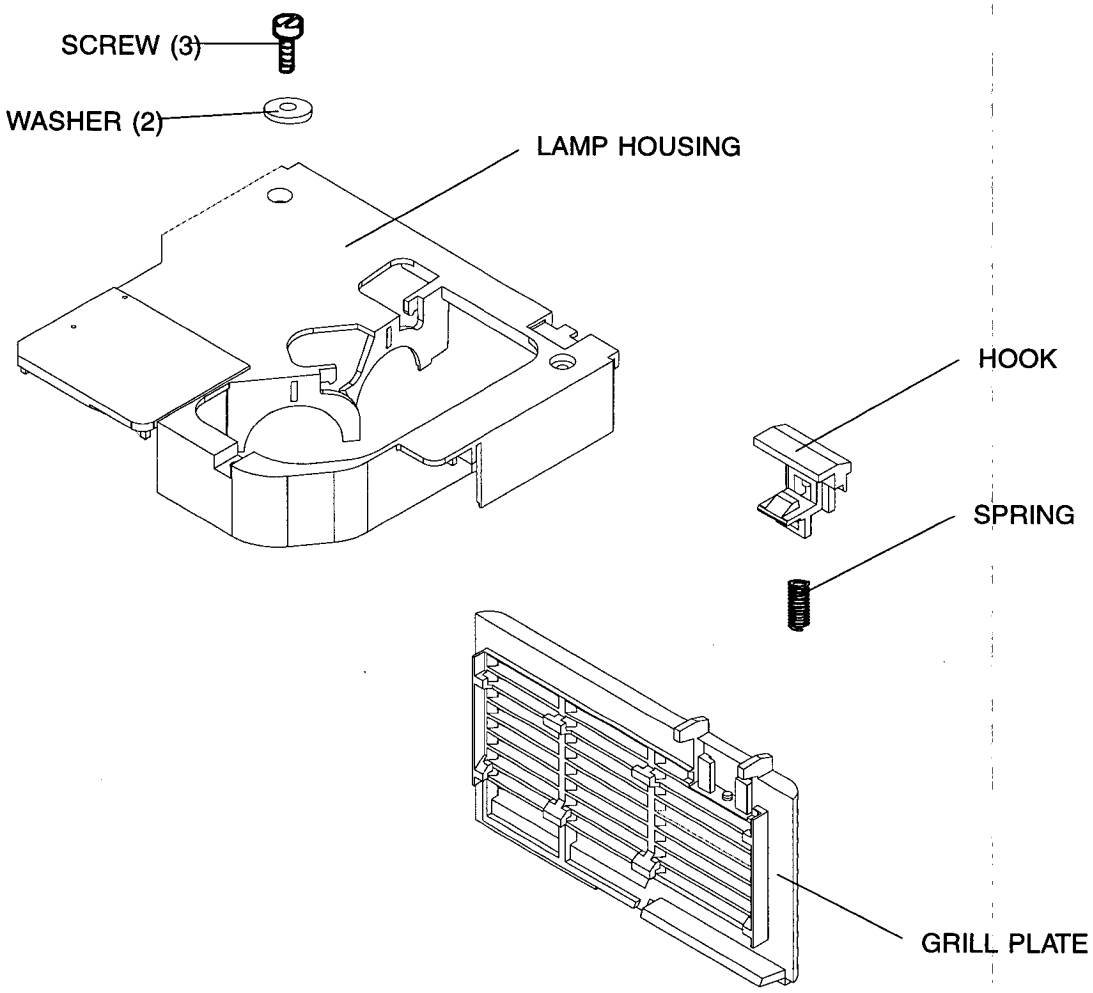


figure 4-25

6. Remove the 1 EJECTORS.

7. Remove the SPRING - Model 320.

8. Remove the MIRROR, the SPRING and the MIRROR HOLDER.

