

The MetroLux II Darkroom Lamp Controller and Shutter Timer

Owner's Manual
V.2.8

With Instructions for
MetroLux II
Remote Sensor/Easel Top Meter

MeteRed Light
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San Francisco, CA 94127
www.meteredlight.com

*Thank you for purchasing
The MetroLux II Darkroom Lamp Controller by Metered Light.
Before using the unit please read the Owner's Manual.
You can then easily install, configure & operate the unit properly.*

Warning:

To prevent fire or shock hazard do not expose this product to any type of moisture. This equipment is intended to be electrically grounded. Your MetroLux II is equipped with a 3-wire ground plug---a plug that has a third (grounding) pin. This plug will fit only a grounded AC outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet. Do not defeat the purpose of the grounding plug!

Please read instructions before plugging in and observe power ratings for this unit. The MetroLux II Darkroom Lamp Controller is rated to switch lamps up to 720 Watts/120volts. DO NOT EXCEED THIS POWER LEVEL. Damage to MetroLux II may occur.

The MetroLux II Darkroom Lamp Controller is internally fused.

Introduction:

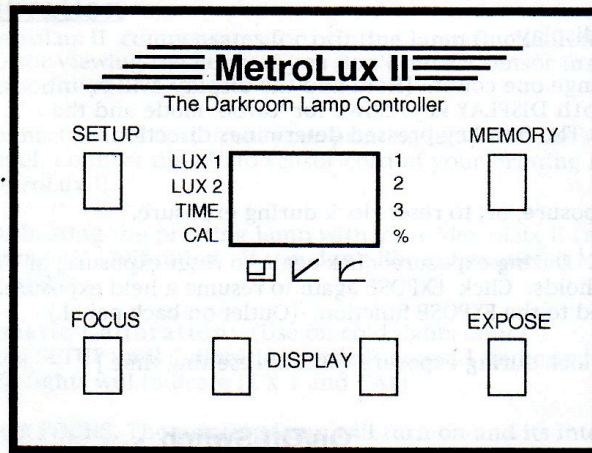
A premiere compensating exposure timer for photographic printmaking, the MetroLux II Darkroom Lamp Controller monitors the intensity of your printing lamp at the lampsource *during* the exposure, and adjusts for the output fluctuations of the lamp by shortening or extending exposure times proportionately. MetroLux integrates time/light to count light units (lux).

For temperature sensitive coldlights, the closed-loop MetroLux II is dynamically more effective than voltage regulation systems in stabilizing repeatable exposures. And, MetroLux II works with practically every lamp source under the sun... *including* the sun itself. We go outdoors with platinum printers to compensate for cloud cover during their sunlight exposures.

There are many advanced features and custom controls to personalize your MetroLux. Controls exist to adjust metronome sounds and LED brightness, Hold and Reset functions, exposure range and counting styles. There is even a shutter timer function accurate for measuring your camera shutters into the sub-milliseconds. And, when using the optional MetroLux Remote Sensor, you can make easel-top readings. But more about that later. Don't be put off by the size of this owner's manual. There are many capabilities of your new MetroLux, but the basic functions are easy to grasp.

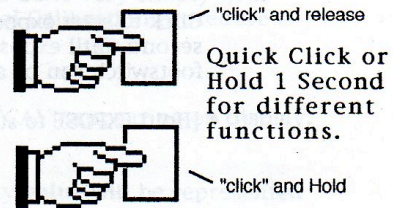
Unpacking:

Carefully remove the unit from the packing carton making sure not to toss out any accessories you may have ordered such as footswitches or the Remote Sensor. Check for photo sensor (on 10ft. cord), or 3 pin din jack adapter for Zone VI heads. Operating manual and warranty cards should be included.



The Keypad

Keys on the MetroLux II have dual functions. Primary functions are indicated on the front panel. Secondary functions are defined below in brackets.



SETUP: •Quick click selects Lux 1, Lux 2, or Time.

Display LED indicates selection. Click SETUP to step through Lux 1, 2, and Time.

LUX 1 & LUX 2 The lamp is monitored; exposure is compensated & controlled.

TIME Time-based exposure. No compensation. Acts like standard timer.

CAL Calibration mode.

•[Hold selects Calibration mode. See Pg. 3-1]

MEMORY: •Quick click selects exposure times or %-Factor from four place memory stack.

The LED on the right side of the display indicates selection. Click MEMORY to select location from Memory 1, 2, 3 or %. To factor an exposure time by a percentage, click MEMORY to select the percent factor (*%). (When not in use, the percent factor remains at 100 and exposures will be counted at 100% of their face value.) When the percent factor is other than 100, the % LED (*) remains lit, and exposures are factored at the designated percentage.

•[Hold selects Customizing Options. See Pg. 4-1]

FOCUS: •Quick click turns printing lamp on with metronome.

