

BESELER
PM2.5

PM2.5
COLOR
ANALYZER

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I. IMPORTANT SAFEGUARDS[©]

When using your photographic equipment, basic safety precautions should always be followed, including the following:

1. Read and understand all instructions.
2. Close supervision is necessary when any appliance is used by or near children. Do not leave appliance unattended while in use.
3. Care must be taken as burns can occur from touching hot parts.
4. Do not operate appliance with a damaged cord or if the appliance has been dropped or damaged—until it has been examined by a qualified serviceman.
5. Do not let cord hang over edge of table or counter or touch hot surfaces.
6. If an extension cord is necessary, a cord with a suitable current rating should be used. Cords rated for less amperage than the appliance may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.
7. Always unplug appliance from electrical outlet when not in use. Never yank cord to pull plug from outlet. Grasp plug and pull to disconnect.
8. Let appliance cool completely before putting away. Loop cord loosely around appliance when storing.
9. To protect against electrical shock hazards, do not immerse this appliance in water or other liquids.
10. To avoid electric shock hazard, do not disassemble this appliance, but take it to a qualified serviceman when some service or repair work is required. Incorrect reassembly can cause electric shock hazard when the appliance is used subsequently.

SAVE THESE INSTRUCTIONS

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PM2L COLOR ANALYZER

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SPECIFICATIONS

Line Input: 117 volts AC, 50/60 Hz.

Power Consumption: 10 watts.

Electrical Construction: Solid State.

Warm-Up Time: Instantaneous.

Light Detector: Photo-Multiplier.

Density Range: More than 4 densities.

Probe Box Dimensions: H. $2\frac{9}{16}$ ", L. 7", D. $1\frac{5}{8}$ ".

Low Light Sensitivity: 0.0002 Foot Candles.

Analyzing Meter: $4\frac{1}{2}$ " Differential Volt Meter.

Length of meter: 3-1/2"

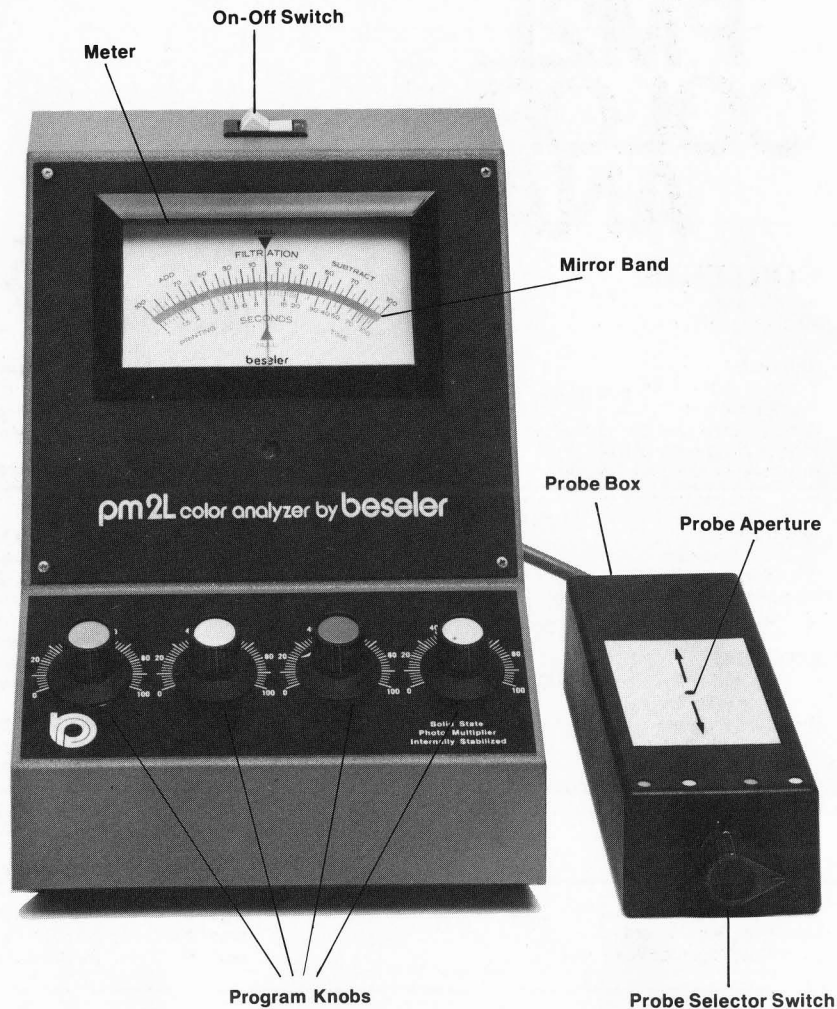
Upper Scale: Filtration (Optical Density).