9. Remove the CIRCLIP and the SINGLE LAMP SOCKET ASSEMBLY from the PLUG.

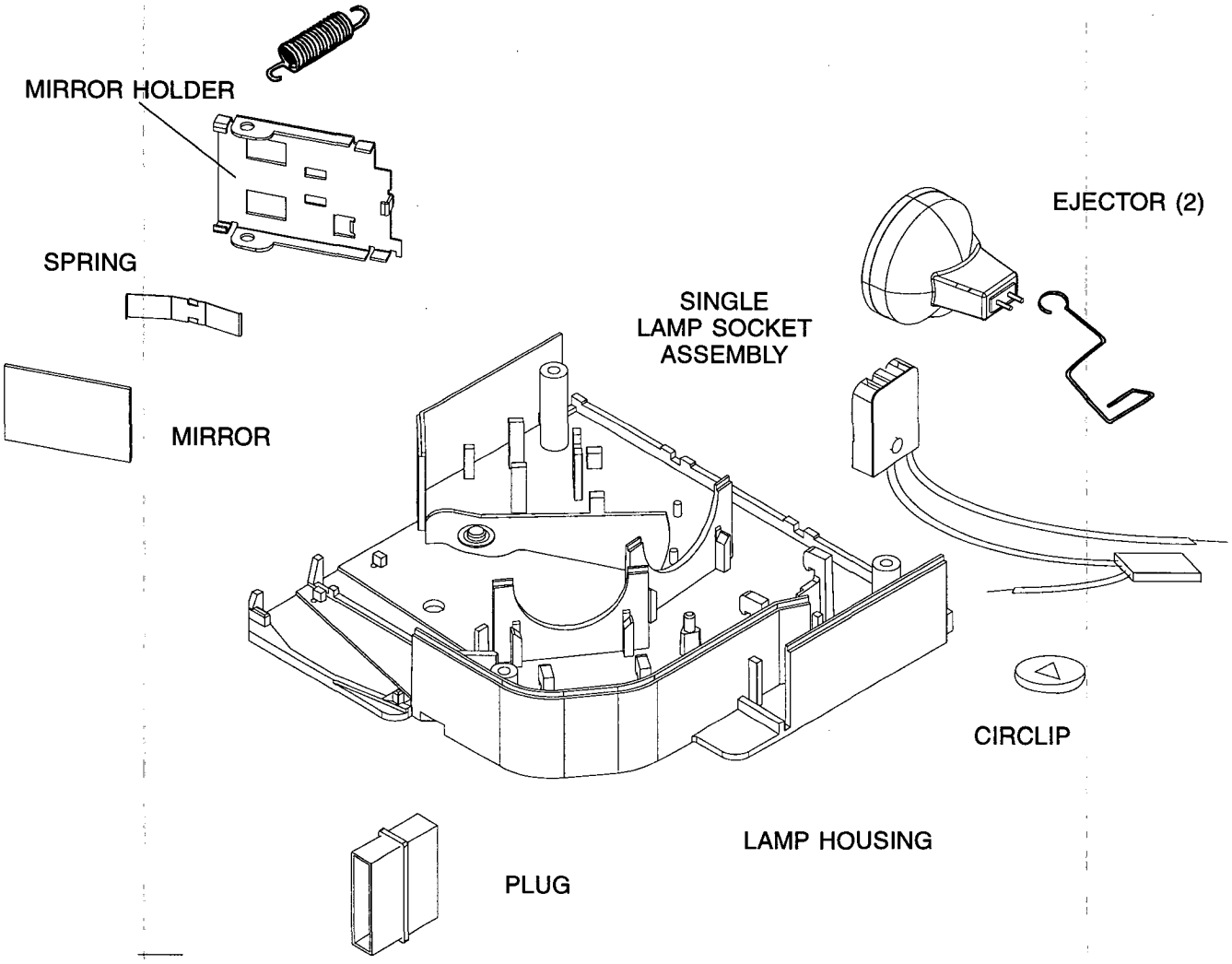


figure 4-26

NOTE

In case of assembling the SINGLE LAMP MODULE take care of the position of the MIRROR and SPRING.