•[Hold turns printing lamp on without metronome. For silent focusing.]

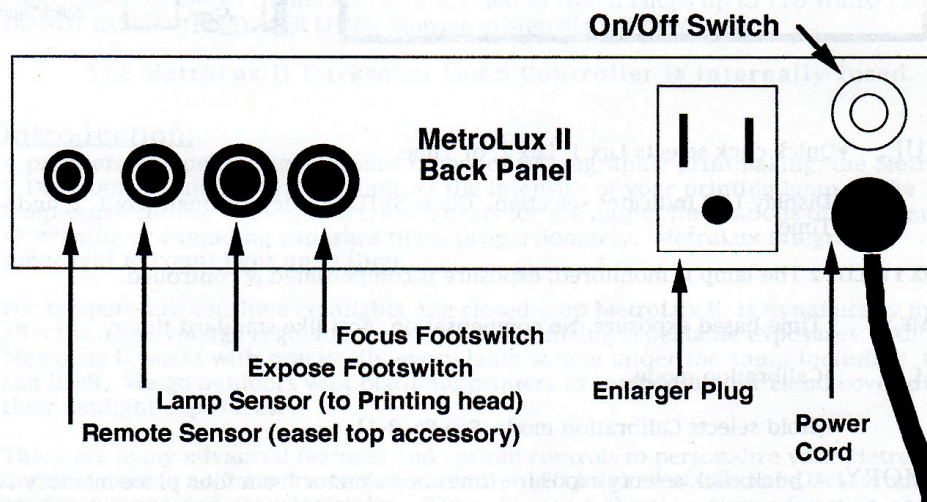
DISPLAY(↓↑): Sets the numeric display.

Press either key to change one count. [Hold and the display will count continuously. Hold both DISPLAY keys down for 'turbo' mode and the display counts fastest. The first key pressed determines direction.]

EXPOSE: • Quick click to Start exposure, or, to reset clock during exposure.

Click to start exposure. During exposure: click again to reset exposure, or hold 1 second until exposure holds. Click EXPOSE again to resume a held exposure. A footswitch can be added to the EXPOSE function. (Outlet on back panel.)

- [Hold EXPOSE to stop clock during exposure without resetting time.]



Power Switch: Turns MetroLux II On/Off.

Also reboots MetroLux when turned on while holding SETUP key.

Back Panel Outlets:

Enlarger plug outlet for printing lamp. (Do not exceed 720 Watt rating). Unit is internally fused with a slo-blo 10A fuse. (220 Volt units are fused with slo-blo 5A fuses.)

Two 1/4" phono plug outlets for optional footswitches. Duplicates functions of FOCUS and EXPOSE keys on front panel.

RCA Jack, Lamp Sensor to printing head.

Mini-jack, for optional MetroLux II Remote Sensor hookup.

Calibration

MetroLux II compensates for printing lamp fluctuations only when connected to a photo sensor viewing the lamp. If you don't have a sensor installed, please see 'Installing a Sensor'. (pg. 7-1).

Connect the AC cord from your printing lamp into the AC outlet on the MetroLux II back panel. Connect the photo sensor cord of your printing lamp into the RCA jack on the MetroLux II.

Calibrating the printing lamp with your MetroLux II can be done very simply with Automatic Calibration. If you don't like automatics, a Manual Calibration procedure is available.

Automatic Calibration: (Use on cold lights only.)

Hold SETUP until Calibration mode is entered (indicated by "CAL" appearing on display. LED lights will indicate LUX 1 and CAL).

Click FOCUS. The printing lamp will turn on and its intensity value will be represented numerically on the MetroLux II display. This number will change as the lamp warms up. The lamp will be allowed to stabilize for two minutes after which the intensity value is automatically stored to memory, the printing lamp will shut off, and MetroLux II will return to LUX 1. Proceed to print.

Lux 2 can also be automatically calibrated in the same manner. After entering Calibration, press SETUP once to indicate the LUX 2 channel. Proceed as above.

Manual Calibration:

Hold SETUP until the Calibration mode is entered. The LUX 1 LED will light. If you chose to enter a calibration value into the LUX 2 channel, press SETUP again to move to LUX 2.

Click FOCUS. The printing lamp will turn on and its intensity value will be represented numerically on the MetroLux display. When you see the calibration value you wish to enter, hold SETUP until calibration mode is exited. The printing lamp will turn off as MetroLux enters the printing mode.

To manually install a specific calibration number, enter Calibration mode. Leave lamp off. Use DISPLAY keys to enter desired number.

Exit Calibration by holding SETUP until MetroLux returns to printing mode. Exiting the calibration mode enters your new calibration value to memory.

Keeping Notes



After your Calibration values are set, record those values here. If your MetroLux is rebooted or the Calibration values are accidentally erased, they can then easily be reinstalled manually.

