Installation and Operation Manual

DOUTHITT

Integrator-Timer
Magic 81

Exposure Basics

For proper exposure of light sensitive materials — film paper, plates, etc. — a precise amount of light is required. This amount is determined by the brightness of a light source and the time of exposure. Accurate timers are available to control the duration of exposure, but it is most difficult and expensive to stabilize light intensity. Due to the constant and often drastic change in brightness of different light sources, accurate exposures have been difficult to maintain with conventional timers. Here is the answer:

The "intelligent Timer" or Light Integrator, senses even the slightest change in light intensity. It shortens the exposure when the light becomes brighter and lengthens it when the power is down. The Integrator accumulates radiant energy from the light source, until it reaches the amount needed for a good exposure, as determined by you. And it will repeat this exposure precisely, over and over again without fail, even when light intensity changes — and intensity changes constantly.

How Much Does Brightness Vary? On a 120 Volt power line, a 3% Volt fluctuation is very common. This is caused by the constantly changing load on supply lines and power transformers. Yet, with Quartz lamps (filament), such a slight and hardly noticeable variation will cause a 10% change in your exposure. Assume you set up a job in the afternoon with the power down to 110V. After dinner you come back to finish production and the power has gone up to 124V. This changes the light output, causing a more than 50% increase in exposure! Certainly a problem if you are working with a timer, but well within the scope of the integrator. With the integrator your exposures will be most accurate, all the way through this kind of variation.

Important to Know Mercury Vapor and Additive lamps not only change light output with voltage fluctuations, they are also sensitive to variations in bulb temperature!

Installation of Keyboard Light Integrator

1) Unpack instrument carefully. If there is any damage, please notify your dealer and delivery service as soon as possible. Photocell is packed under unit. (Figure 1.) Do not discard. Set up the control unit at appropriate location (Different style mounting brackets are available). (Figure 2 & Figure 3.) IMPORTANT: Light sources or units that do not use more than 150 Watt can be connected directly to the control unit. The Control Unit with the letter X after the Model Number has a built in Contactor. Connect the high power light unit to output A. If second light unit is to be used, connect it to output B. Contactor is connected to output A only and will control an incandescent light source up to 1000 Watts. If your light source is of higher wattage than this and does not have a built-in Contactor or relay have an electrician install Contactor or relay with a 120 volt AC coil. This coil to be operated by the control unit of the Integrator. If the integrator is to be used on a camera that does not have an external timer control connection, contact your dealer or your electrician.

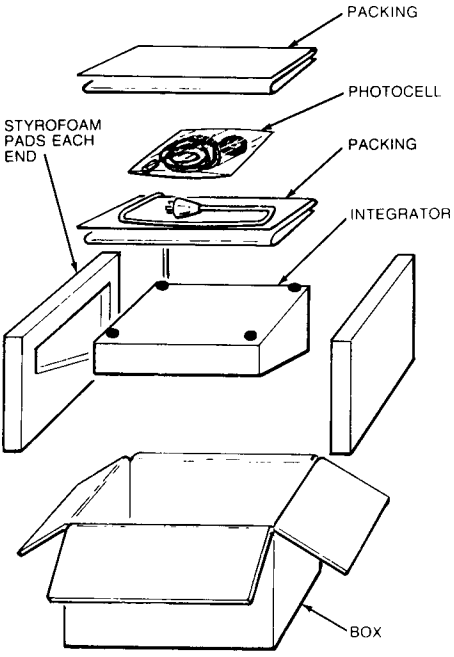


Figure 1. Unpacking Integrator

1. Take wall mounting bracket and use as a template, mark the 3 inside hole positions on the wall.
2. Drill holes and insert plastic screw anchors if necessary into the wall. Drive the mounting screws into the anchors leaving about 1/16 inch between the screw head and anchor/wall. Check positions of wall mounting screws with the mounting bracket making sure it is a firm fit.
3. Make sure the Integrator is not plugged into a power outlet. Then, remove its rubber feet and screws from the base. Now take the wall mounting bracket and align it with the holes in the base of the Integrator making sure the top of bracket is to top of Integrator. Assembly the 2 parts using the rubber feet and their screws. Now hang integrator on wall.