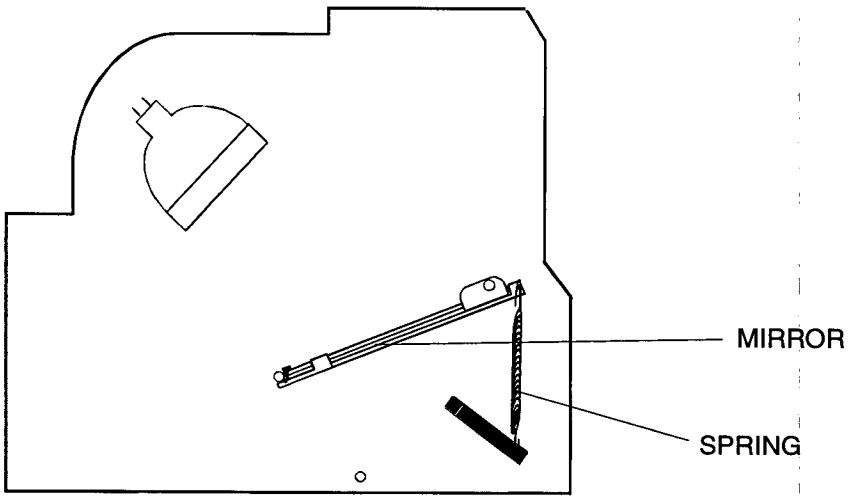


figure 4-27

Lubrication

Use the lubricant BARRIETA L 25 DL (50g) No. 558 1960

Grease all arrow marked spots.