VC
Lux 1

146

6 GRADED
Lux 2

224

BRIGHTNESS = 5 1/2
SOFT = 'F'
HARD = 'F'

BRIGHTNESS = 8
SOFT = 'H'
HARD = 'H'

Calibration Range:

Good calibration values range from 10-900. If your numbers are too low, try repositioning the photo sensor closer to the lamp. If they are too high, move the sensor further from the lamp. If this is not possible, a neutral density gel can be fitted over the sensor.

Printing With MetroLux

The MetroLux II Darkroom Lamp Controller has three printing modes: LUX 1, LUX 2, and TIME. It operates as a compensating exposure timer when in the LUX 1 or LUX 2 printing modes. It operates as a standard timer in the TIME printing mode. To use the unit as a compensating timer in LUX 1 or 2, a photo sensor must be attached to the printing lamp (See Pg. 7-1) and the lamp must be calibrated (See Pg. 3-1).

Compensated Printing (LUX Modes)

This is the usual printing mode used by most MetroLux owners.

Use MetroLux II in the LUX modes just like you would use any other timer, only remember, the numeric display indicates exposure times in LUX units. (One LUX equals one second of time when the lamp is operating at the same intensity as when it was calibrated.) Use $\downarrow\uparrow$ keys to adjust exposure values. A second LUX channel is available to use as a convenient place to store calibration values for a 2nd printing lamp, contact printers, or alternate settings on variable contrast heads.

Uncompensated Printing (TIME Mode)

MetroLux II counts seconds like a normal timer. Photo sensor installation is not required for operation in the TIME mode.

Percentaging (For Drydown and Exposure Control)

Percentaging can be utilized for any of the 3 printing channels: LUX 1, LUX 2, & TIME. Click MEMORY key until the % LED is lit.

Set the display to desired percentage using $\downarrow\uparrow$ keys. All exposure values (Lux or Seconds) will be factored by the percent displayed.

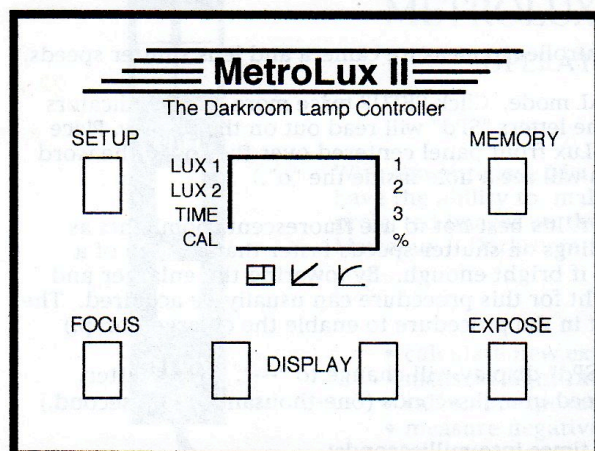
Click MEMORY key again until your exposure value reappears. The % LED remains lit indicating that exposures displayed will now be factored by a percentage.

Percentaging is most commonly use in applying dry-down factors (best explained in Ansel Adams' book, The Print). Our abridged definition of "dry-down": Photographic printing papers become slightly darker as they dry, most noticeably in the highlights of the print. To determine the value of this dry-down effect, expose a normal print. If it looks good wet, print another 5% lighter. As this second print dries, if it matches your wet print, your dry-down factor is 5%. (Typical dry-down factors range from 1-11%.) Set MetroLux percent factor to 95% to compensate for 5% dry-downs.

When the percent factor is other than 100%, the % LED remains lit. Exposures can be factored with this function from 25 to 250%. The latitude of the percent allows printers more than one f/stop of relative exposure control in either direction.

Handling Two Enlargers

Though MetroLux comes equipped with a single AC outlet, a duplex AC junction box with 3-way switch can be built for less than \$10 and make switching between lamps a breeze. Simply plug both enlargers into the junction box outlets, use an RCA male to dual RCA female Y-adapter (available at Radio Shack) to accomodate two photo sensors simultaneously. (Since only one lamp is ever lit at one time, only the lit lamp will be monitored.) Store calibration on lamp #1 in CAL 1 and calibration on lamp #2 in CAL 2. To switch from lamp 1 to 2, throw switch on the AC junction box and set MetroLux II from LUX 1 to LUX 2.



Customizing MetroLux

You can customize six features on your MetroLux II Darkroom lamp Controller. Access the customization mode by holding the MEMORY key. The display will soon read "cod" (customized options display).

The custom option menu includes:

- A Audio choices for metronome
- B Beep pitch duration and pitch
- C Count by 0.1, 0.5, 1, or 10
- D Display brightness of LEDs
- E Exempt secondary memories
- F For Remote Sensor integration time.

Scroll through the options stack by clicking MEMORY once for each choice.

