

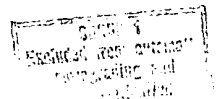
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ABSTRACT

The MLT 1540 Light Table has been accepted for use in NPIC. The table has met, or exceeded the specifications provided for its production.

This document reports the testing accomplished on those items which were changed as a result of the prototype testing (T&E Report 70-03, NPIC/R-46/70, August 1970).

Declass review by NGA/DoD



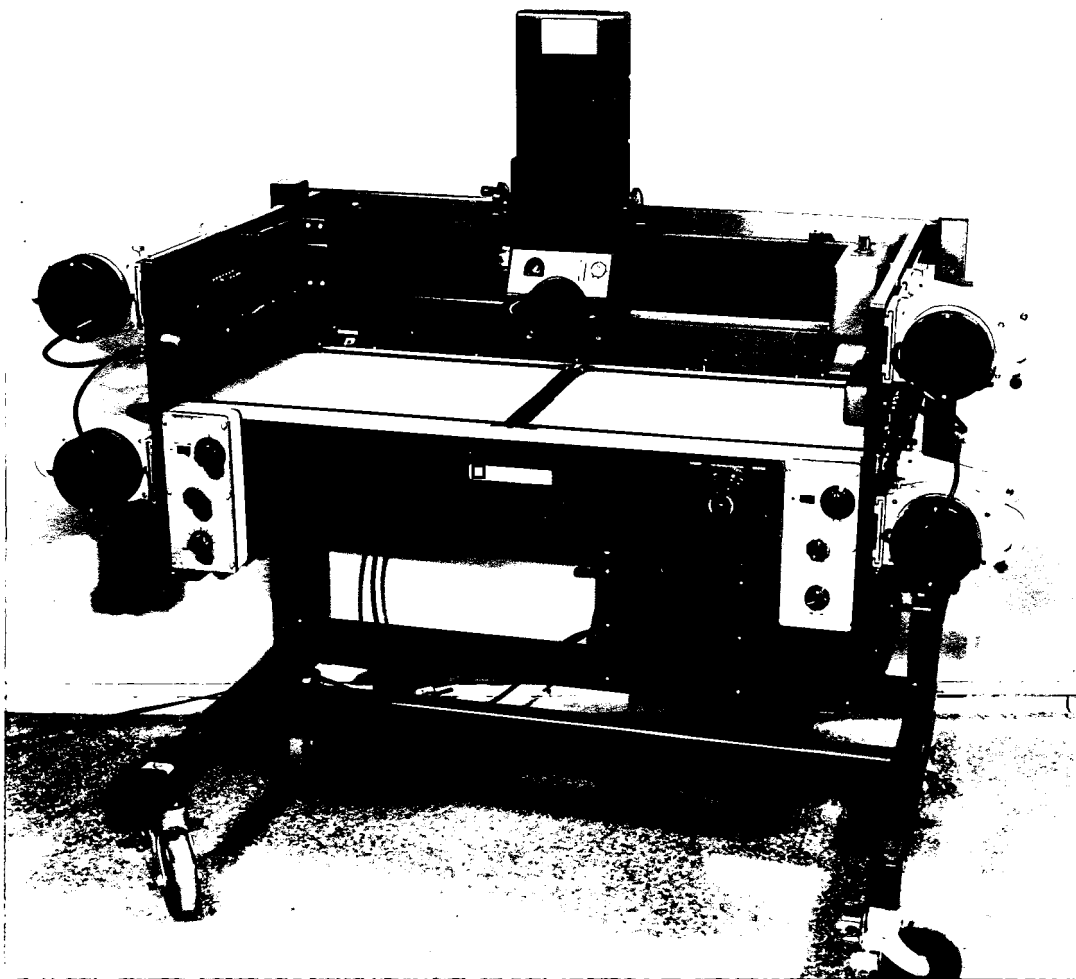


Figure 1. MLT 1540 Light Table

SUPPLEMENTARY TEST & EVALUATION REPORT

X1 [] MLT 1540 LIGHT TABLE PRODUCTION MODEL

T&E REPORT 70-03
SUPPLEMENT

1. Introduction

X1 1.1 The [] 1540 Split Format Light Table was originally tested from 12 March to 1 May 1970. This testing resulted in the aware of a production contract to [] for tables of like design, but with some substantial changes. The first production model was received for testing on 11 December 1970. Testing was completed on 29 December 1970.