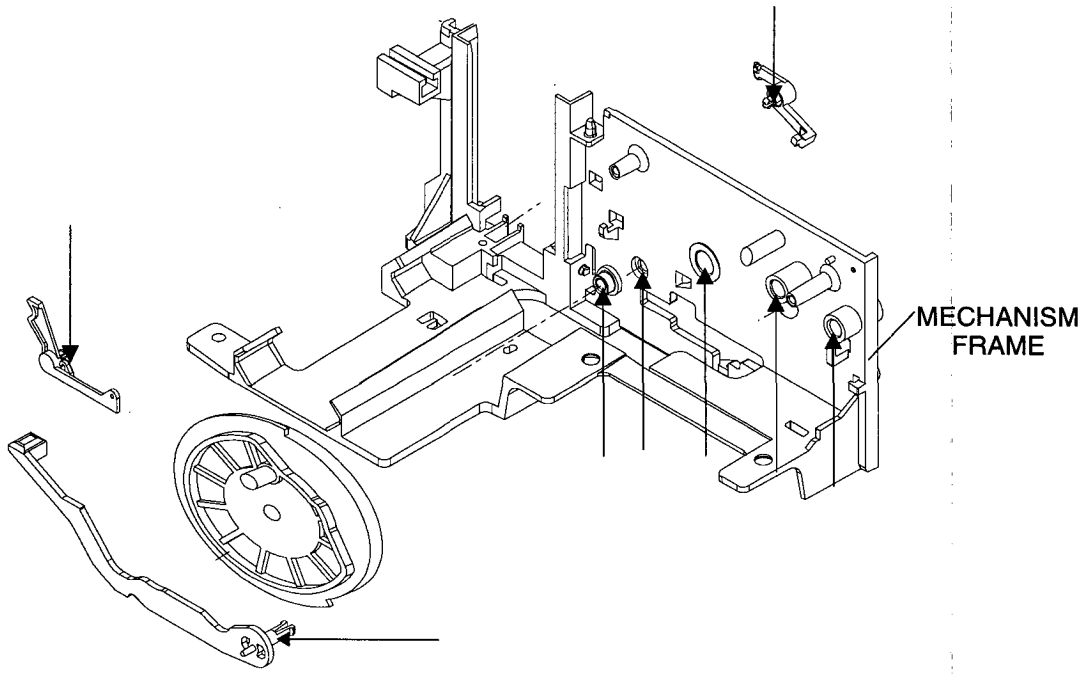


figure 4-28

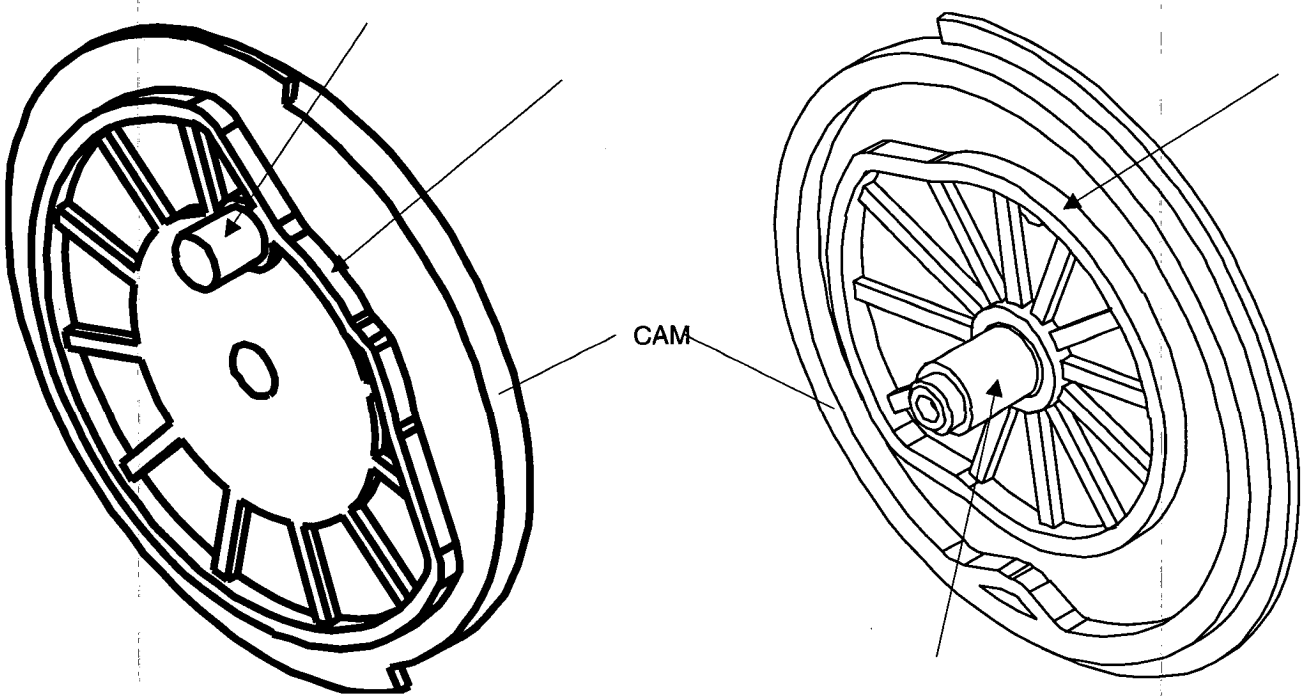


figure 4-29

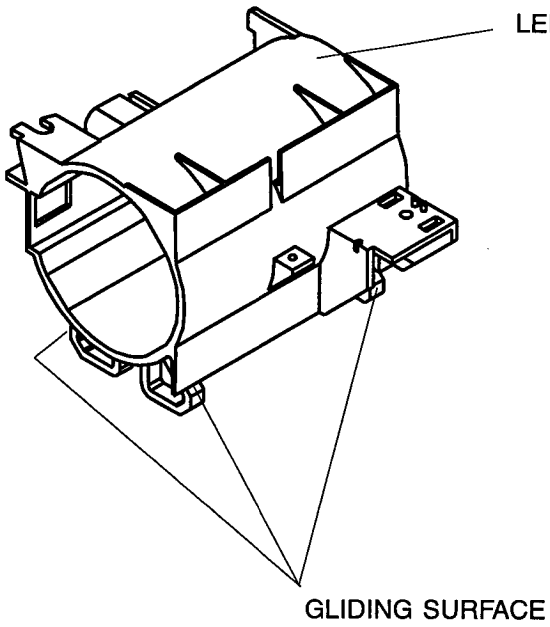


figure 4-30

Projector Checking

1. Power on the Projector. If there is no function and no initialization procedure, check the primary in the VOLTAGE SELECTOR and the secondary Fuses F1 and F2 on the MASTERBOARD PCB.

Slide Transport Problems (Slide jam)

To avoid slide jams check the position of the DRIVE RING. Use FIXTURE TOOL TL 622 0454 to adjust the TRAY MOTION PCB how it is described in Modification Instruction No.1

