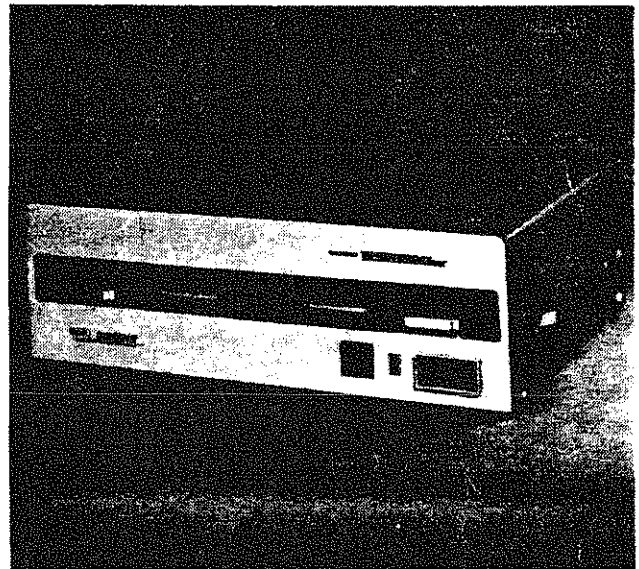


# Memorase<sup>®</sup> C-600 EPROM Eraser



## Operation Manual



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81-0060-04

81-0060-04 Rev A

## Addendum:

The following addendum will reflect the change in the wiring diagram as well as the operating instructions as required by replacement of the standard timer (part number 54-0019-03).

ADDENDUM TO  
MEMORASE C-600 EPROM ERASER  
OPERATION MANUAL

VII. MAINTENANCE:

B. Opening and closing cabinet

2. This section is changed to read as follows:

To remove tray from the cabinet: The tray is mounted into a sliding bracket. To remove the tray from the bracket, slide the tray out to the maximum open position. Holding the sides of the tray, evenly but firmly pull tray out to release the tray from the sliding bracket.

5. To reassemble the cabinet, carefully lower the lamp assembly and fasten with screws. Carefully replace the cover and secure with four (4) screws.

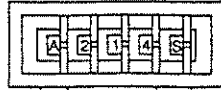
To replace the tray, instructions are changed as follows:

Align the tray in the sliding bracket, being careful not to bend the sliding bracket. Slide the tray in as far as possible. Firmly push the tray in and out until it closes completely.

Check operation of lamps, switch, fan and timer before returning to assembly station.

## Use Instructions Programmable Timer

### PROGRAMMING SWITCH DIAGRAM



#### Function Select:

- A Delay on Operate
- B Delay on Release
- C Interval On
- D Control-Off Interval On
- E Recycle
- F Single Cycle
- G Control On-Off Interval On
- H Control On-Off Delay
- I Pulse
- J Cumulative Delay On Operate

#### Counter Mode:

- B Divide by 10
- C Divide by 100
- A, D-J Normal Count

#### Time/Counter Setting: 001 to 999

#### Time Base:

.1 S	1/10 Seconds	Timing range	0.1 to 99.9 Sec.
S	Seconds	Timing range	1 to 999 Sec.
.1 M	1/10 Minutes	Timing range	0.1 to 99.9 Minutes
M	Minutes	Timing range	1 to 999 Minutes
.1 H	1/10 Hours	Timing range	1 to 99.9 Hours
H	Hours	Timing range	1 to 999 Hours
10 H	10 Hours	Timing range	10 to 9990 Hours

1. For standard use, rotate the **Function Select** switch to D (Control-Off Interval On).
2. Select the desired time range by rotating to the appropriate setting on the **Time Base** switch.
3. Enter the desired time by rotating to the appropriate number on the **Time/Counter Setting** switches. Numbers should be entered to left. For example the number **10** would be represented as **010**.

MEMORASE®

INDUSTRIAL EPROM ERASER

MODEL C-600

I. GENERAL DESCRIPTION:

The Industrial EPROM Cabinet is designed to provide intense, ultraviolet radiation upon a tray which is capable of holding up to 600 EPROMS per cycle. The cabinet is designed for ease of operation, safety during loading, safe and maintenance free operation.