Lower Scale: Exposure.

Case Construction: Grounded, all metal case.

Total Shipping Weight: 6 lbs.

Programming Bank: For the storage and retrieval of one complete program (color and exposure). Also has the capacity for establishing and recreating an infinite number of different programs by means of its calibrated program scales.



BASIC INSTRUCTIONS FOR USING THE BESELER PM2L COLOR ANALYZER

Your purchase of the PM2L will be rewarded by many years of maintenance-free, faithful service. The best way to get acquainted with the instrument is to keep it in front of you for reference while reading the introductory first section of this instruction booklet. Operation of the PM2L is a simple, three-step procedure:

- 1—PROGRAM a REFERENCE negative into the PM2L by adjusting four knobs on the analyzer.
- 2—ANALYZE the COLOR of the UNKNOWN negative by adjusting the filtration in the enlarger.
- 3—ANALYZE the EXPOSURE of the UNKNOWN negative by adjusting the aperture of the enlarging lens.

No doubt you're anxious to try out your new analyzer by making a few color prints right away. There are just two preliminary steps which you must take before you can use the PM2L for the very first time:

- 1—Select an appropriate REFERENCE negative which is typical of the negatives you're going to be printing and:
- 2—Make a perfect 8 × 10 color print from your REFERENCE negative by the "trial and error" method.

SECTION I

SELECTING THE REFERENCE NEGATIVE

The best REFERENCE negative is one you've shot yourself. The analyzer will be deriving the color and the exposure for all future negatives from the PROGRAM derived from the REFERENCE negative. It is therefore obvious that the original REFERENCE negative and the subsequent UNKNOWN negatives should be as much alike as possible. For this reason, you'll want to shoot your REFERENCE negative on the type of film you plan on using in the future.

The REFERENCE negative should be well-exposed and not too contrasty. It should contain a large, front-lighted flesh-

tone and a clean, neutral grey area. (Have the subject hold an 18% grey card.)

You'll be printing your REFERENCE negative many times over the years, so it makes good sense to take the time and effort to obtain a good one.

If you want to start printing before you've had time to shoot your own REFERENCE negative, you can get a good 35mm REFERENCE negative as a part of the Kodak Color Data Guide (Eastman Kodak Publication R-19), available from your photo dealer.

Alternately, you might browse thru your own collection of color negatives to find one which has previously printed well and which contains an excellent flesh-tone and use this as a temporary REFERENCE negative with which to get started.

TRIAL AND ERROR PRINT

Put your REFERENCE negative into the enlarger and set your enlarging lens three stops from wide open. If you're going to be printing with acetate (CP) filters, put a heat absorbing glass and a UV filter into your filter drawer and leave them there. (The heat absorbing glass and the UV filter should remain permanently in the filter drawer.)

Adjust the magnification of your enlarger to yield an 8" × 10" image. Focus and compose the image and then vary only the filtration and the exposure time (but not the aperture setting!) and make a perfect 8" × 10" color print by the "trial and error" method.*

Record the exposure time which was used to make this perfect "trial and error" print. This exposure time is the "STANDARD" printing time which you'll need to know later, when PROGRAMMING your analyzer.

Also record the F/stop, the filter pack and the enlarger magnification which were used to produce the perfect color print. Do not alter the filter pack or any of the enlarger settings and *leave the REFERENCE negative in the enlarger!*

*If you would like a step-by-step explanation of how to make a perfect color print by the "trial and error" method, please refer to Section IX of this booklet where the procedure is spelled-out in detail.