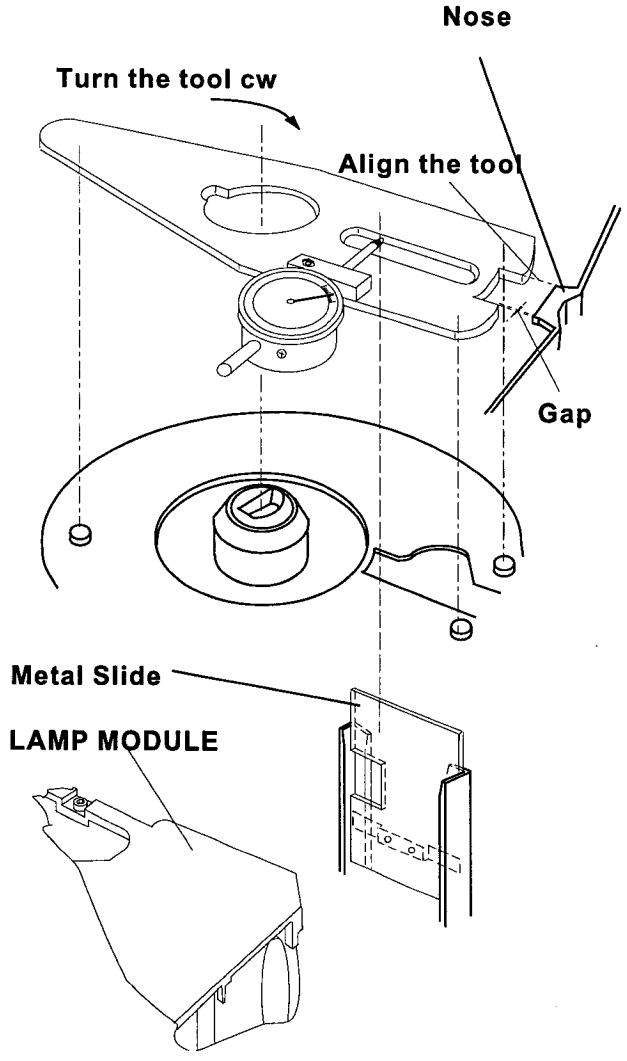


figure 4-31

NOTE

Take care of the spring located at the rear side of the Metal Slide (see figure 6-1). The spring must be outside of the Slide Gate.

MAINTENANCE

Maintenance Intervals

After about 1 500 running hours or 500 000 SLIDE LIFTER cycles at a room temperature of 0 - 40°C (32 - 104°F) we recommend maintenance by an authorized Kodak Service.
When the projector is operated in a dusty environment or in an enclosed area, maintenance should be done every 1000 operating hours.
When operating in an enclosed area, supply the necessary air and exhaust. If needed, the enclosure should have an additional fan.

Maintenance Procedure

Open the projector. Clean with a dust cleaning device.

The following structural components should be dismounted, cleaned, if necessary parts replaced, lubricated and assembled.

Component	Page
Upper Housing	4-1
Center Housing	4-3
Fan, Keyboard PCB and Tray Motion PCB	4-6
Transformer, MASTERBOARD PCB and Back Panel Assy	4-8
Mechanism Frame and Lens Mount	4-9
Lens Mount	4-10
Mechanism Frame	4-13

Cleaning of the other parts and structural components depends on how dirty they are.

See Item 4 DISASSEMBLY/ASSEMBLY.

Cleaning

It is important to clean the parts of the magazine drive and the slide transporter. See center housing, mechanism frame and lens mount. These parts should be cleaned thoroughly with a cleaner that does not damage the material.

The following parts should be checked for wear and, if necessary, replaced.