Use $\downarrow\uparrow$ keys to make selections in each option.

A.....Audible Metronome?

Choices	Selection
A11	Beep on during both Focus and Expose modes.
A01	Beep off in Focus mode, on in Expose mode.
A00	Beep off in both modes.
A10	Beep on in Focus mode, off in Expose mode.

B.....Beep Duration/Pitch

This control has two facets, beep duration and beep pitch. Toggle between with the EXPOSE key. The beep will sound in this mode and changes can be heard immediately.

C..... Count Factors

MetroLux' 3-digit display can time exposures in three ranges.

Choices:	0.1	0.5	1.0	10
Range:	0.1-99.9	0.5-99.5	1-999	10-9990

D.....Display Brightness

Use $\downarrow\uparrow$ keys. Up for brighter, down for dimmer. (Use Turbo mode (see Display, pg. 2-3) as the steps are very small) The display always shows "d88".

E..... Eliminate Memories

Choices	Selection
E-3	All print mode memories open.
E-1	Only primary print mode memory open: Memory #1 and %.

F..... Remote Sensor Integration Time

Affects "light-gathering" interval of MetroLux II Remote Sensor. (See Integration pg. 6-5) To leave the Customization mode, hold MEMORY until the display goes blank. MetroLux will return to the printing channel last used.

Shutter Timing

Use MetroLux II Darkroom Lamp Controller to measure camera and lens shutter speeds.

Hold SETUP until MetroLux enters CAL mode. Click SETUP twice more. LED indicators will light up next to Time and Cal. The letters "SPd" will read out on the display. Place the shutter to be timed on the MetroLux front panel centered over the "o" in the word "MetroLux." (If you look closely, you will see a hole inside the "o".)

Shine a light directly into the shutter. It's best not to use fluorescent roomlights as their cycle may generate faulty readings on shutter speeds faster than 1/60th of a second. (Your enlarger can be used if bright enough. By lowering the enlarger and removing the lensboard, enough light for this procedure can usually be acquired. The FOCUS key is still active at this point in the procedure to enable the enlarger lamp.)

Time shutter: click EXPOSE. The "SPd" display will change to "---". Trip shutter. MetroLux will display the shutter speed in milliseconds (one-thousandth of a second.)

To convert fractional shutter speed times into milliseconds:

Simply divide 1000 by the bottom integer of your shutter speed.

Example: 1/2 sec.

$1000 \div 2 = 500$ milliseconds

Shutter Speed	Milliseconds	Shutter Speed	Milliseconds
1/1000	1.0	1/30	33.3
1/500	2.0	1/25	40.0
1/400	2.5	1/15	66.7
1/250	4.0	1/10	100
1/200	5.0	1/8	125
1/125	8.0	1/5	200
1/100	10.0	1/4	250
1/60	16.7	1/2	500
1/50	20.0	1	1.00

Speeds slower than 1 second are displayed in seconds. Upper limit is 6.55 seconds.

Problems?

If "---" display does not change after tripping shutter:

-increase or decrease the amount of light falling through the shutter.

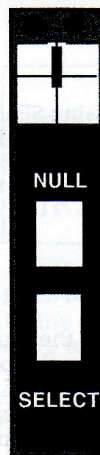
Clear display to "---" by clicking EXPOSE.

Electronic flash can be timed by firing the stobe in the room. Pointing the flash into the hole is not necessary or recommended. This would saturate the sensor and could make a false reading adding extra microseconds. (Time your TV remote control if you're bored.)

To exit Shutter Time mode, hold SETUP.

METROLUX II REMOTE SENSOR

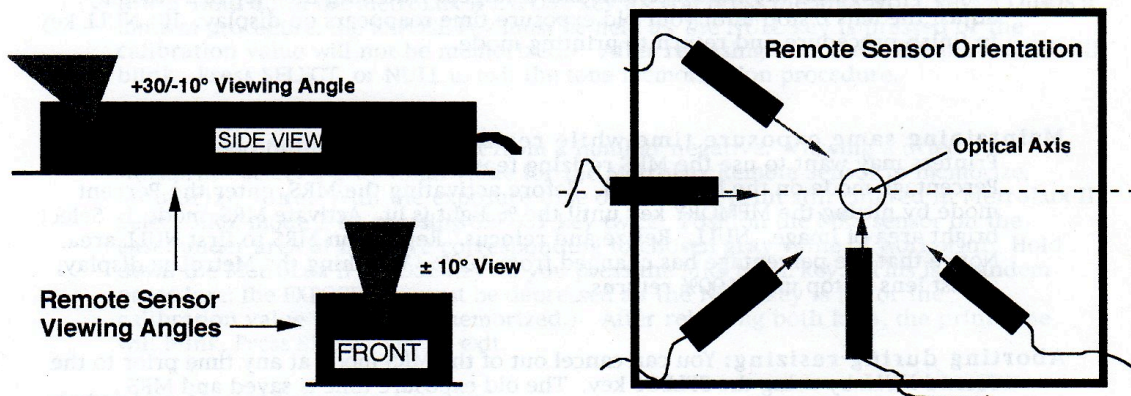
OPERATING INSTRUCTIONS



With the purchase of a MetroLux II Remote Sensor (MRS), you have the ability to make sensitive readings of light from projected images on the printing easel. When used with the MetroLux II Darkroom Lamp Controller, the MRS can:

