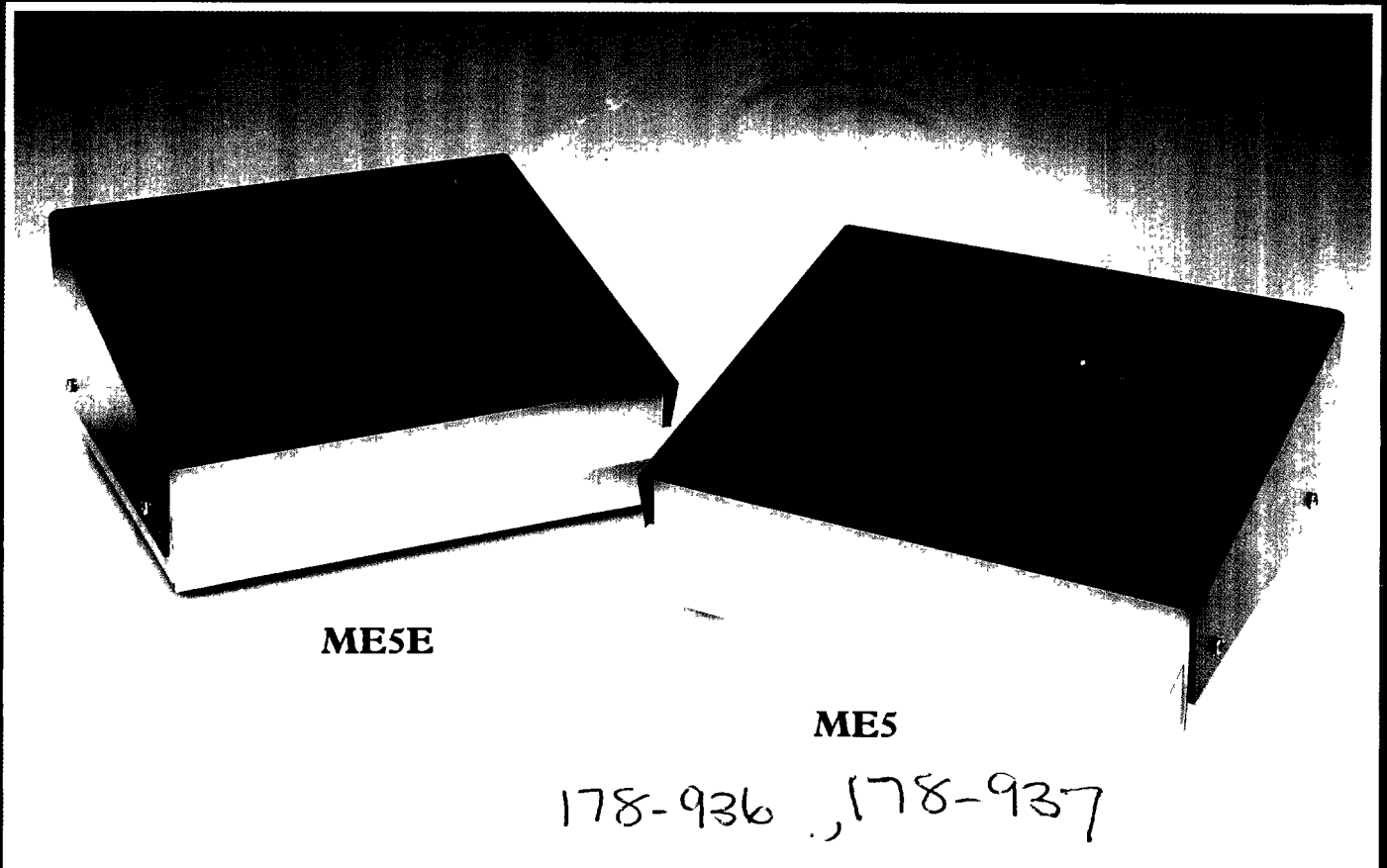


Lawtronics

UV EPROM ERASERS



The ME5 and ME5E economy eprom erasers are designed to complement the range of larger erasers manufactured by Lawtronics.