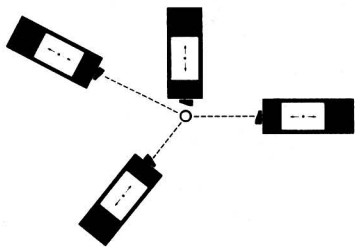
SETTING-UP THE ANALYZER FOR THE FIRST TIME

- 1- Plug the line cord into any 117 volt AC outlet.
- 2- With the REFERENCE negative in the enlarger and with the same filter pack and enlarger settings that were used to make the perfect trial-and-error print, turn on the enlarger and turn off all lights in the room including all safelights.
- 3- Place the probe on the easel so that the projected image of a medium flesh tone is falling onto the probe aperture. (Not a highlight or a shadow, but a "medium" flesh tone area.)
- 4- Turn on the analyzer and position it so that the light from the meter face is not falling onto the probe.

NOTE: Your Beseler Color Analyzer is equipped with orientation arrows on the top surface of the probe. These arrows are useful in helping you position the probe correctly in order to obtain accurate and consistent results when taking readings via the spot method.

Whenever possible, the aperture of the probe should be placed in the center of the projected image directly under the enlarging lens.

If the flesh tone or desired color to be programmed (analyzed) does not fall in the center of the easel, you must make use of the probe orientation arrows.



Place the aperture of the probe in the area to be programmed (or analyzed). Orient the probe so that one of the arrows is pointing towards the center of the projected image. (See illustration.)

Once this alignment has been made, the probe should not be moved during analyzing.

PROGRAMMING THE ANALYZER

- 1- Move the probe switch to the CYAN position and adjust the Cyan program knob to null the analyzing meter.
- 2- Move the probe switch to the YELLOW position and adjust the Yellow program knob to null the meter.
- 3- Move the probe switch to the MAGENTA position and adjust the Magenta program knob to null the meter.
- 4- Move the probe switch to the WHITE position and adjust the White program knob until the meter needle is superimposed directly over the "standard" printing time on the lower EXPOSURE scale ("seconds"). (The "standard" printing time is the number of seconds for which the perfect trial and error print was exposed.)
- 5- Repeat steps 1-4 until a continuous null reading is indicated in the Cyan, Yellow and Magenta positions, and the "standard" printing time is indicated in the White position.
- 6- Record the CYAN, YELLOW, MAGENTA and WHITE PROGRAM SCALE settings. Any time you want to re-create this analyzer program, you may do so by simply turning all four program knobs to their zero settings, and then adjusting the four program knobs to the proper settings which you have previously recorded.

Turn off the analyzer. It is now fully programmed to faithfully reproduce the color and the exposure of your perfect trial-and-error print on the future prints you make from any number of unknown negatives. Do not touch or alter any of the analyzer settings.

Record the settings of the Cyan, Yellow, Magenta and White program knobs. To recreate this medium flesh tone program at a later date, simply reset the program knobs to these same positions.

ANALYZING AN UNKNOWN NEGATIVE

Place the "unknown" negative into the enlarger. Turn on the enlarger and turn off all darkroom lights, including all safelights. Size, focus and compose the image in the normal way. Place the probe aperture on the easel so as to "read" a medium flesh-tone area.

- 1- Move the probe switch to CYAN and adjust the enlarging lens aperture to null the meter.
- 2- Move the probe switch to YELLOW and add or subtract Yellow filtration from the filter pack to null the meter.
- 3- Move the probe switch to MAGENTA and add or subtract Magenta filtration from the filter pack to null the meter. (repeat steps 1, 2, and 3 until a continuous null reading is indicated in the Cyan, Yellow and Magenta positions.)
- 4- Move the probe switch to the WHITE position and open or close the aperture of the enlarging lens until the meter needle is superimposed directly over the "standard" printing time.

The negative is now completely analyzed and you're ready to make a print. (Expose for the "standard" printing time.)

COLOR PRINTING FILTERS: AN EASIER WAY!

If you're using CP filters rather than a continuous filtration colorhead, you'll probably find it more convenient to simply stack your CP filters directly on top of the probe aperture while analyzing your UNKNOWN negatives.