SPECIFICATIONS:

- A. Overall size: 34" L x 26" W x 10" H  
(86.5 cm x 66 cm x 25.4 cm)
- B. Weight: Approximately 115 pounds (52.3 kg)
- C. Electrical: 115V AC, 60 Hz, 9 Amps (220/240V AC, 50 Hz,  
5.0 Amps)
- D. Primary Wavelength: 254nm
- E. Nominal Output: 18,000  $\mu\text{W}/\text{cm}^2$  at surface of EPROMS  
(1" (2.54 cm) below lamp)
- F. 0 - 120 Minute Timer
- G. Non-Resetable Hour Meter
- H. Sliding tray for loading EPROM's with viewing port and  
interlock to prevent accidental exposure
- I. Multi-unit Stacking Capability

## II. UNPACKING AND SET-UP:

- A. Remove the Model C-600 from shipping container.
- B. Install the cabinet on a sturdy work table with adequate electrical input service (see label). There must be a minimum of six (6) inches (15.2 cm) clearance behind the cabinet for the cooling fan to operate properly.
- C. The cabinet is designed for stacking multiple units. Additional stability of the work surface must be allowed.

**CAUTION**

Do not attempt to operate the lamps with the hood off or the interlock switch defeated. Short wave ultraviolet is harmful to unprotected eyes and skin.

**DANGER: HIGH VOLTAGE**

Do not tamper with the lamp connections of ballast wiring. If any lamps are damaged in transit, have the lamp replaced by qualified maintenance personnel (see maintenance section).

### III. OPERATION:

- A. The cabinet drawer is designed to accept any of three separate trays that will accommodate either 4", 5" or 6" wafers. It will also accept five (5) pieces of conductive foam (5 1/2" x 20", 13.97 cm x 50.8 cm) where a maximum of 600 EPROMs can be loaded at one time.
- B. When the foam pads or wafer trays have been carefully loaded, the drawer should be pulled out of the cabinet until the spring tabs engage the stops. The pads or trays can then be slid into the drawer. The back of the drawer has a full length stop to prevent pads or trays from being inserted too far. The front and sides are equipped with a 1/8" (.32 cm) high stop to maintain proper alignment when drawer is closed.

NOTE: The cabinet does not have to be fully loaded to operate.

- C. Push the drawer in completely. There is an interlock switch which will give a slight "click" when the drawer is closed. Set the time for proper exposure time and let run (see section IV).
- D. While in operation, the cooling fan will be running to help stabilize the thermal environment of the cabinet. Operation of the UV lamps may be observed through the viewing ports on the front of the drawer. These are equipped with special UV filters to insure that no harmful radiation emerges from the cabinet.
- E. If EPROMs are on a circuit board, and the board has no materials that may be damaged by shortwave UV light, the entire board may be placed on the drawer.

#### IV. EXPOSURE CONSIDERATIONS FOR EPROMS:

A. The primary wavelength for erasure of EPROMs is 254nm (shortwave UV). In this cabinet, 254nm output is produced by a series of low pressure mercury vapor lamps. The nature of these lamps is as follows:

1. There is an optimum operating temperature for the 254nm output of the lamps.
2. To reach that temperature there is a warm-up time required (see V-B).
3. There is a gradual decline in 254nm output of the lamps over a period of time. This, as with any mercury vapor lamps, is accelerated with repeated on and off cycles (see figure V-A).
4. The output from lamps may vary  $\pm 10\%$  due to differences in materials and processing.

B. To summarize, the output of these lamps will vary with environmental changes, cycling on/off time and frequency, and age of the lamps. After the cabinet has warmed up, the key factor in computing exposure time is the age of the lamps.

The following data is intended for use as guidelines to compute proper exposure time.

1. UV radiation intensity produced at a distance of 1" (2.54 cm) from a new lamp =  $18,000 \mu\text{W}/\text{cm}^2 + 10\%$
2. If the energy required to erase a particular EPROM or wafer is known, the minimum exposure time may be determined from the following relationship:

$$t = \frac{E}{(6 \times 10^5) ie}$$

Where

t = Exposure Time (min)  
E = Erase Energy  $\left(\frac{\text{w-sec}}{\text{cm}^2}\right)$   
@ 254nm Wavelength  
i = Light Intensity at Chip/Wafer Surface  $(\mu\text{W}/\text{cm}^2)$   
e = Lamp Efficiency (see Figure V-A)



(IV-B-2 con.)

