

**DOUTHITT**

**MAGIC 82 & 782 INTEGRATORS**



245 Adair Street, Detroit, Mi 48207-4287 1-313-259-1565

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# INTRODUCTION

Your new MAGIC Light Integrator was built by the team of dedicated assemblers, engineers and technicians for the Douthitt Corporation in Detroit, Michigan, USA. It was designed and produced with great care and attention to detail and workability. MAGIC Integrators are exceptionally accurate and unsurpassed in exposure repeatability and should give you many years of uninter-

rupted service. They will prove to be a profitable investment and we hope that you will remember to specify DOUTHITT when purchasing other light integrators/timers, contact lights or printing lights.

**To get full value from your MAGIC Light Integrator, please read this instruction manual and the warranty carefully.**

## EXPOSURE BASICS

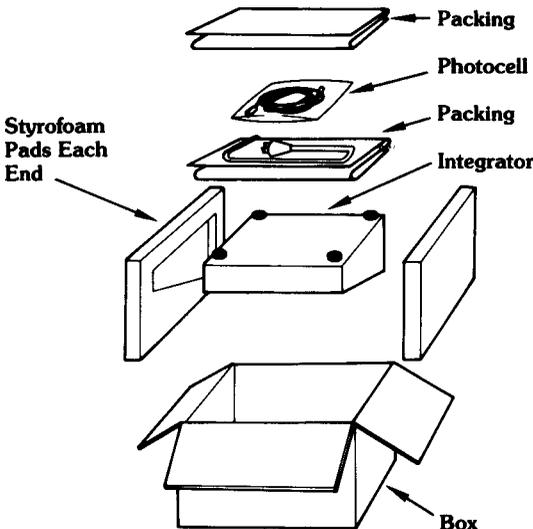
For proper exposure of light sensitive materials; film, paper, plates, etc., a precise amount of light is required. This amount is determined by the brightness of a light source and the time of exposure. Accurate timers are available to control the duration of exposure, but it is most difficult and expensive 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.

How Much Does Brightness Vary On a 120 Volt power line, a 3½ 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.

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

## UNPACKING PROCEDURES



Check for damaged or missing parts. Contact your Dealer or the Shipping Company if there is any problem. Save the packing material for possible return, exchange or repair. Repack the control unit exactly as shown, face down. Never place photocell, line cord or other accessories on the face of the unit and always cushion these items, so that they will not scratch or rub and cause damage.

## INSTALLATION OF PHOTOCELLS

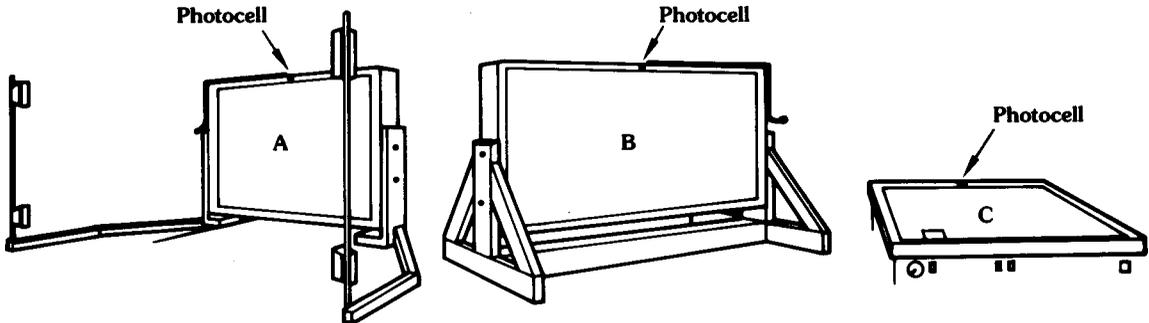
Mount photocell with double-sided tape provided or a screw. Cable connects to the integrator control unit outlet marked: "Photocell" A or B.

**A—On a Camera Copyboard:** mount it in the middle on top, fastening the cable with plenty of slack at the pivot point to avoid pinching.

**B & C—On Contact and Platemaking Frames:** mount it in the center of the longest side, looking at the light, not to be affected by reflection from copy, glass, curtains, safelights, etc.

**Use with Printing Lights.** Photocells are mounted in the Printing Light Head for more repeatable and accurate results. Photocells mounted on frames can be influenced by reflective material nearby, such as curtains, operators in light work clothing or very light copy. Mounted at the edge of the area of even illumination they are also influenced by slight movement of the light head.