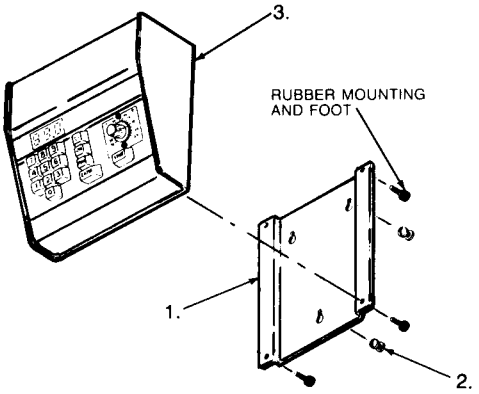


Figure 2. Flat Wall Mount

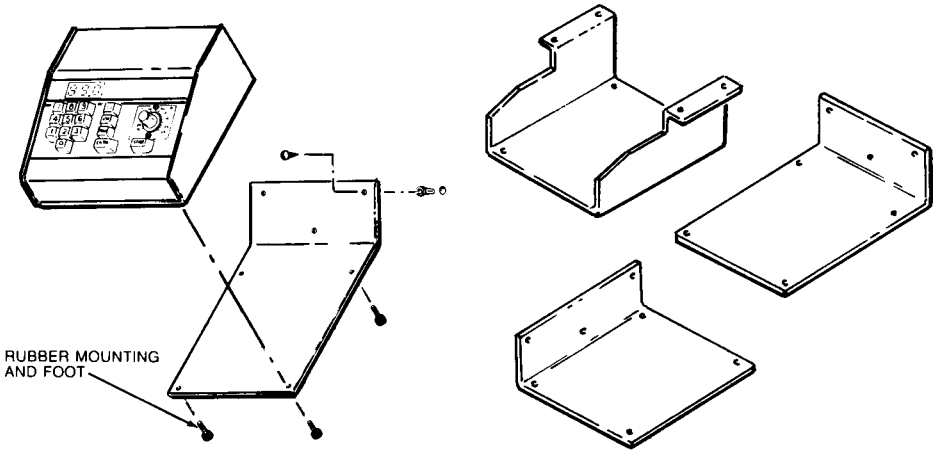


Figure 3. Different Style Mounting Brackets

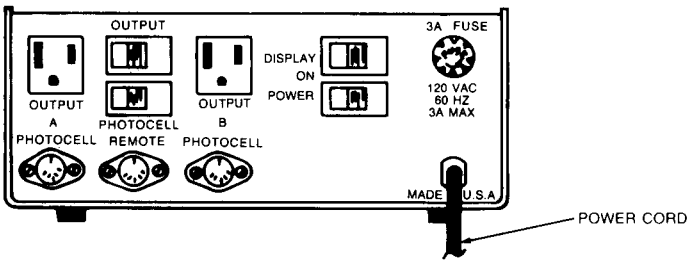


Figure 4. Back Panel Of AI-950

2) INSTALLATION OF THE PHOTOCELL

- Camera Copy Board: Mount the photocell in the center of the top of the copy board frame between the lights. Make sure that the cable is fastened with plenty of slack to allow the copy board to pivot freely without pinching it. (Figure 5A)

- Contact and Platemaking Frames:
  Fasten the Photocell on the center of either long side of the frame, or as close as possible. The Photocell should look at the light source but not be influenced by reflections from copy or plates. (Figure 5B & 5C)

- Fasten Photocell with double sided tape or with a screw. Run cable from the Photocell to the Photocell outlet on the backside of the integrator. To allow for the great difference in light intensity of various light sources, it is necessary to calibrate the Photocell as follows:

- Photocell should be shielded from all safelights in darkroom application.