Example:

One commonly used EPROM has an erase energy rating of 6 w-sec/cm<sup>2</sup>. The lamp has been in use 500 hours, as determined by the cumulative hour meter.

Therefore:

$$\begin{aligned} E &= 6 \\ i &= 18,000 \\ e &= 80\% \\ t &= \frac{6}{(6 \times 10^{-5}) (18,000) (.80)} = 6.9 \text{ Minutes} \end{aligned}$$

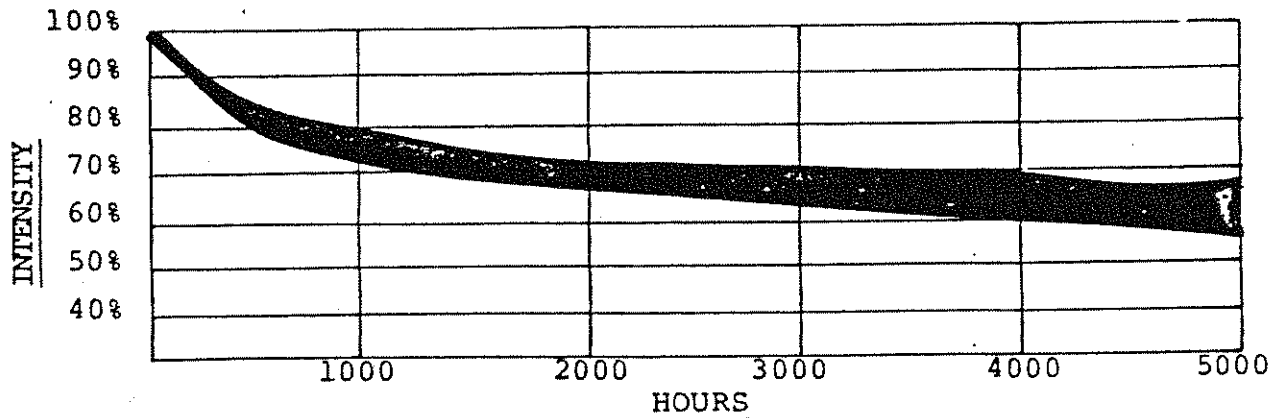
Most users add approximately 10-20% more time as a safety margin, so the example chip would be run 9-10 minutes.

3. If the erase energy specification of a chip is unknown the following procedure may be used.
  - a. Expose a sample chip for 30 minutes.
  - b. Verify complete erasure.
  - c. Increase or decrease exposure times as required
  - d. Periodically verify complete chip erasure.