Photocells mounted in the Light Head respond to minute variation of light output and the exposure is adjusted with precision.



### Use with UV Black light FILTERS for DYLUX and COLOR PROOFING MATERIALS.

High quality glass UV filters are used to filter all visible wave lengths, light. They allow only the pure Ultra Violet, UV, to expose the sensitized materials. Due to the fact the photocell is sensitive to all colors of light, as well as the UV, inconsistent exposures may result with strong ambient light. Two ways are recommended to correct this error:

1) The first and far superior choice is the positioning of the photocell in the light head. When mounting photocells in light heads always find a cool area near the input of cooling air. Protect the

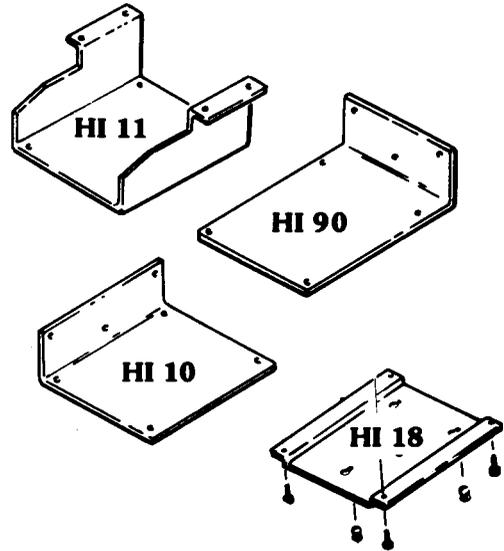
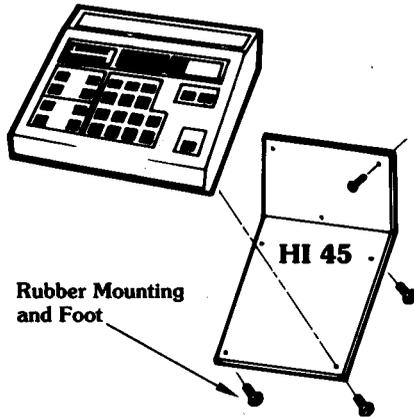
cell from direct close rays from the lamp, reflected light is plenty strong enough and the influence from ambient light will be nonexistent or negligible. Since all spectral lines increase and decrease in the same ratio with intensity fluctuations a UV filter is not necessary but may be the choice of the operator.

2) Mounting the photocell on the frame as previously described and use a UV filter.

**WARNING—If you are exposing from various distances do not mount the photocell in the lamp head.**

## MOUNTING CONTROL UNIT

Several mounting brackets are available to mount the Integrator Control Unit to the wall, the side or front of equipment, or under a counter. This will keep your valuable counter space free.



## CONNECTION OF CONTROL UNIT (LIGHTS AND PHOTOCELLS)

### 1. POWER

The line cord is plugged into a wall outlet with 120 Volt, 60 Hz (cycle), common on the North American Continent. For use with other voltages or 50 Hz check with DOUTHITT.

### 2. BREAKER

The breaker will disconnect the power should an overload occur, to protect operator and equipment. MAXIMUM OUTPUT per outlet is 250 watts.

### 3. CONVENTIONAL PHOTOCELL

One Photocell is supplied with the Integrator. An added photocell outlet is provided if a second light source should need to be integrated.