- calculate new exposure times during print resizing
- measure light ratios for contrast determinations
- calculate exposures to match shades of gray
- measure negative densities -projection densitometry
- calibrate paper speeds to help eliminate test strips

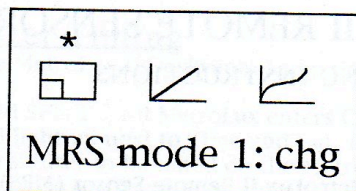
The MRS plugs into the smallest jack on the rear of the MetroLux II. There are two keys on the MRS, SELECT and NULL. They operate functions for remote sensing. Readings are displayed on the MetroLuxII. The MRS sensor is located above the NULL key. It is recessed 1/4" below the top surface under the opening in the white area. It is 1/25" square (1 mm sq.) and is situated at the crosshairs.



The MRS sees 10 degrees right, left, and rear and about 30 degrees forward. Be aware of stray light (safelights, etc) that may affect measurements. Remote sensing should be done with the MRS positioned flat on the work surface pointed towards the optical center of the projected image source.

Remote Sensor Choices

Mode 1		CHg	Print-resizing Exposure Recalculation
Mode 2		Nu1	Tone Null: Memorize and Match
Mode 3		Log	Measures Light Logarithmically



Print-Resizing

Activate MRS, Mode 1, by pressing SELECT key once. Enlarging lamp turns on. MetroLux display will momentarily read "chg" before refreshing with value of last exposure time.

Calculating new exposure times while resizing print:

Position the MRS on the easel with the crosshairs in a bright area of the image just printed. Click NULL. The display will blink the exposure time used on the prior print. Now resize and focus the image. Position the MRS in the exact same area of the image as measured during the first NULL. Click NULL again. MetroLux II recalculates a new exposure time, loads it into memory and returns automatically to the printing mode.

Calculating new f/stop while resizing print:

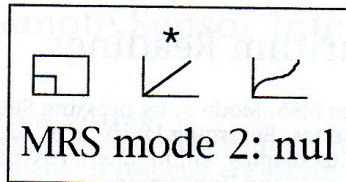
Activate MRS, mode 1. Position the MRS on the easel with the crosshairs in a bright area of the image just printed. Hit NULL. The display will blink with the exposure time used on the prior print. Remember that time. Now resize and focus the image. Reposition the MRS in the exact same area of the image as measured during the first NULL. Notice that the exposure time has changed. Watching the MetroLux display, adjust the lens f/stop until your old exposure time reappears on display. Hit NULL key to finish procedure and return to printing mode.

Maintaining same exposure time while resizing print:

Printers may want to use the MRS resizing features in combination with the Percentage mode on the MetroLuxII. Before activating the MRS, enter the Percent mode by hitting the MEMORY key until the % light is lit. Activate MRS, mode 1. Select bright area of image. NULL. Resize and refocus. Reposition MRS to first NULL area. Notice that the percentage has changed from 100%. Watching the MetroLux display, adjust lens f/stop until 100% returns.

Aborting during resizing: You can cancel out of the MRS mode at any time prior to the second NULL by using the SELECT key. The old exposure time is saved and MRS operations are aborted.

Error Messages: If after the first NULLing a "2LO" prompt appears, it is recommended that you select a brighter area of the projected image to measure and start MRS operations over again. If this does not eliminate the "2LO" prompt, you may want to increase the sensitivity of the MRS. This is done through your Customized Options. See "Integration Settings", Pg. 6-5.



Tone Null

Activate MRS, Mode 2, by pressing SELECT key twice. Enlarging lamp turns on. MetroLux display will momentarily read "nul" before refreshing with value of last used exposure time.

Selecting and Memorizing a Gray Tone

Tone matching can help you eliminate some test strips getting you one step closer to a final print. Before tones can be matched, one must be memorized. There are at least two methods:

Step-Wedge Method:

Make a step-wedge of grey values: Size the enlarger for a standard print size (ie. 8 x 10, 11 x 14). With no negative in the enlarger, expose a piece of paper at the appropriate f/stop for a range of times that will include your preferred printing time. Example: If 15 seconds is your preferred printing time, find the f/stop that creates a step wedge with a good range of grays from white to black at exposure times of 3, 6, 9, 12, 15, 18, 21, 24, and 27. Use the dry step wedge to record exposure times on corresponding gray steps. Save for later visual references.