1.2 This report details the operation of those items which were changed, or for which change was requested. Those items which were satisfactory at the previous testing were not checked, and are not reported.

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2. Summary of Test Results

The following table summarizes the results of the supplementary testing. References listed will be found in the main document, T&E Report 70-03, NPIC/R-46/70, July 1970.

<u>Correction to be Made</u>	<u>Present Condition</u>	<u>Remarks</u>
<u>1. Film Handling System</u>		
a) Lower cover position for split mode (p. 13)	Satisfactory	
b) Bracket detents (p. 18, 19)	Satisfactory	
c) Release lock (p. 18)	Satisfactory	
d) Idler bracket flex (p. 19)	Satisfactory	
e) 70mm tracking (p. 19)	Satisfactory	Finger Guides physically hold edges of film in position.
f) High speed should not go below 20 inches/second (p. 20)	Satisfactory	
g) Film tension (p. 20)	Satisfactory	
<u>2. Illumination Sources</u>		
a) Uniformity (p. 15)	Satisfactory	This specification was revised for production models.
b) Color of Illumination (p. 14, 15)	Satisfactory	
c) UV Certification	Satisfactory	
<u>3. Microstereoscope Mount Assembly</u> (p. 20, 21)	Satisfactory	

<u>Correction to be Made</u>	<u>Present Condition</u>	<u>Remarks</u>
4. <u>Carriage Motion</u>		
a) Manual Movement (p. 22)	Satisfactory	This specification was changed for the production models.
b) Fail-Safe Y Switch (p. 26)	Satisfactory	This specification was changed for the production models.
c) Adjustable X translation stops (p. 21)	Satisfactory	Made stops semi-captive.
5. <u>Controls</u>		
a) "Shape" coding of control knobs (p. 25)	Satisfactory	
b) Pictograms (p. 25)	Satisfactory	
c) Quick release loading mechanism (p. 26)	Satisfactory	
6. <u>Noise</u> (p. 24)	Satisfactory	This specification was changed for the production models.
7. <u>Elevating Table</u> (p. 13)	Satisfactory	Stops have been provided. Cord interference no longer exists.
8. Parallellism - Glass to Pod Holder	Satisfactory	Supports with adjustment to achieve parallellism are provided.
9. *Vibration	Excellent	Building vibrations are measurably damped by the table structure when tilted, regardless of tilt angle.

* No correction requested.

3. CONCLUSIONS

X1 3.1 The MLT 1540 Light Table production Model is suitable for operational use. The production model has been inspected by operational components and meets with their approval.

4. Description of Equipment

4.1 Microstereoscope Carriage and Mount

4.1.1 The focus mechanism has been completely redesigned. The prototype had an coarse focus with a fine focus mechanism mounted on it. The present unit has an integral unit with coarse and fine movement completely built for this table. The pod retainer is unchanged.

4.1.2 The bearings for the carriage have been changed to give a smoother manual motion.

4.1.3 The motorized drive has been completely redesigned. The controls have been moved to the area above the pod mount (see Figure 2). The counterbalance system has been eliminated in favor of a fail-safe Y-motion system. When the table is tilted, the carriage cannot move in the Y direction unless: 1) a toggle switch is thrown, and 2) a fail-safe release switch on the pod mount position is depressed.

4.1.4 Semi-captive movable stops in the X-direction were added to prevent rhomboid arms from hitting the frame of the table.

4.2 Film Handling System

4.2.1 The film handling controls have been reworked. The shapes of the speed controls have been changed to avoid the fatigue noted in the earlier report. Pictograms have been added to avoid confusion and misuse of the controls (see Figure 3).

4.2.2 Mechanical fingers have been added to prevent tracking difficulties with 70mm film.

4.2.3 The quick release action of the film brackets has been changed to preclude accidentally dropping a loaded spool of film by catching the release on clothing.