### 4. CONVENTIONAL LIGHT CONTROL

Outlet "A" or "B" load is: 120 volts, 250 Watts  
MAXIMUM

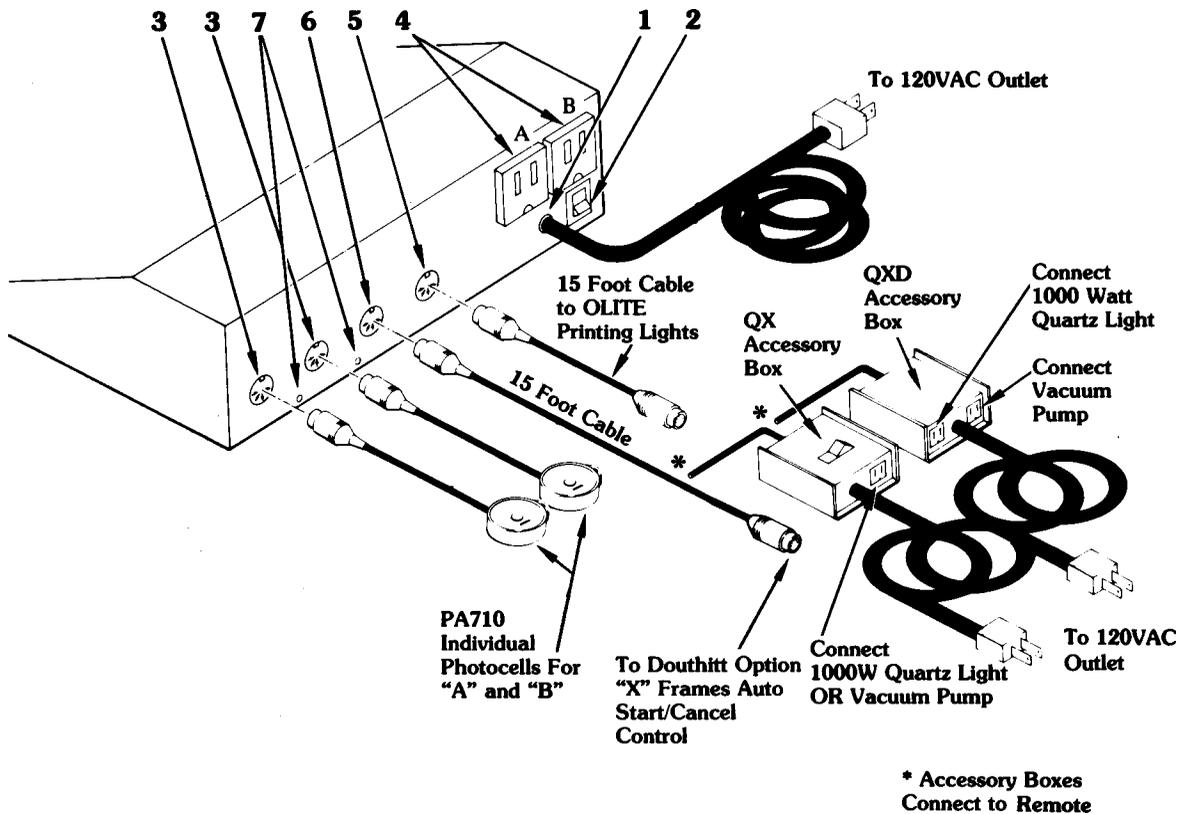
One of these outlets carries power during the exposure to turn on the exposure light directly, see item (1) below, or through a contactor, see items (2), (3) below.

(1) Lower Power Lights, such as 100 Watt Point Lights or Flash Lamps, are plugged into the corresponding outlet "A" or "B".

(2) High Power Lights, such as 8000 Watt Pulsed Xenon or Quartz Copyboard Lights, 3000 Watt or 5000 Watt Printing Lights, generally have built-in contactors, powerful relays that switch the high current of the lights but use only little power on the control coil. Such lights can be connected safely to the output.

(3a) 1000 Watt or 600 Watt Quartz Lamps, carbon arcs or other lights up to 1200 Watts that do not have a built-in contactor can be connected only with the DOUTHITT QX or QXD Accessory Box as described on page 7.

## CONNECTION OF CONTROL UNIT (LIGHT AND PHOTOCELLS)



**(3b) Cameras, Platemakers** or other equipment that draw more than 1200 Watts and are not equipped with contactors should have one installed. It will not only carry the switching current but electrically separate both instruments. Cameras or equipment with contactors but no ready provision for external switching should be equipped with a suitable relay. The 120 VAC coil will be connected and activated by the integrator, and should be electrically insulated and completely isolated from other circuitry. The relay contacts should be wired in parallel with the manual "ON" or "Expose" switch contacts.

**IMPORTANT:** All electrical wiring, modification to equipment other than that manufactured by DOUTHITT or adaptations must be made by qualified electricians who will accept full responsibility for the safety and operation of the equipment. No one is authorized to modify equipment manufactured by DOUTHITT. Call the manufacturer should you have further questions at 1-800-DOUTHIT.