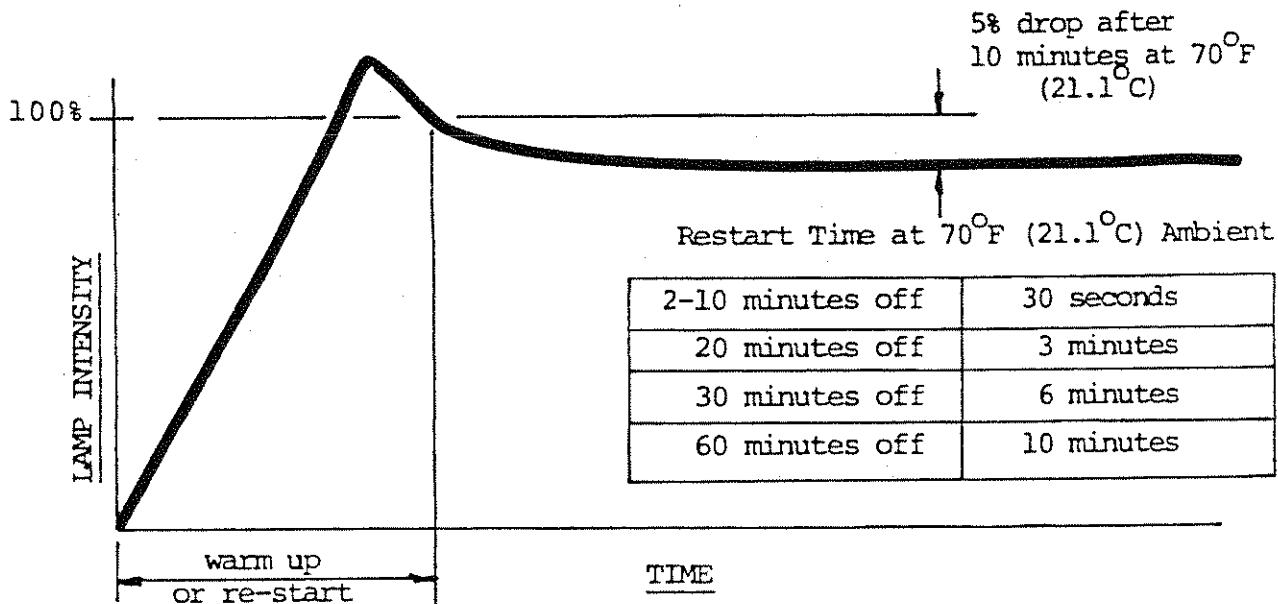
NOTE: Many factors of EPROM chip construction, age, and processing materials affect erasure time. Increased exposure times may be required on older EPROMs.

V. LAMP CHARACTERISTICS:

A. Aging Characteristics of Lamp



B. Warm-up Cycle and Restart Cycle



WARM UP TIME

Ambient 60°F (15.6°C)	20 Minutes
Ambient 70°F (21.1°C)	10 Minutes

## VI. SAFETY:

The Model C-600 Cabinet is the largest commercially available source of short wave ultraviolet known. The total 254nm output of this cabinet is extremely hazardous.

Under normal operation as described in Section III, this unit will provide no hazards to personnel due to exposure to high voltage of short wave ultraviolet radiation. At no time should any attempt be made to defeat the interlock of the cabinet. Operation of the lamps any time with the tray open indicates a malfunction which should be corrected immediately by qualified personnel.

The following information is provided to discourage those who might otherwise be tempted to circumvent the safety features of this instrument.
--

### AFFECTS OF SHORT WAVE ULTRAVIOLET ON PERSONNEL:

It is essential that adequate precautions be taken in any application of short wave lamps. Prolonged exposures or exposures to high intensities of ultraviolet radiation can cause temporary, but painful inflammation of the conjunctiva (the outer membrane of the eye), as well as histological effects in the cornea, iris, and lens of the eye. Reddening or even burning of the skin (erythema) similar to sunburn will be caused by excessive exposure to ultraviolet energy. In extreme cases, permanent harmful effects can occur.

The glass used in conventional eyeglasses affords adequate eye protection. However, care should be taken that the ultraviolet energy does not enter the eyes from the side, nor is reflected into the eyes from the back sides of the glasses.

Other protection should include the ears, particularly when the wearer may be exposed to a number of lamps. It is well to remember that when one is exposed to ultraviolet energy, the effects may not be felt until several hours afterward. Likewise, individuals vary greatly in their sensitivity to radiation. Children, for example, are much more sensitive to ultraviolet than are adults.

Prolonged exposure of the unprotected skin and eyes should always be avoided and people with fair skins should avoid even occasional exposures. Barrier creams and lotions give some protection for brief exposures, but when the exposure is long or the intensity is high, protective clothing on the hands, face and arms is advised. Enclosures or opaque shields around the source can be used to control the exposure to radiation but avoiding all unnecessary exposure will reduce any possible long-term effects.

(VI con.)

Recommended reading: "Criteria for a recommended standard... Occupational Exposure to Ultraviolet Radiation" published by U.S. Department of Health, Education and Welfare, Public Health Service, Document HSM-73-11009 and "Practice for Occupational and Educational Eye and Face Protection" published by the United States of America Standards Institute, Document USAS Z . 1-1968.