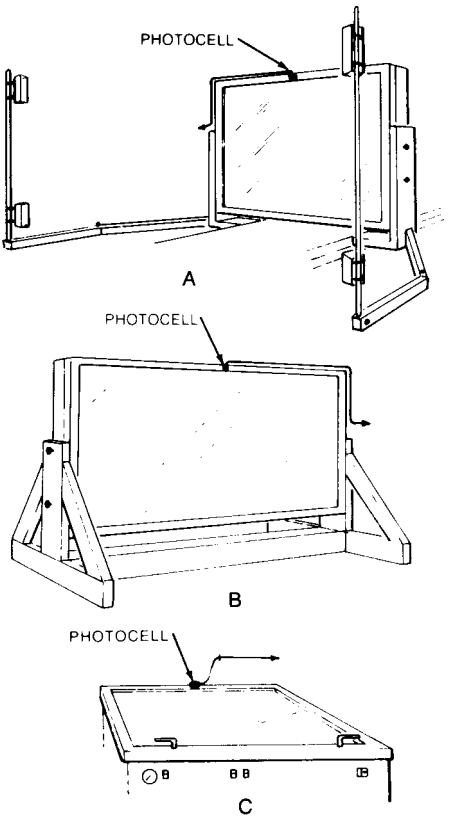


Figure 5. Installation of Photocell

3) CALIBRATION OF INTEGRATOR

To use as an integrator, a Photocell must be connected to one of the Photocell outlets, and the Photocell Switch must be pushed to that side (see Figure 4.) Then press the "T/I" button. The indicator lamp on top of override dial (see Figure 6) will light and the unit is now operating in the integrator mode

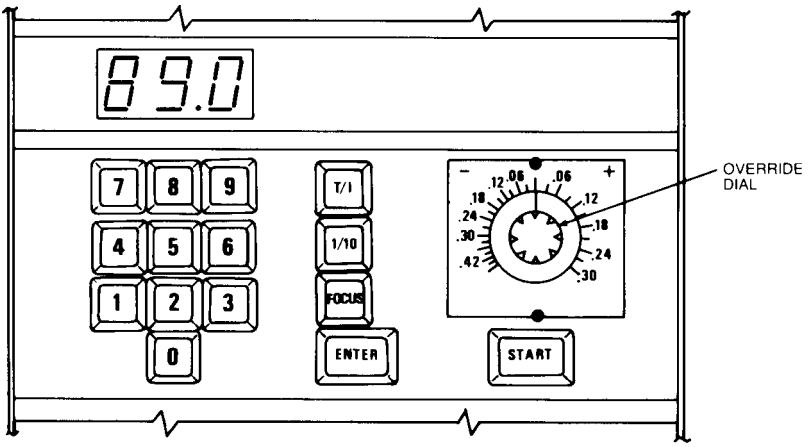
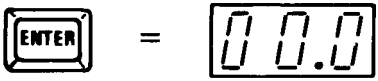


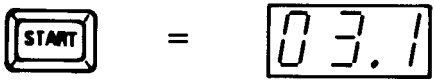
Figure 6. Front Control Panel

- Press “Enter” button to clear display



- Set Decimal Point to show tenths of second or full seconds by pressing 1/10 button.

- Press “Start” button and watch display count UP, press “Start” again, firmly, to cancel. (Note: the unit will not cancel if in Integrator Mode and the Photocell is not connected or counts too fast or slow. To cancel, switch to timer mode, then cancel.



- If it counts faster or slower than actual seconds, the Photocell should be calibrated so that “light units” equal seconds.

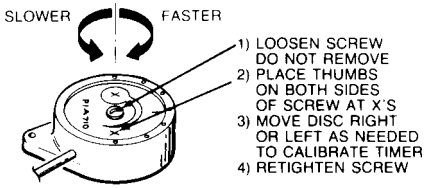


Figure 7. Calibration Of Photocell

- Loosen the center screw on the Calibration Disc of the Photocell. Make sure the white indicator line is on or between the marker dots on the outer ring.
- Turning the Calibration Disc clockwise, to the right, will make the display go faster, shorten the exposure time; turning it to the left, counterclockwise, will show the numbers for longer time.
- Get a stopwatch or a watch with a second hand.
- Press “Enter” to clear the display.
- Start stopwatch and exposure simultaneously. Remember that the exposure starts when the “Start” button is released.
- After 10.0 seconds on the watch press the “Start” button again to stop the integrator. The display should show 10.0. If it shows a higher number turn the Calibration Disc to the left. With a lower count turn the Calibration Disc to the right until the time is very close.
- With very high light intensity turning the Disc all the way to the left may still give you too short an exposure. Remove the Disc altogether and install the little Attenuator filter over the sensor cavity. Reassemble and calibrate again. (Figure 8.)