## CONNECTION OF CONTROL UNIT (LIGHT AND PHOTOCELLS)

### 5. CONTROL

Connect OLITE Printing Light to this outlet with 15 foot cable. It can turn the power supply ON and select the intensity of the light, High, Medium or Low.

### 6. REMOTE

Connect Remote Switch (see item (1) below), QX or QXD Box (see item (2) below) or Option "X" Vacuum Control Cable.

(1) Two remote switches are available, a handheld type designed to hang from above, RS1, and a flat switch for counter, wall or floor that can be operated by hand or foot, RS2.

(2) After connection of QX or QXD Box to the REMOTE outlet on the Integrator, plug the AC connector of the QX/QXD Box directly into a wall outlet, 120 VAC.

(2a) To operate 1000 Watt Quartz Lights or other high power lights or equipment up to 1200 Watts use the QX or QXD Accessory Box. The 15 foot cable is connected to the REMOTE outlet and to the box. Make certain the switch on the QX Box points to the Light and the right AC outlet is used on the QXD Box. The Remote Switch can then be connected to the extra outlet on the QX Box.

(2b) To operate a Vacuum Pump in connection with the Delay feature provided on the MAGIC 82 and MAGIC 782 Integrators, plug the pump connector into the outlet on the QX Box and switch to "Pump", or plug into outlet with the picture of a pump on the QXD Box. (Not needed on DOUTHITT Option "X" frames with built-in integrator.)

(2c) To turn on CAMERA COPYBOARD LIGHTS and DELAY SHUTTER and EXPOSURE consult with DOUTHITT for modification. Light unit control is plugged into QX Box, switched to Vacuum Pump, camera shutter is connected to Output "A", Flash lamp to Output "B". Shutter Delay is selected in the same manner as the Vacuum Pump Delay on the Control Panel of the Integrator.

### 7. ELECTRONIC CALIBRATION

Two calibration screws are provided in recessed holes to assist in adjusting counting speed of light integration. For ease of operation, better control and meaningful numbers DOUTHITT recommends that photocells be calibrated so that 1.0 counting unit equals approximately 1.0 second. It is important that the photocell itself is set to be close to this optimum. Fine calibration is then accomplished here. Do not move this setting after it is established as it will change all exposure values. Through aging of the lamp or other influences times will eventually become somewhat longer or shorter but exposures will be consistent. (See Photocell Calibration, Page 10.)

Now that the Lights and Photocells are connected, the Photocells should be calibrated for satisfactory operation. Before this is done it is advisable to be familiar with the operation of all the functions on the control panel.

**BASIC:** MAGIC 82 and 782 Integrators are easy to operate and are designed to clearly identify each function button and to make certain that only the function and the number need be pressed for operation. No dual functions or multiple sequences are used.

To become familiar with all the functions it is recommended to use low power lamps in the different outputs and first use the instrument in the TIMER mode. Practice will soon show how easy it is to master the system.

#### A. BRIGHT

"BRIGHT" Controls the brightness of the Display numbers and Indicator Lamps. PRESS "BRIGHT" once and the Display is dark, press again for dim, again for bright.

#### B. LOCK (MAGIC 782 ONLY)

Pressing "LOCK", with the corresponding Indicator lamp lit, will lock exposures and functions entered. It will prevent accidental erasures and warn other operators to use a different memory. Exposures without lock are also retained in the memory. The feature gives extra protection for those values used repeatedly.

## OPERATION OF MAGIC 82 AND 782 INTEGRATORS

### C. T-I (TIMER INTEGRATOR)

When the Integrator is first turned on it comes up in the INTEGRATOR mode. Should it be more desirable to work in the TIMER mode, press "T-I" and the indicator light will show the change. Each output, A and B are controlled independently so that light A may be integrated while light B is timed.

### D. A-STEP (782 ONLY)

Auto-Step function is used when several exposures follow each other such as Main, Flash and Bump on a Camera or 4 colors in proofing. Upon completion of one exposure step, the next memory step is called automatically. Should one exposure be cancelled, it will repeat until complete, then the integrator will step. After the last, the first of the series comes back for a repeat. 2 to 10 exposures can AUTO-STEP. Several sets can be programmed independently. The indicator will show A-STEP SET.