Memorize tone. With 15 entered in the MetroLuxII display, position the MRS sensor on the easel (no negative in the enlarger.) Select MRS, mode 2 by pressing SELECT key twice. Hold down the MetroLux II EXPOSE key as you press the MRS NULL key. (This is a tandem procedure: the EXPOSE key must be held as the NULL key is pressed or the calibration value will not be memorized.) After releasing both keys, the print time will blink. Press SELECT or NULL to exit the tone memorization procedure.

Print Method:

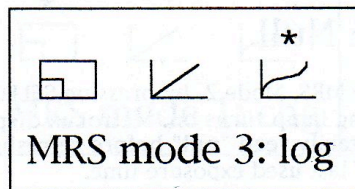
Make a good full-tone work print from a familiar negative. Viewing a dried workprint, select a gray tonal value for the MetroLux Remote Sensor to memorize.

Memorize tone. With the exposure time of the work print still entered in MetroLux II, Select MRS, mode 2 by pressing SELECT key twice. Position the MRS sensor on the easel under area of negative corresponding to chosen gray value of workprint. Hold down the MetroLux II EXPOSE key as you press the MRS NULL key. (This is a tandem procedure: the EXPOSE key must be depressed as the NULL key is hit or the calibration value will not be memorized.) After releasing both keys, the print time will blink. Press SELECT key to exit.

Matching the Memorized Tone

Always start by loading MetroLux with exposure time used during memorization. Set up new negative for printing. Select MRS, mode 2 by pressing SELECT key twice. Place the MRS sensor on image area to be gray-matched. Press NULL key. The MetroLux will blink with values for the areas the MRS is reading. Move the MRS to other areas and you will see the display change accordingly. When settled on a selection, press NULL. MetroLux automatically installs the new exposure time, turns the lamp off and returns to printing mode.

Error messages: If values selected produce readings too low or too high, MetroLuxII will display "2lo" or "2hi", work with a brighter or darker area of image, or adjust the sensitivity of the MRS. (See "Integration Setting", pg. 6-5).



Logarithm Readings

Activate MRS, Mode 3, by pressing SELECT key three times. Enlarging lamp turns on.

MetroLux display will momentarily read "log" before showing light values.

The display initially shows the light intensity in a linear fashion. This allows you to find the brightest area, the fbf (filmbase-plus-fog, brightness area, shadow area) for the NULL value. (We assume a simple understanding of densitometry.) Once the fbf is found, NULL. The display now shows the log of the ratio of the NULL value to the present value. This is the same as the log of the optical density of the projected negative.

$$\text{Display} = \log_{10} \left(\frac{\text{NULL value}}{\text{Present value}} \right) = \log_{10} (\text{projected density})$$

To measure the density range of a negative: With a negative in the enlarger and MetroLux II in the Log mode, use the MRS to find the brightest area. The bigger the number the brighter it is. If there is a "clear area" this will be the brightest. NULL. The display now shows optical densities, 0.00, for the NULL value. Remember, the true fbf cannot be measured without removing the negative or having a hole in your negative carrier. What we call the fbf is always NULled out. If a negative value appears on the display, such as "-.30", this represents an area brighter than the NULL value. In this case 2x brighter. You may wish to reNULL.

Chart of typical densities:	Zone			Log ₁₀ density		Linear density	
Density measurements taken with the MRS may be different than actual densities of the negative since the MRS takes into account lamp evenness, lens contrast and background light. It is a real time measurement of what the paper sees during exposure.	0 (fbf)			0.00		1	
	I			0.15		1.4	
	II			0.30		2	
	III			0.45		2.8	
	IV			0.60		4	
	V			0.75		5.6	
	VI			0.90		8	
	VII			1.05		11	
	VIII			1.20		16	
	IX			1.35		22	
	X			1.50		32	

Areas brighter than NULled values will be displayed as negative values. The limit of calculation for the log mode is -.99 through 3.40.

You may reNULL at any time in the log mode.

To exit mode 3, press SELECT once.

Remote Sensor Integration Settings, Limitations

Integration setting

This is the period of time MetroLux II "gathers" light from the MRS while making calculations. If readings are consistently too low --the "2LO" prompt continually recurs-- increase the integration setting, to allow the MRS to gather more light. If readings are consistently too high-- the "2Hi" or "999" prompt continually recurs, decrease the integration setting.

"2LO" : At this point the resolution of the MRS is 2% and decreasing.

"2HI" : The measured light is too bright and the sensor is saturated.

"1" : The light levels are very low or very high. You should be able to tell.

In bright situations near saturation the MRS can have idiosyncracies and display numbers that are inconsistent with the light intensities. Don't trust numbers unless they settle down. You may see these numbers drift with coldlights when the MRS is used in the TIME mode. In this case they are probably real. Coldlights drift.