#### VII. MAINTENANCE:

- A. The Model C-600 Cabinet is relatively maintenance free. The installations in which this cabinet will be used, i.e., semi-conductor assembly plants, are considered clean environments and should not cause any degradation of the lamps or reflector. The cabinet is finished with a high quality paint so finger marks or dust can be cleaned off with an all purpose detergent cleaner.
- B. Opening and closing cabinet (see Figure VII-G):

TO BE PERFORMED BY QUALIFIED MAINTENANCE PERSONNEL ONLY.

CAUTION: Ultraviolet hazard--see section on safety.
---

WARNING: High voltage, disconnect all power before servicing.
---

1. Move cabinet to sturdy work station which will allow the lamp assembly to be opened without obstruction. Do not attempt to service cabinets which are stacked.
2. Remove tray from cabinet. When spring pins lock in place, grip the tray on the sides and with your finger, release both spring pins. The tray can now be removed from the cabinet.
3. Remove four (4) screws on the right and left side of the cover and carefully lift the cover off. This normally requires two people to safely remove the cover.
4. Remove two (2) flat head screws on the lower right side of the lamp assembly. Carefully swing lamp assembly up and to the left until it comes to rest perpendicular to the work table.

(VII-B-4 con.)

CAUTION: The lamp assembly is not stable enough in this position to leave unattended. If lamp assembly is to remain in this position, some safety precautions must be taken to guard against the lamp being knocked over accidentally. A block of wood should be placed under the lamp assembly to relieve strain on the hinge. Also, a safety chain could be attached to one of the flat head screw holes and fastened to the work table.

5. To reassemble the cabinet, carefully lower the lamp assembly and fasten with screws. Carefully replace the cover and secure with four (4) screws. Replace tray and check out operation of lamps, switch, fan and timer before returning to assembly station.

C. Lamps and Reflector:

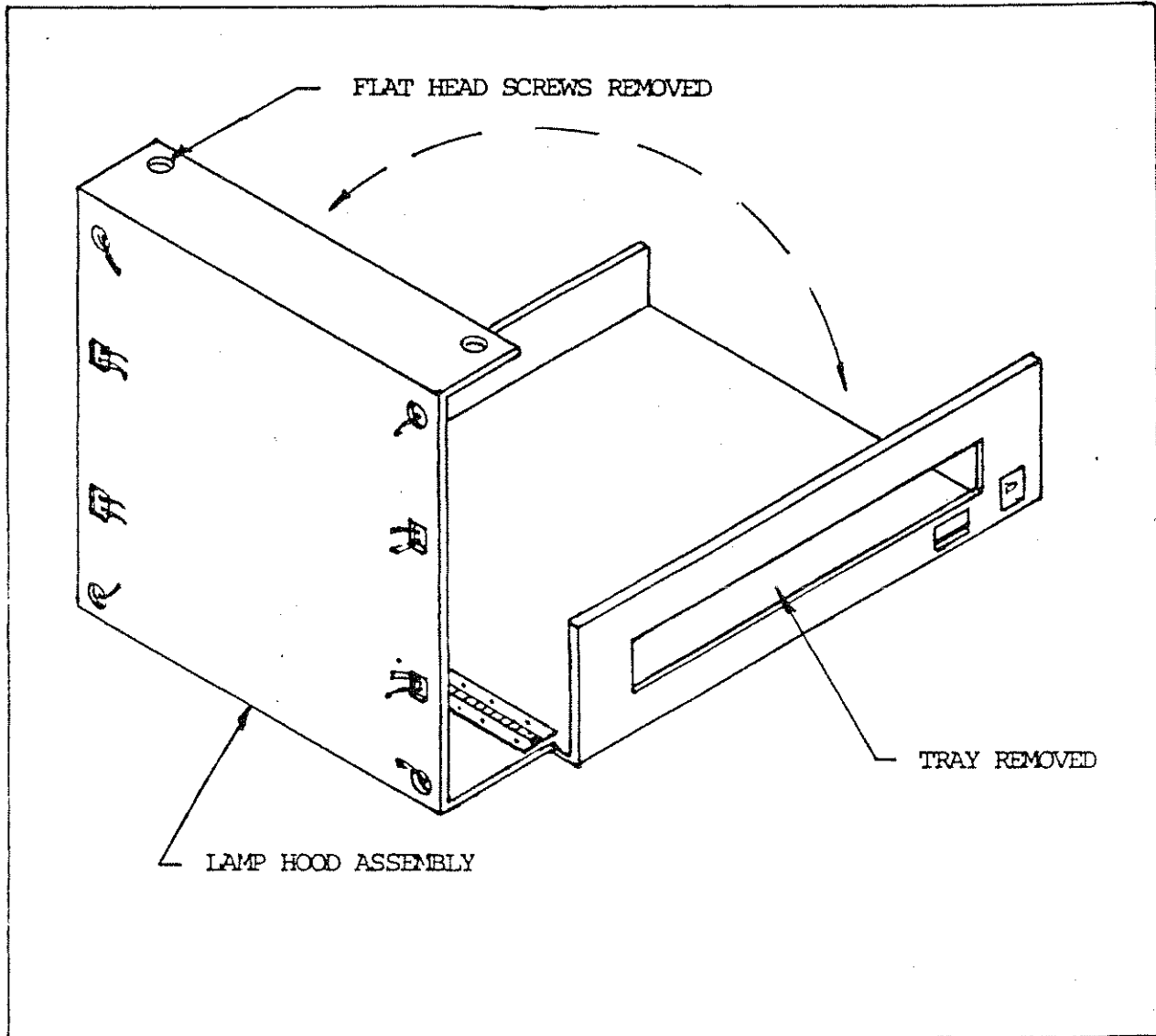
1. In some cases it might be wise to clean the lamps. If this is to be done, the following are required:
  - a. Pure iso-propyl alcohol
  - b. Lint free tissue or cloth
2. Apply alcohol to the tissue and lightly wipe each individual web of lamps to remove excess dirt. Repeat a second time working from one side to the other to assure each web is clean.
3. Lamp Removal: If the lamp is broken or its output is low, it must be replaced. After the lamp or lamps have been identified as needing replacement, carefully loosen set screw in the phenolic connector on the lamp electrode disconnecting the lamp leads. Remove the two outside screws and loosen the two inside screws on the reflector. Remove the defective lamp and reflector assembly.
4. Lamp Replacement: Slide the new lamp and reflector into the center screws and tighten. Replace outer screws and lamp leads.