### E. DELAY

Pressing this button will show all 3 decimal points on the main display. Any number entered indicate the delay in full seconds. Press START and the Delay will be displayed counting down. The Pump will operate until the exposure starts, during the exposure, and will shut off 1 second after the exposure is completed. To stop the pump during the Delay cycle, just press START again. To cancel the entry, press DELAY and 0 (Zero). Indicator will show Delay set or off. The Delay feature requires the use of the QX or QXD Accessory Box, connected to "REMOTE" Outlet on the rear panel of the Control Unit. Further details under "CONNECTION" on Page 7. Automatic vacuum time delay is standard on Option "X" frames with built in integrator.

### F. POWER

Turns on the Integrator. All entries in the memory will be retained as long as the Integrator is not unplugged or the main power shut down.

### G. A-B

Pushing this button selects light connected to Output "A" Or "B" according to Indicator lamps. This selection is retained in the memory step with the 782. With the 782 different exposure times may be entered for "A" and "B" and will be repeated.

### H. FOCUS

This is a manual exposure button to turn on a light.

### I. DISPLAY

Large numbers show exposure time, delay, override and, on the 782, memory number.

### J. INDICATOR LIGHTS

Instantly shows all functions selected.

### K. MEMORY MINDER

Allows the operator to record exposures for different applications with a water soluble erasable pen. **Do not use pencil!** It will record all values in the ten memory 782 or allow quick change in the double memory 82 on the MAGIC button keyboard.

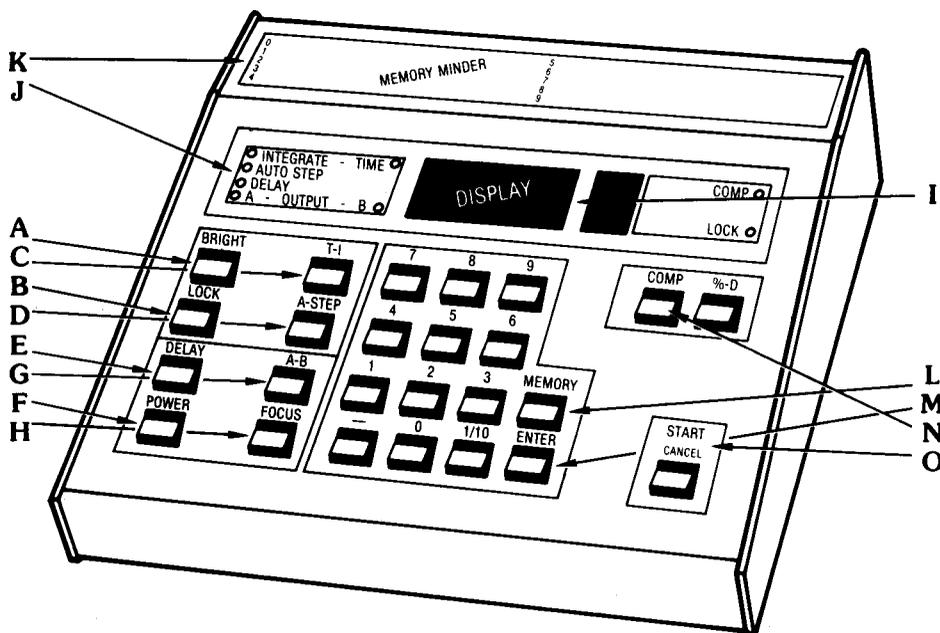
### L. MEMORY (782 ONLY)

Press "MEMORY" repeatedly and the display will step through the 10 memory locations. Press a number, then MEMORY and it will instantly display the selected memory. Enter exposure values, the choice of light, A or B, or AUTO-STEP in each memory location for different applications. They will all be remembered for instant recall.

### M. ENTER

To enter a specific exposure time, press "ENTER" then the number. Pressing the "1/10" changes the decimal point to extend the range from 1/10 of a second to over 16 minutes. For up to 99 seconds it is advisable to leave the decimal point moved in, as in 10.0, and show the "tenth" counting down.