To change the integration setting: Select Customized Options Display (COD), channel "F". The COD stack is accessed by holding the MEMORY key until "cod" displays. Click MEMORY key to scroll through the stack to the "F" setting. Adjust integration time using Up/Down keys. Exit by holding the MEMORY key. Integration settings range from 0.2 to 9.9 seconds.

Limitations of the MRS

The MRS has limitations of accuracy, repeatability, light intensity, etc. Sometimes MRS knows its own limits and will prompt you with "2HI" or "2LO". In other instances, you need to know its limitations and understand the symptoms to get the most from MRS.

MRS does not see all colors of light equally. Unless you do color photometry or use a multi-grade light source, this makes no difference: MRS sees safelights.

Lastly, because of how log calculations are made in MetroLux, an inconsequential error is generated. (Plus or minus 0.015 of the actual log). This is why MRS NULL values are always 0.01, not 0.00.

Considering the Environment

As you use the MRS, you will discover some amazing things about light in your enlarger and darkroom. Look up at your enlarger from the easel top and you will see what the MRS sees. In some darkrooms you will see safelights, dirty lens, uneven light sources, light leaks reflecting off the ceiling, light off the easel reflecting off the enlarger and back to the easel... Some of these are of minor effect and some are not. If you try to do accurate densitometry from zero to 2.00 or 3.00 you will discover some of these and others. Be careful with your measurements.



INSTALLING A SENSOR:

MetroLux was designed to overcome the problems of light output fluctuations associated with coldlight printing lamps. We watch the light while you print, correcting for fluctuations. It works fine with all light sources that do not exceed the 720 watt power requirement. Certain precautions must be followed when installing the probe:

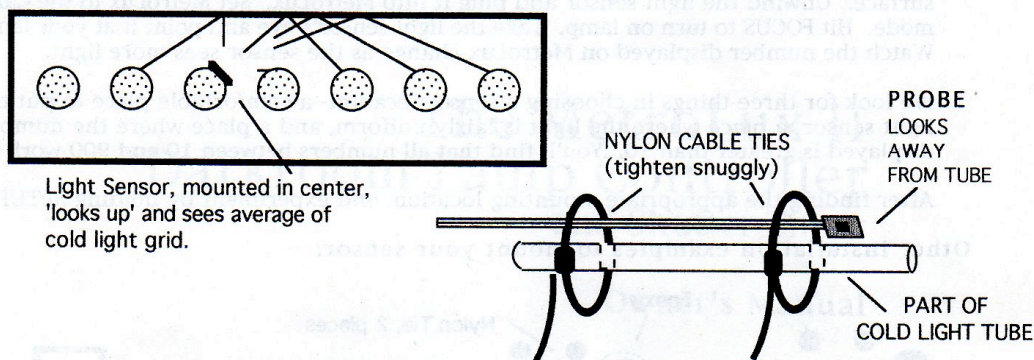
- While installing the probe, be sure the light source you're working on is electrically disconnected from all power sources.
- Always strain relief the probe such that a tug from the outside cannot damage the tube or other parts of the printing lamp.
- Tie probe wire out of the way. As the enlarger moves up and down, be sure that the probe wire is not pulled or damaged.
- Avoid exposing probe or wire to heat. If it's too hot to touch, it's too hot for the probe (probe temperature range is -15° to 140°F). With some quartz and tungsten lamps, the probe wire will need to be mounted on the outside of the housing, away from heat. In this case, the probe can view the light through a small hole drilled near the source.
- The probe's-eye-view is very sensitive to changes in position. The probe should have a clear view of the printing lamp and not be allowed to move.
- Sound pretty complicated? It's very simple. We've installed many probes in all kinds of lamps without problems. If you have problems, drop us a line.

For Coldlights. Below is an installation technique we have used for the Aristo D-2 coldlight, the most common coldlight. If you have another type, these instructions should provide enough general information for fitting your coldlight with a sensor. Read the instructions through once before starting. Simple tools and a little smarts can perform the operation.

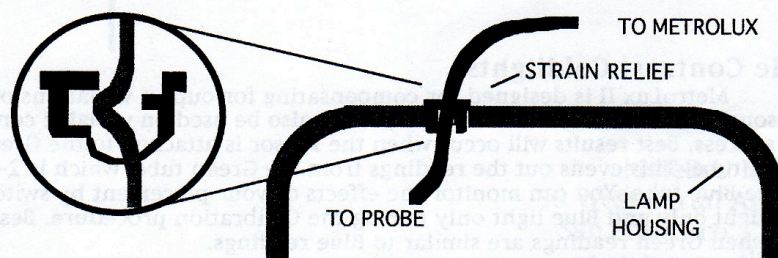
Tools: pencil, masking tape, screwdriver, electric drill with 1/8" and 3/8" bits.