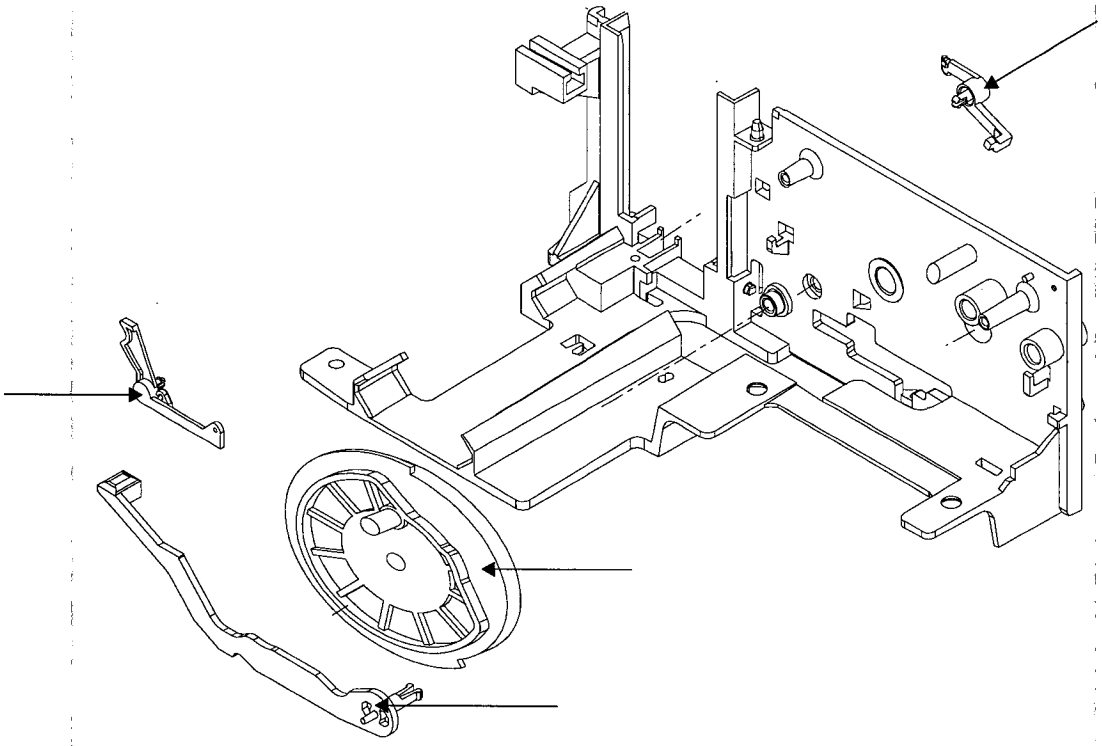


figure 4-32

The optical parts, such as LENS, CONDENSER LENS and should be cleaned regularly with lens cleanser.

Ultrasonic cleaning

At present, there is no information on the reactions of the individual components. We do not suggest this method.

5. TROUBLE SHOOTING

MALFUNCTION:	IT COULD BE THAT:	CHECK:
No function: SLIDE LIFTER does not move, FAN does not run, LAMP is not on.	The Main Power is not present.	1.) Main Power on the wall outlet 2.) POWER CORD for correct connection to the projector and the wall outlet. 3.) The PRIMARY FUSE T2A.
FAN is on, LAMP is on, SLIDE LIFTER does not move.	The SECONDARY FUSES are defective or the secondary voltages are not present.	1.) The secondary voltages on the connector which is coming from the Transformer to J14 (two orange wires = 10 VAC, two brown wires = 26 VAC) 2.) The secondary FUSES for operatability. FH1 = T1.25A FH2 = T2A 3.) Measure the DC voltage on the VOLTAGE REGULATOR U9. PIN 2 = GROUND PIN 3 = Vout = 5 VDC For steps 1-3 (see figure 5-1).

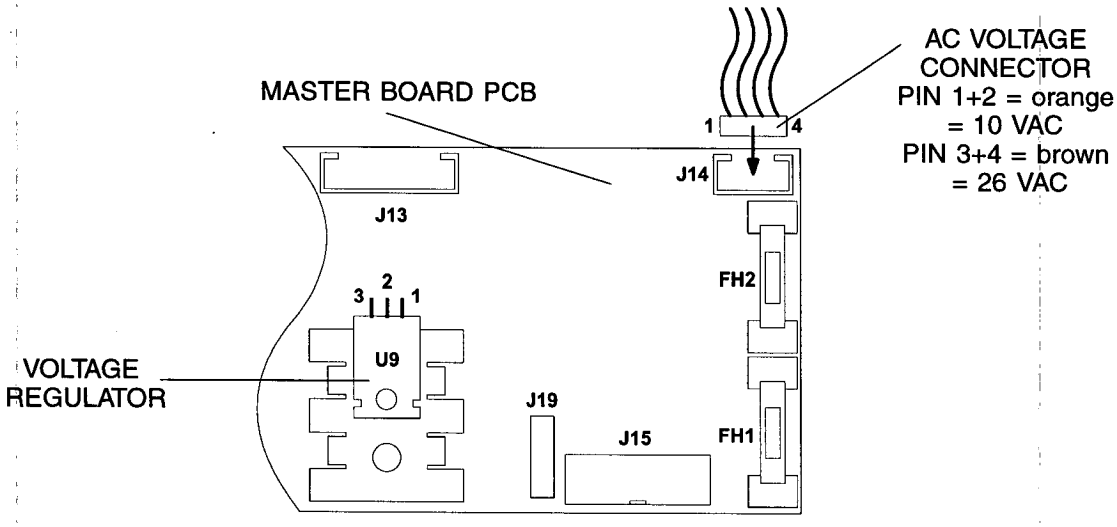


figure 5-1

MALFUNCTION:	IT COULD BE THAT:	CHECK:
Initializing procedure okay but the LAMP is not on.	The LAMP is defective. The THERMOSWITCH is defective. The LAMP SOCKET is damaged The wires coming from the TRANSFORMER to the SINGLE SOCKET ASSEMBLY are disconnected.	1.) The LAMP (visual check). 2.) The resistance of the THERMOSWITCH (see figure 5-2). 3.) The LAMP SOCKET (visual check). 4.) The wiring between the TRANSFORMER and the SINGLE SOCKET ASSEMBLY