4.2.4 Detents and visual markers have been added to aid in the setting up of the specified combinations of film for interpretation.

4.2.5 The idler bracket has been redesigned to eliminate the flex which was specified in the earlier report.

4.3 Illumination Sources

4.3.1 The placement of the illumination sources or tubes was changed to meet the uniformity specification. The curved section of the tube was moved to the center section of the table from the outer section to eliminate the dark area at the center opening of the prototype.

4.3.2 The masks used for the open space between dual webs of film was eliminated.

4.4 Controls

4.4.1 The tilt-elevate control box was moved to a position under the right side of the table. The switches are shape coded to enable blind use of the controls (see Figure 4).

4.5 An elapsed time meter has been added to the circuit for warranty and maintenance purposes. This meter is connected to the main power switch, and counts time when that switch is in the on position (see Figure 5).

4.6 The upper glass surfaces do not move outward in order to use the split format mode. The center rollers can be lifted easily by hand to provide access for stuffing film.

5. Test Details

5.1 The current drawn by the table with lights maximum and both sets of film motors running was 15.5 amps.

5.2 The unit was weighed at 840 pounds.

5.3 Film Handling System

5.3.1 The table was operated in split mode to insure that the cover could be closed when used in that fashion.

5.3.2 Position and operation of the bracket detents on the motors and idler brackets were checked. The positioning is positive and accurate. Visual indicators on the upper film handling station provide a guide for proper positioning of motors and brackets for different sizes and combinations of film. The brackets can be locked in positions other than those detented.

5.3.3 The design and position of the release lock to hold film spools on the motor brackets has been changed. The release operates easily, reels can be changed by one operator, and will not catch on an operator's clothing.

5.3.4 70mm film was run on the table emulsion up and emulsion down. At full speed, the film does track properly. It rode on the fingers and was mechanically prevented from leaving its proper position.

5.3.5 A roll of 9.5 inch film 880 feet long was rewound on the table. Although the speed slowed considerably as the load on the take-up spool increased, total rewind time was 1 minute and 32 seconds. The speed exceeded 20 inches per second at all times.

5.3.6 The tension under static conditions did not exceed 2 pounds per inch of film width.

5.4 Illumination Sources

5.4.1 The uniformity of illumination was checked with the Weston 759 foot lambert meter. The table was turned on and allowed to warm up for 30 minutes. At the end of this time, the maximum light output at the center of both formats was read. This was found to be 3225 fL on the left side, and 3100 fL on the right side. For the left side, the minimum over the entire format was 2100 fL, and 2500 over the restricted area. The gradient, then, for the full format was 35%, and for the restricted area was 22.5% on the left side.

On the right, the minimum over the entire area was 2200 fL, and 2650 fL within the restricted area. The gradient was 27% over the entire area, and 12% within the restricted area.

5.4.2 The quality, or color, of illumination was measured with a Gamma 3000 Scanning Spectroradiometer. Spectral distribution was measured at 10mm increments from 380mm to 720mm, and at each of the four mercury spikes. This information, with the aid of a modified NBS computer program, produced the following information:

Correlated Color Temperature	4894 Kelvins
Color Rendering Index	72.45
X co-ordinate	0.3502
Y co-ordinate	0.3737

These values met or exceeded the specifications set forth for these parameters.

5.4.3 Certification of the absence of damaging ultra-violet radiation was presented by and accepted by NPIC.

5.5 Microstereoscope Mount Assembly

The focusing mechanism was tested for smoothness of action and ability to hold the optics in focus.

In the coarse mode, each complete rotation moved the optics 0.306 inches. In the fine focus mode, one rotation moved the optics 0.09 inches.

The optics did not drift downward with the weight of the optics on the mechanism. A slip clutch was provided which prevented the mechanism from driving the optics down into the format surface. This slip clutch also allowed the operator to raise the optics manually without cranking the focus mechanism.

5.6 Carriage Motion

5.6.1 Manual Movement

The force required to move the carriage manually in the X & Y directions was checked. The specification of 4 pounds in any direction was not exceeded.