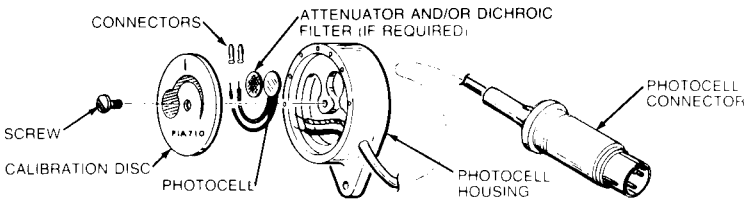


Figure 8. Exploded View Of Photocell

- The Dichroic filter available to reduce infrared -IR- radiation with high power quartz — Tungsten lamps is installed in the sensor cavity, just like the Attenuator disc. It can be used with or without Attenuator filter.
- Now you are ready to work with the integrator just like a timer.

4) OPERATIONAL PROCEDURE AS INTEGRATOR

A) Be sure Display Switch and Power Switch on back of Integrator are turned on.

B) Push "T/I" button so top indicator lamp and bottom indicator lamp will both be "on".

C) Push "Enter" button to clear display. With the 10 digit keyboard, enter the exposure time.

D) Push "Start" button. Note: The cycle will not begin until the "Start" button is released. When there are 10 units of exposure left, you will hear an audible sound (one beep) as a warning that you are approaching your completed exposure. On completion, there will be another audible sound (two beeps). The Integrator will reset for next exposure.

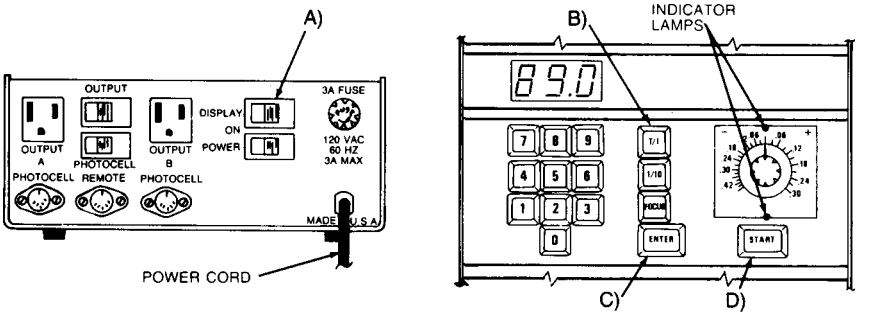


Figure 9. Operational Procedure

5) DENSITY OVERRIDE

The override will vary a pre-set exposure without changing the numbers entered in the display. The dial is marked in logarithmic density steps. A setting of .04 corresponds to a 10 percent increase or decrease of the exposure time. An override of .30 is double or half of the exposure, depending on whether you selected plus or minus. The override has many uses in the graphic arts field. Here are two examples:

- On contact exposures, overlays are often used. While the basic exposure may be known for a single piece of film each additional overlay will require added exposure, corresponding to its density. For instance, three overlays of .04 density will require an exposure increase of .12. Turn the dial knob to .12 and you will find the exposure to be identical to the basic exposure you established. Reset the dial to zero and you can continue working without ever having changed the basic exposure value or having made any necessary calculations.
- Should you wish to choke or spread dots or UPC lines, the override can be most useful.
- Compensate for changes in processor chemistry as you run periodic test strips.
- Make tests on different emulsion speeds of film, mark on box, and compensate with the "override".

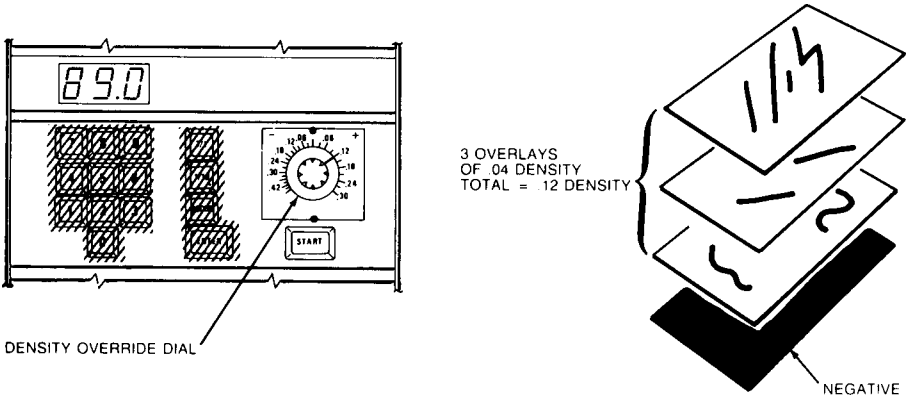


Figure 10. Density Override

OPERATION AS A TIMER

Push "T/I" button to disengage integrator. Top indicator lamp should go "off". You are now in the timer mode. (Figure 11.)