NOTE

Two different transformers are used in the EKTAPRO 320, either the TRANSFORMER PN 621 7564 (see figure 5-2) already installed in the EKTAPRO Models 30XX or the TRANSFORMER PN 621 7614 (see figure 5-3) from the EKTAPRO MODELS 50XX up to 90XX.
To ensure a correct wiring after replacement, take care of the label which is attached to the TRANSFORMER.

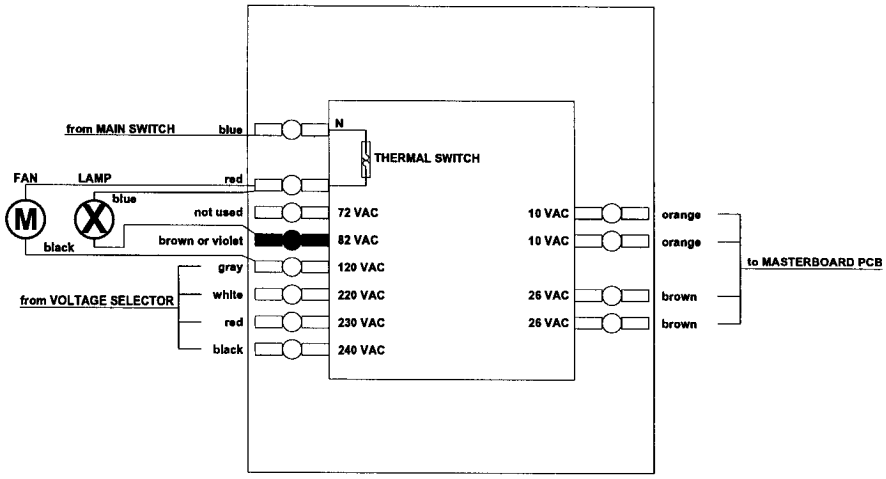


figure 5-2

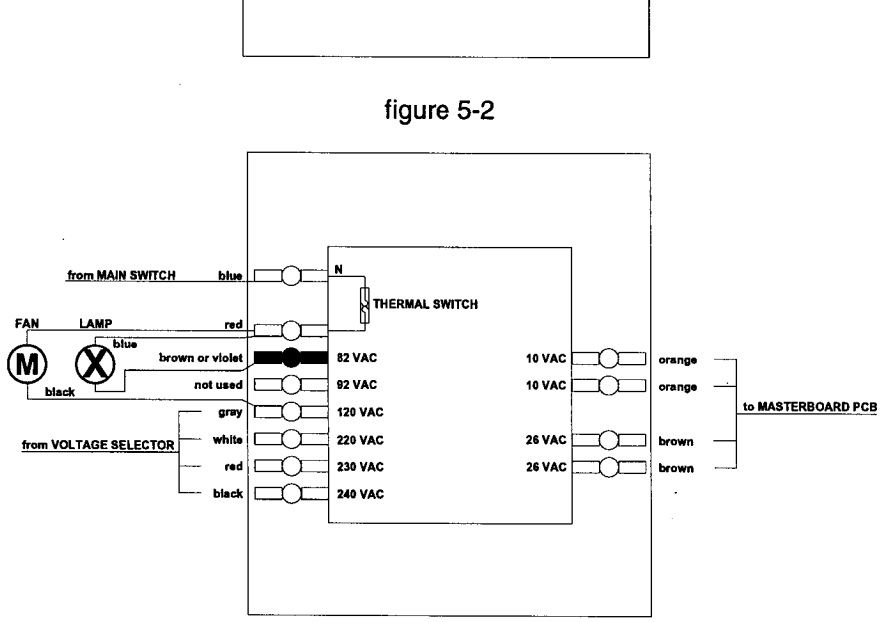


figure 5-3