5.6.2 Fail-Safe Y Switch

The system which prevents uncontrolled movement in the Y direction was tested. No conditions were noted in which the carriage moved in an uncontrolled manner when the table was tilted.

5.6.3 Motorized Movement

The operation of the motorized carriage movement was thoroughly checked. The speed range was found to vary from 0.5 inches/second to 0.02 inches/second. It was found that the motorized carriage, if actuated in X & Y, will not travel at 45 degrees as expected. The direction of travel will always be shaded towards the Y direction.

5.7 An analysis of the noise output of the light table with two webs of 6.6 inch film running at 20 inches per second and the illumination at maximum reveals that there are some excursions over the NC45 curve which is the limiting specification. However, during the operational suitability inspection, the operators did not consider the noise objectionable.

5.8 The parallelism, pod to glass, was checked with the weight of optics on the optics carriage. Maximum deviation was found to be 0.010 inches over the area accessible to the center of the optics mount. This is within the 0.015 inches specification.

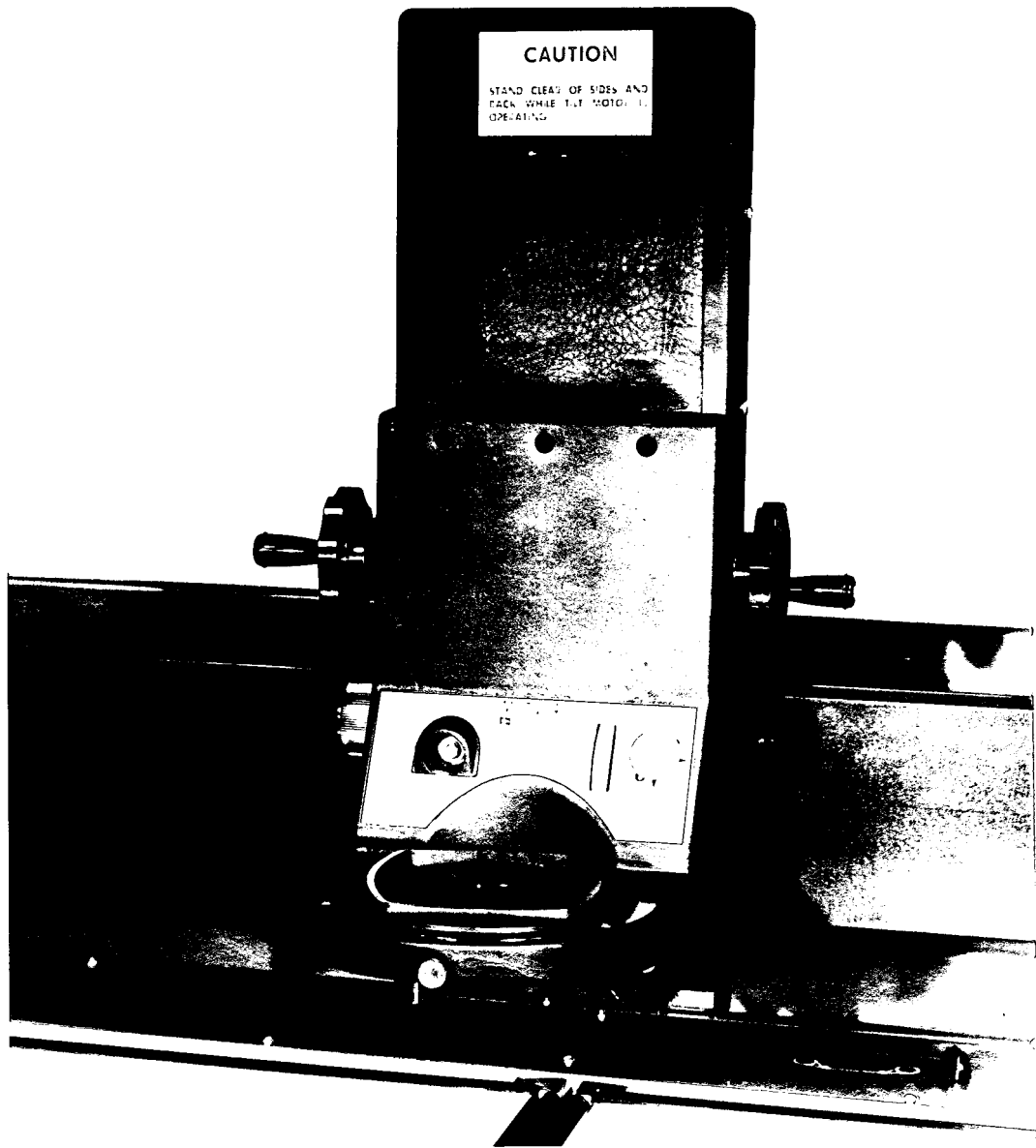


Figure 2. Microscope Mount & Motorized Carriage Controls

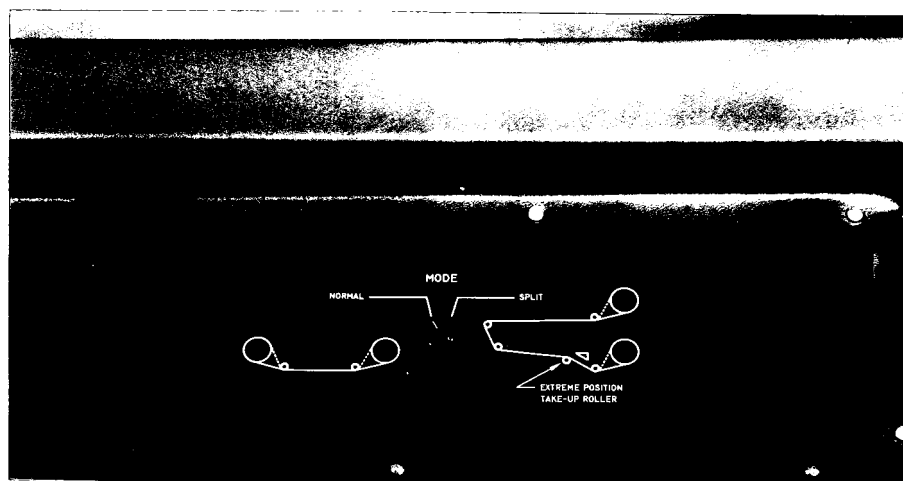
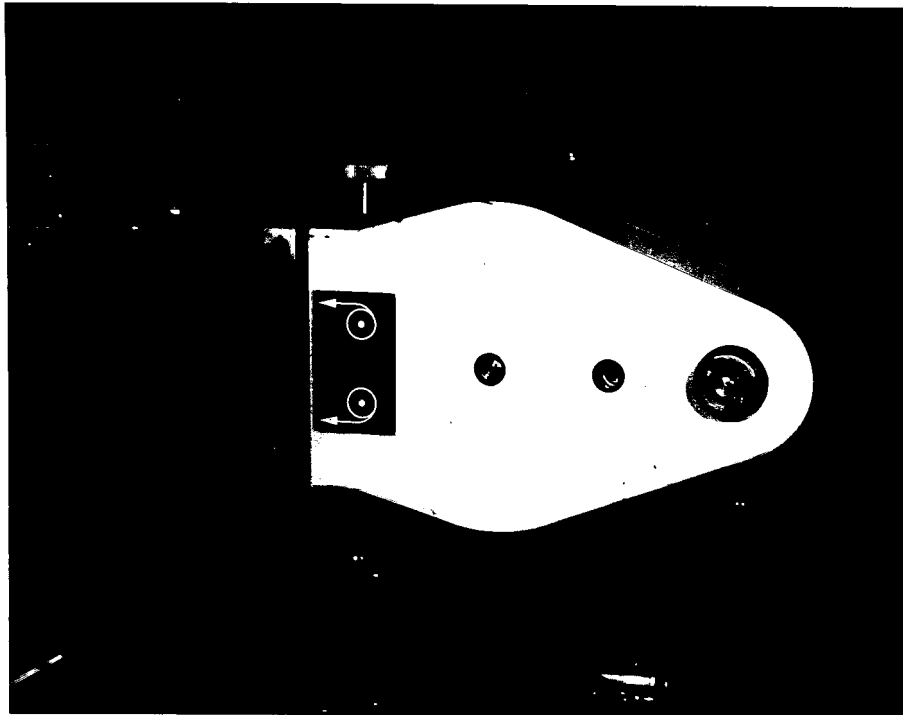