# OPERATION OF MAGIC 82 AND 782 INTEGRATORS



## N. COMPENSATION

Compensation of exposures may be required due to changes in chemistry, film speed, with the use of overlays or just at the option of the operator. Press "COMP" and the center display shows two digits. If the decimal point is in front it is compensating in density steps, at the end it indicates percentages. To change, press "%-D" once. It will convert any number, from percent to density. For example, enter .04 and press %-D, it will show 10. %. Enter a 100 sec. exposure and upon start it will count down from 110 seconds. It added 10% Press COMP again and "-." the minus sign will appear and it will now count down from 90 seconds, 10% shorter. The range is from .30 up, twice the base exposure, to -.30 down, half the time selected. To turn the compensation off, press "COMP" then 0. Compensation equally changes all exposures stored in memories. The red indicator light shows "COMP" ON or OFF. Compensation may be used to change exposures on fixed

aperture cameras according to enlargement or reduction. **NOTE:** The Integrator converts % to Density and reverse. It calculates exposures to the third decimal point but must round off small amounts. Repeated flip-flop back and forth may eventually step up or down one digit.

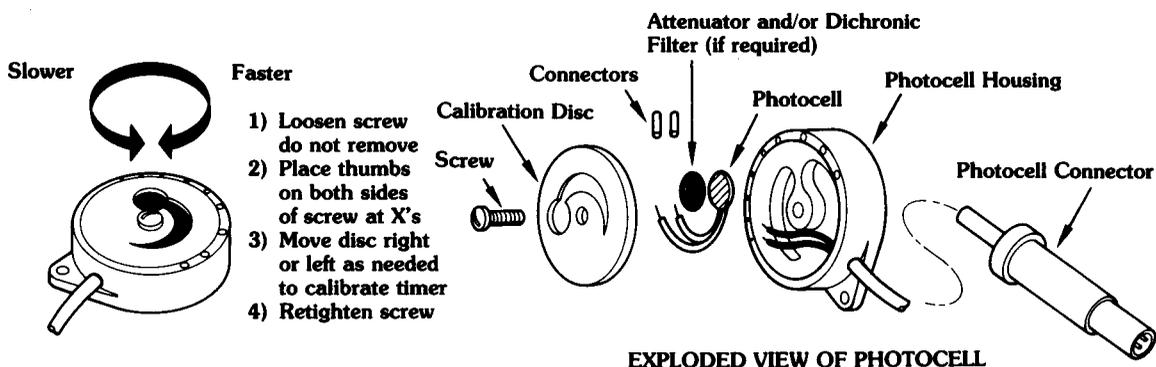
## O. START-CANCEL

Will start the exposure when pressed, cancel when pressed again.

## P. PROGRAM SET-UP

For other applications, select programs as follows: hold down (-) button while turning unit on until (SEL) appears on display. For use with a CAMERA with shutter delay on Channel A only, press Delay button to toggle between (CA) camera and (PU) pump. Connect 120V shutter to output (A), flash to (B) on integrator. Connect camera lights to pump output on QX or QXD box. Press (-) button again for operation.

## PHOTOCELL CALIBRATION



To allow for the great difference in intensity of different light sources and to make sure that the integrator counts in meaningful units; one unit equals one integrated second, it is necessary to calibrate the photocells.

Turning the cover disc makes the display count faster or slower (See illustration). With a watch, try to get it close to seconds. It will never be right on, nor will it repeat exactly as the light intensity

changes constantly. That is the true function of the integrator.

Should the count still be too fast with the disc closed all the way, insert the neutral density filter supplied or make a little round one, .5 inch diameter. A dichroic filter is available to reduce IR or lamps such as the 1000 Watt Quartz lights. Filtration of your own can also be placed over the top of the photocell. (See picture).

## 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 probe.

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, unplug the unit for a little while and plug in again. This may solve the problem.

Due to severe line noise and interference in some locations, the microprocessor may get confused

momentarily by misinterpreting such a signal, substituting it for a legitimate command. Unplugging the unit for 10 seconds will restore the operation. Should such problems persist, use a line filter, as common with computers, or contact the dealer or Douthitt.

**NOTE:** Do not open the unit yourself or let anyone else try to repair it. **There are no user serviceable parts inside.** Today's highly sophisticated equipment can no longer be repaired with tools or parts available to even the finest technician, because most of the functions are in software.

## 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.

## QUARTZ LIGHTS

### 1000 WATT QUARTZ LIGHT

- Computer Designed Reflector for exceptionally even coverage of contact exposure frames at low height.
- High Power Quartz Lamps for short exposure times with "Lights-On" high quality contact films.
- Accurately timed and repeatable exposures, with DOUTHITT light integrators.
- Contactor boxes or other devices are not necessary when used with the DOUTHITT MAGIC 82 and 782 using QX or QXD Boxes.