Although the erasing capacity is smaller and therefore more suitable for education and individual engineering applications both units are built to the same robust professional standards.

In addition to erasing five 28-40 pin DIL devices both units accept circuit boards up to 150 x 60mm in area and 20mm height.

Each instrument in the range is a highly robust, table-top unit, constructed to exacting standards to operate consistently and reliably even in industrial environments. The wide choice of erasing capacities available allow the user to match a particular instrument to his throughput levels. All units incorporate advanced features to assure dependable erasure and maximum operator safety. The rugged cabinets are all fully sealed against UV leakage and electrical screening eliminates interference. The filtering action of the UV tube quartz results in negligible ozone separation and all units are protected against static. All models incorporate a safety interlock device that shuts off power to the UV source when the drawer is removed.

The only real limitation during their operating life is the normal effective life of the UV tubes. These high quality units have an expected life of approximately 2000 hours

working down to an 85% degree of efficiency. The ME Series is designed to facilitate easy changing of expired tubes since the instruments' rugged construction ensures a lifetime of dependable operation. Because of the precise nature of quality EPROM erasure however, empirical calibration every 200 operating hours is strongly recommended, since all UV tubes gradually lose their radiation intensity with age. (See Assuring Proper Erasure).

SPECIFICATIONS

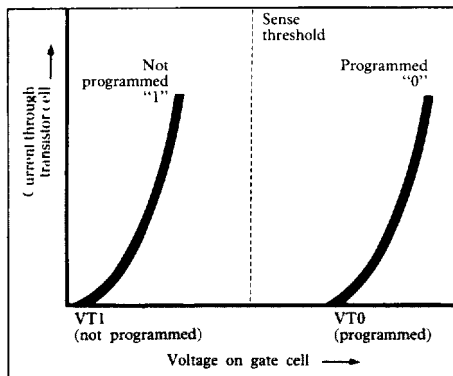
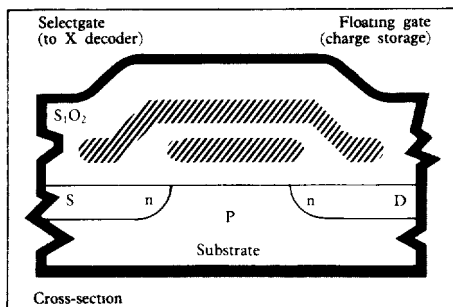
	ME5	ME5E
Operating voltage	220/240v	
UV wavelength	253.7nm	
UV intensity (240v)	nom 5mw/sq cm	
Tube life	2000 hrs to 85%	
Capacity	5 Eproms 24/28/40	
	On board erasing	
	150 x 60 x 20mm high	
Timer 60 min	ME5 only	
Indicators	Erase on	
Safety features	Exposure interlock	
Dimensions	190W x 95H x 165Dmm	
Weight	2.00kg max	
Shipping wght	2.25kg max	

Lawtronics Ltd reserve the right to modify this specification without notice.