Figure 3. Pictograms used for Film Handling Controls

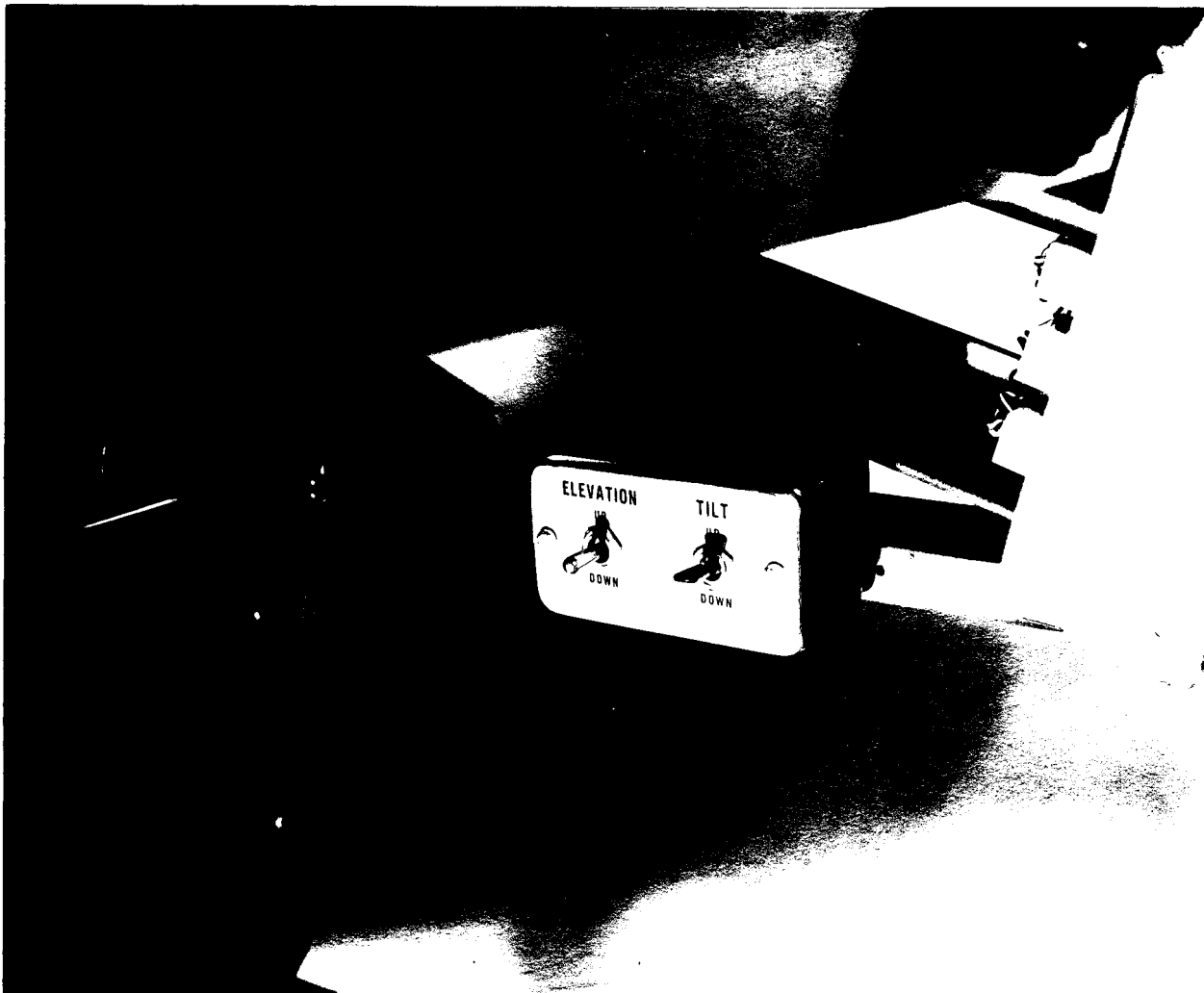


Figure 4. Location and Configuration of Title & Elevation Controls

NOTE: Shield shown in photograph behind controls was not acceptable and has been replaced.