Press "Enter" button to clear display.

With 10 digit key board, program proper amount of time. Note: The "1/10" button will give you tenths of a second.

Push "Start" button to begin the exposure cycle.

The audible sounds (one beep and two beeps will also occur in the timer mode.

Override does not operate with the timer.

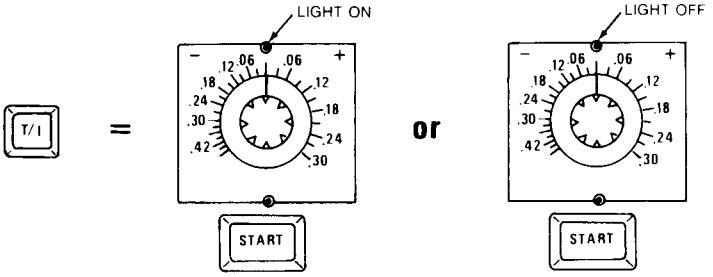


Figure 11. Operation As A Timer

7) NOTE

Any time the power is turned off, the integrator will erase its memory and it will be necessary to re-enter your exposure time. In order to maintain the programmed exposure time from day to day, do not turn off the Power Switch. If you want the "LED" display turned off, this can be done without disturbing the program. Simply turn off the Display Switch on the back of the unit.

8) TWO LIGHT SOURCES

This unit can operate two light sources with the purchase of an additional Photocell. When switching from A to B Photocell and light source, be sure both switches are pushed in that direction.

9) MAINTENANCE

It is important to keep the integrator clean and dry. Information, accessories, and service are available through your dealer. For repairs always return complete unit with Photocell. Should the integrator refuse to function altogether, check the fuse on the back panel and replace, if necessary, with an appropriate 3 amp fuse only. No other fuses should be used nor should it ever be shorted out.

10) If the integrator works in the timer mode, but refuses to function as an integrator, check the Photocell and the connecting cable. Most malfunctions are caused by broken or shorted cables that were pinched, stepped on or torn off. Should there be any type of malfunction, turn it off and on again. This may solve the problem. Persistent malfunctions cannot be repaired by electricians or technicians not equipped with the necessary technical information and replacement parts. Return the equipment immediately to the supplier for fast service.

IMPORTANT

Do not open the control unit or let anyone unauthorized do so. There are no user serviceable items inside.

1) PACKING & SHIPPING

Your light integrator and Photocell are delicate instruments. If you need to ship them, pack them with the utmost care. Improper packing jeopardizes your warranty or increases your repair costs. If possible pack in the original carton with the Styrofoam pads on each side. Put paper or cushioning around the Photocell and plugs and make sure they are packed underneath the control unit. **Do not put any hard material on the face of the unit when packaging.**

Should the original shipping box not be available any longer, make sure that a strong carton is used. Wrap the control unit and parts carefully with soft cushioning, making sure that no plugs, connectors or photocells can touch the paint. The carton should be firmly filled so that the contents will not move during shipment.

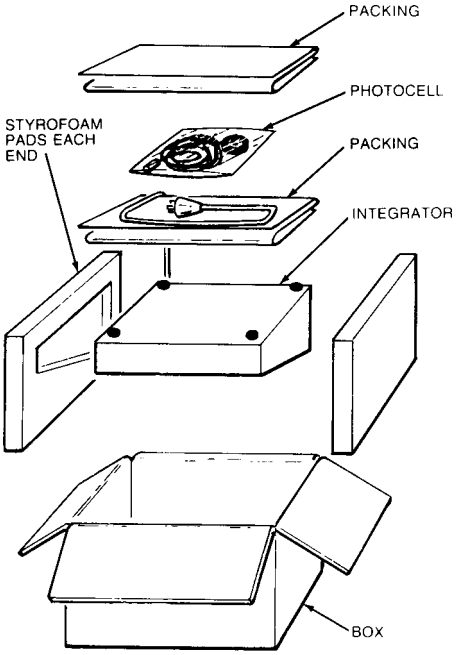


Figure 1. Unpacking Integrator

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