OPERATING YOUR UV ERASERS

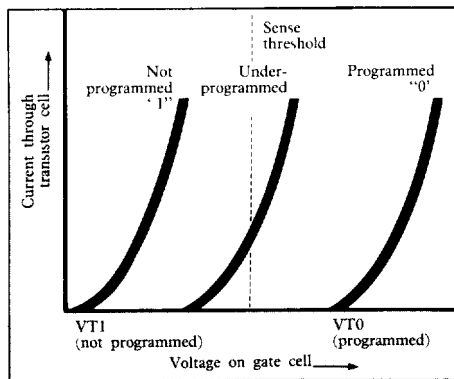
PROGRAMMING AND ERASING EPROMS

FIGURE 1 illustrates a typical storage cell serving as one of the memory elements of an EPROM. It consists of a top select gate and a bottom floating gate. The top gate is connected to the row decoder and the floating gate is used for charge storage. The cell is programmed by injection of high-energy electrons onto the floating gate. Since it has no electrical connections, this gate acts as a capacitor plate, and the charge is trapped. This charge causes a shift in cell threshold, as shown in FIGURE 2. When voltage is applied to the select gate — at a point between the two curves — the transistor will turn on if in the “not programmed” or “1” state, and remain off if in the “programmed” or “0” state. Since there are no electrical connections to the floating gate, erasure must be achieved by non-electrical means. The accepted method is exposing the memory element (in fact, the entire memory array) to high-intensity ultraviolet radiation at a wavelength of 253.7 nm, for a prescribed period of time. This radiation creates an ionising action, causing the charge on the floating gate to leak back through the oxide layer into the substrate. When sufficient charge has been drawn off, the cell is no longer programmed in the “0” state.



ASSURING PROPER ERASURE

Neither programming nor erasure occur instantaneously. Programming may require 100 or more pulses to achieve the desired shift in cell threshold. Likewise, erasure — achieving the desired shift in the opposite direction — requires irradiation at a known UV intensity and wavelength, for the right amount of time. If a cell is under-programmed or under-erased, its electrical characteristic curve may cross the sense threshold, as shown in FIGURE 3. It can be seen that small changes in select gate voltage (or temperature) can cause the cell to seem either to pick up or drop bits.

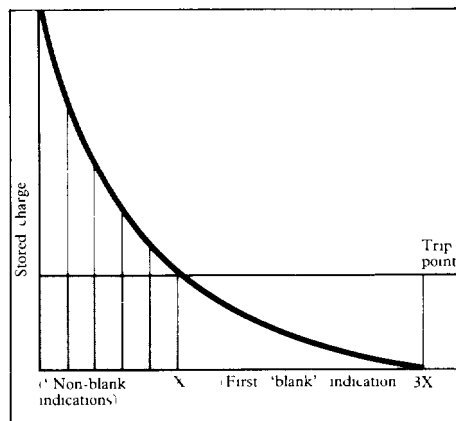


One of the most common causes of failure of equipment containing MOS EPROMS is, in fact, improper erasure of PROM devices before programming. And such faults can be very difficult to trace — particularly under field conditions.

Proper erasure requires (1) use of a high-quality UV eraser, and (2) applying the right UV intensity for the correct period of time. This latter requirement can be met by understanding a few simple facts and following a few straightforward procedures.

The amount of time needed for erasure of a MOS EPROM is specified in terms of minimum integrated dosage, which is expressed in Watt-seconds/cm². This value varies with (1) the device to be erased, (2) its previous programming and erasing history, (3) the power rating of the UV source, (4) the age of the UV source, and (5) cleanliness of EPROM windows and UV source tubes.

Each manufacturer specifies minimum erase dosage for each device supplied and is usually in the range 6 to 15 Watt-sec/cm². However, these figures are nominal, and should be used only as a rough guide. As the UV source ages, its intensity gradually diminishes. For this reason, periodically check the UV source by the following procedure, illustrated in FIGURE 4.



- (1) Place a programmed EPROM under the UV source for a measured short period of time.
- (2) Place the EPROM into the programmer, and check to see if it is blank.
- (3) If not, place it under the UV source again, for another measured period of time. Repeat steps (2) and (3) until the PROM is blank.
- (4) Multiply the “time-to-blank” by 3, and use this figure as the minimum erase time.

This final step assures that erasure progresses well beyond the “trip point,” or sense threshold.

Periodical checks of the UV source, and recording of the minimum erase time — preferably on the instrument itself — will assure proper erasure, provided reasonable cleanliness of tube and EPROM windows is maintained.

WARNING

Short-wavelength UV is injurious to the eyes, and can cause painful skin burns or other harmful effects. For this reason, it is important to use a UV eraser provided with a suitable safety interlock that automatically shuts off the UV source when the tray is not in place.

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