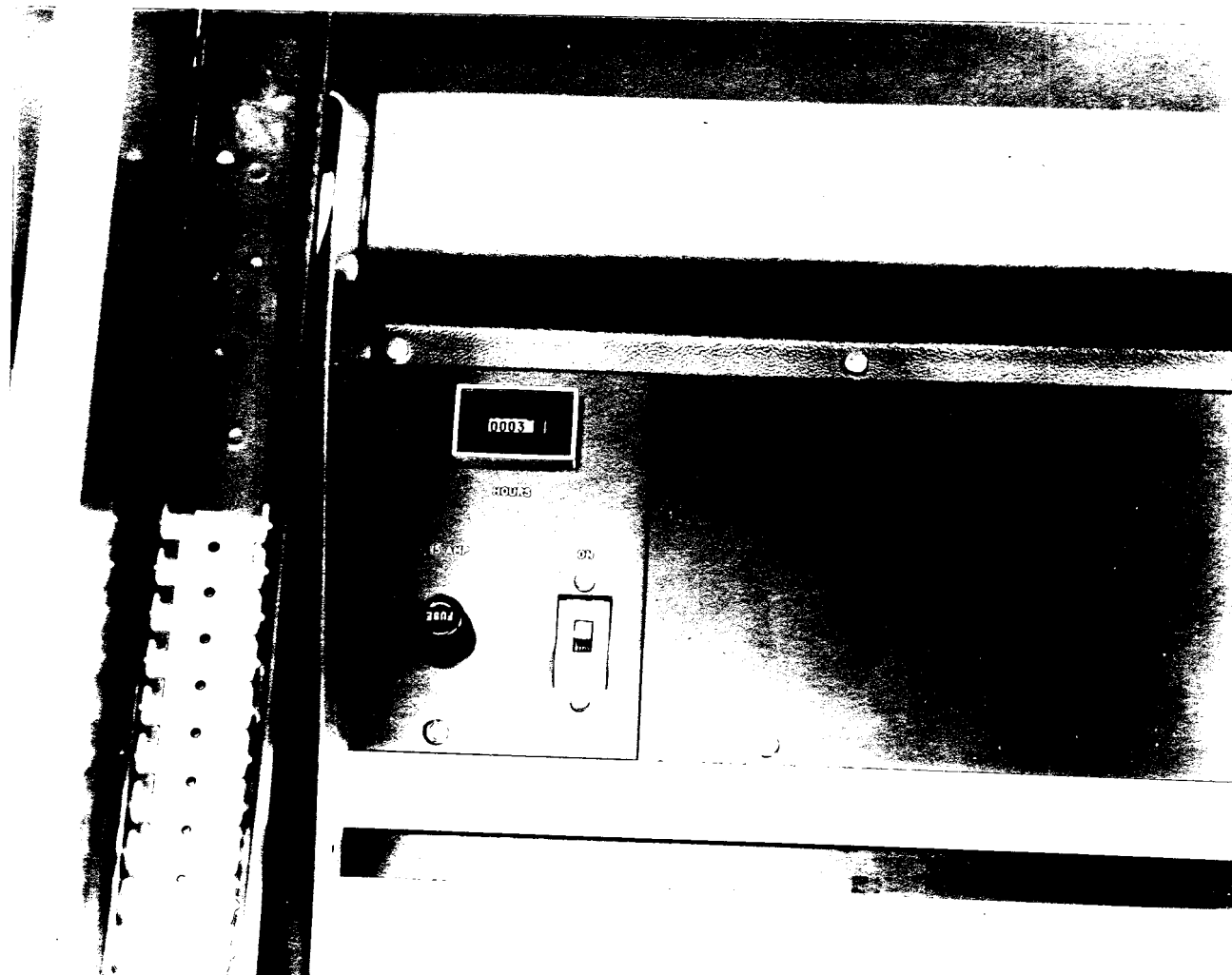


Figure 5. Main On-Off Switch and Elapsed Time Meter

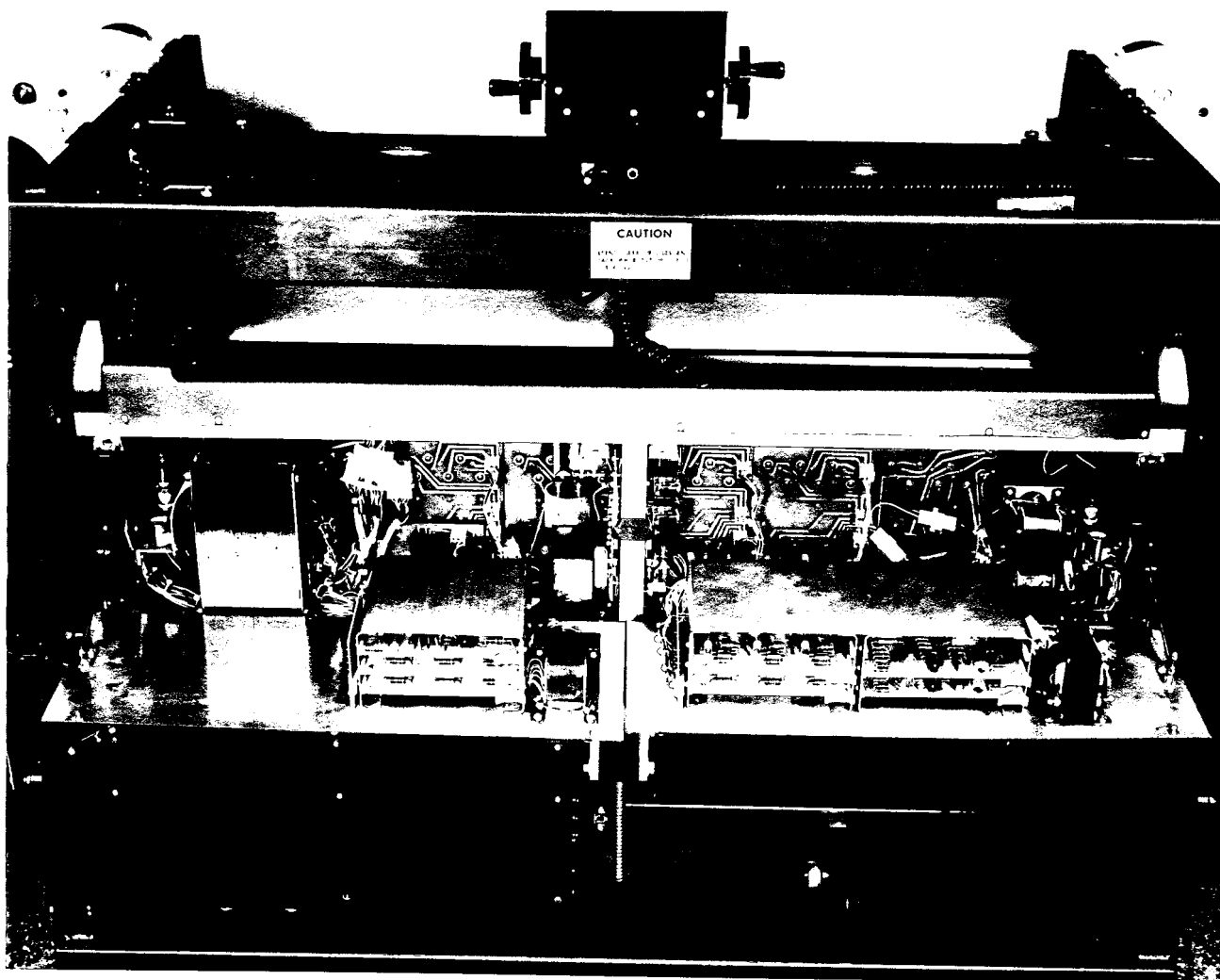


Figure 6. Rear Panel Access for Maintenance & Repair

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