D. Transformer: Open circuit voltage is 6000V AC on the secondary. Operating voltage is 2800V AC nominal at 28-30 ma. If a transformer is not operating properly it should be replaced.

E. Timer, Hour Meter and Fan: All three components are easily replaceable if parts become defective. If the fan is removed or replaced, make sure that the air flow is directed out the back panel.

(VII con.)

F. Fuseholder is located at the rear of the cabinet. Replace only with equivalent fuse.



G. Figure VII-G

VIII. C-600 REPLACEMENT PARTS:

<u>DESCRIPTION</u>	<u>QTY/CABINET</u>	<u>115V/60Hz Reorder NUMBER</u>	<u>220V/240V/50Hz Reorder NUMBER</u>
Lamp, Grid w/Leads & Tie Wires	6	77-0006-01	77-0006-01
Transformer	6	40-0062-01	40-0062-02
Fan	1	47-0009-03	47-0020-02
Timer	1	54-0019-03	54-0020-01
Hour Meter	1	54-0034-01	54-0034-04
Rubber Feet	6	72-0004-01	72-0004-01
Fuseholder	1	56-0004-01	56-0004-01
Fuse	1	56-0006-01	56-0006-02
Switch, Interlock	1	53-0050-01	53-0050-01

IX. OPTIONS:

<u>DESCRIPTION</u>	<u>QTY/CABINET</u>	<u>115V/60Hz Reorder NUMBER</u>	<u>220V/240V/50Hz Reorder NUMBER</u>
Foam EPROM Pad	5	72-0038-01	72-0038-01
4" Wafer Tray	1	20-0420-02	20-0420-02
5" Wafer Tray	1	20-0420-01	20-0420-01
6" Wafer Tray	1	20-0420-03	20-0420-03

DWG NO	DRAWING SIZE	REV
SCALE	NONE	SHEET OF