1. Disconnect the power chords and remove the coldlight head from your enlarger.
2. Mark the relative orientation of the cap and bottom of the coldlight with a pencil.
3. Remove two small screws on sides of coldlight. Lift the cap off the coldlight.
4. Mark the location on the cap where the hole will be drilled. It must be located on the top such that the probe wire will clear the transformer beneath the cap.
5. Drill the hole with 1/8" bit and then widen the same hole with the 3/8" bit.
6. Clean the hole of any burrs and remove shavings from inside the lamp housing from inside the lamp housing.

7. Feed the probe wire through the hole in the cap. Now pass the probe end through the opening on the fluorescent tube mount board towards the tube itself.
8. Look closely at the probe and note which side "sees". It is the side with the shiny square eye. With eye away from fluorescent tube, strap wire to the tube near the center of the cold light grid with nylon cable ties at both 1/4" and 1" distance from probe. From here the sensor can see the 'average intensity' of the light. Pull snug and clip away the excess ties.



9. Realign cap on lamp; spin in the screws.
10. With the lamp reassembled, take up slack in probe wire by gently pulling excess wire out of cap. Take the strain relief (the strain relief is the odd-shaped, black thing in the plastic bag that the probe came in) and with the wire laid into the larger piece, force the other side in so that it clamps ('pinches') the probe wire. Use a pair of pliers to squeeze and snap this strain relief through hole.



Probe strain relief, and close-up of assembly, in coldlight lamp house.

TUNGSTEN & QUARTZ LAMP INSTALLATIONS

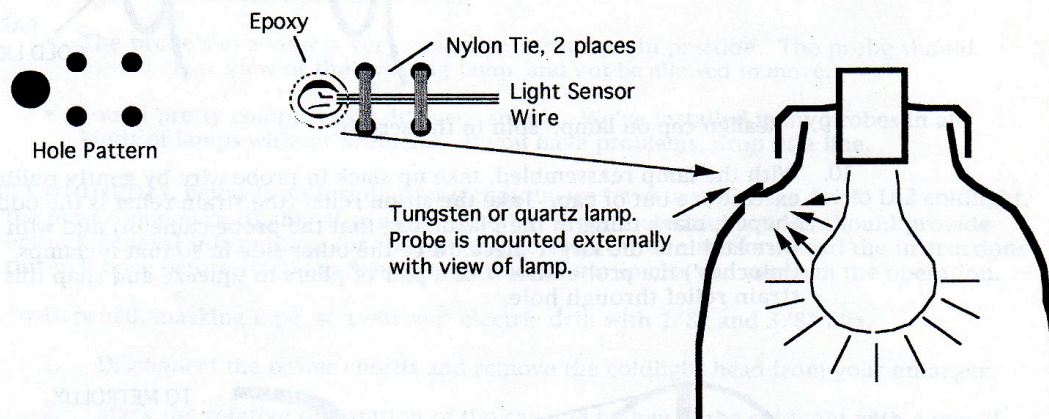
As a means of fastening the light sensor to some tungsten and quartz lamp houses, we have used the hole pattern shown below. With these holes, the probe is positioned over the 1/4" hole, with the wire trailing between the other four (4) holes. Nylon ties through the other holes fasten the light sensor wire to the housing. A drop of epoxy on the back of the light sensor holds it firmly in position.

Before drilling holes in the lamp house, we like to perform an experiment: With the light source removed from the enlarger, set up MetroLux and the lamp on a work surface. Unwind the light sensor and plug it into MetroLux. Set MetroLux to the Cal mode. Hit FOCUS to turn on lamp. Take the light sensor's eye and point it at your lamp. Watch the number displayed on MetroLux change as the sensor sees more light.

We look for three things in choosing a sensor location--a comfortable place to put the light sensor, a place where the light is fairly uniform, and a place where the number displayed is greater than 10. You'll find that all numbers between 10 and 900 work fine.

After finding the appropriate mounting location, end experiment by holding SETUP.

Other installation examples to mount your sensor:



Variable Contrast Coldlights:

MetroLux II is designed for compensating for output variations on single grade lamp sources. With a few considerations, it can also be used on variable contrast tubes with great success. Best results will occur when the sensor is attached to the Green tube looking at the Blue tube. This evens out the readings from the Green tube, which is 2-3 times brighter than the Blue tube. You can monitor the effects of your placement by switching between Green light only and Blue light only during the Calibration procedure. Best printing results occur when Green readings are similar to Blue readings.

It is also suggested that you choose a middle contrast setting to calibrate. This way the output variations on contrast changes will not be as large a swing from your calibrated value.

Many printers using the MetroLux II on their VC coldlights are calibrating their LUX 2 channel for the highest contrast setting.