Once you have established your filter pack, simply transfer the entire stack of CP filters into your filter drawer all at once, rather than going to the filter drawer again and again, one filter at a time while attempting to "NULL" the meter. The net effect is the same either way, and "stacking" the filters over the probe is faster and more convenient. You must be sure to include the UV filter and heat absorbing glass in your reading. You may leave the heat absorbing glass and the UV filter in your enlarger while stacking the CP filters on your probe.

By re-setting the program control knobs to the recorded positions, any previously recorded program can be re-created at a later date without having to re-program from your REFERENCE negative.

SECTION II

THE FILTRATION SCALE

The upper scale is the FILTRATION scale. (See fig. A) In addition to simply indicating the *need* to add or to subtract

filtration, the FILTRATION scale also indicates the *amount* of filtration change necessary to null the meter. (A reading of "add 30" indicates that adding 30 units of filtration to the filter pack will result in a "NULL" reading on the meter. Similarly, a reading of "SUBTRACT 30" indicates that subtracting 30 units of filtration from the filter pack will result in a "NULL" reading on the meter.) The scale is calibrated in units of .05 and is perfectly linear. Thus a needle position exactly half-way between calibration marks is equivalent to an additional .025, while a position one-quarter of the way past a calibration mark is equivalent to an additional .0125, etc.

The analyzing meter reads "absolute" values, but the stated value for any CP or CC filter is only an approximation and not an exact indication of the actual density of the filter. Similarly, the calibrated scales on most colorheads are only nominal values. You should also be aware that CP and CC filters tend to fade from age and from exposure to light and heat, which reduces their actual density. When there is a discrepancy, always believe your analyzer.

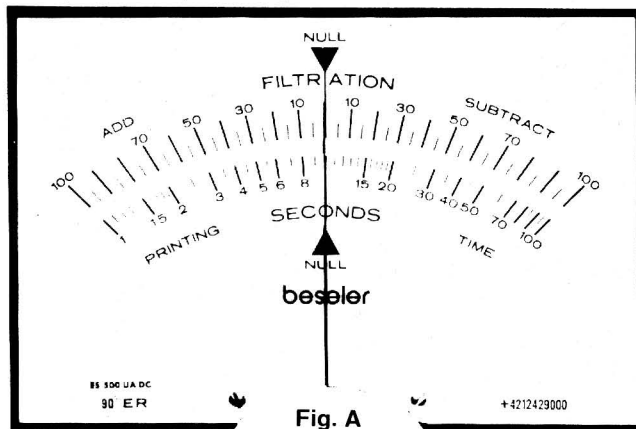


Fig. A

THE EXPOSURE SCALE

The lower scale is the EXPOSURE scale. When analyzing UNKNOWN negatives, the aperture of the enlarging lens is

normally adjusted until the meter needle is superimposed directly over the "STANDARD" printing time and the print is then exposed for the "STANDARD" printing time. When making either very large or very small prints, it may not be possible to open or close the enlarging lens enough to superimpose the meter needle over the "STANDARD" printing time. (You may "run out" of F/stops on your enlarging lens.) Should this occur, the REQUIRED printing time (in seconds) may then be read directly from the meter face. (The meter needle will indicate the REQUIRED printing time for whatever lens aperture you happen to be at.)

By the same token, the EXPOSURE scale will also indicate the required printing time for any other F/stop, and changing the F/stop will change the printing time shown on the EXPOSURE scale.

This feature allows for considerable flexibility: For example, should you wish to print at a favorite F/stop, just set your lens to that F/stop and then simply read off the printing time on the EXPOSURE scale. Should you wish to do so, it also allows you to use the shortest possible exposure time, simply by setting your lens to its maximum aperture and then reading the printing time on the meter scale. Alternately, it allows you to expose for the longest possible time (useful when dodging and burning-in), simply by closing down your lens to its smallest opening and then reading the printing time on the meter scale.

STANDARDIZED NULLING TECHNIQUE

The key to color printing is STANDARDIZATION. Do everything the same way every time. (Same paper, same processing time, same temperature, same agitation etc.) Standardize too on your procedure for nulling the analyzing meter.

The best procedure is to position the analyzer to one side of the enlarger and to make it a practice to stand directly in front of the meter face every time you null. This procedure safeguards against unwanted variables such as eye-parallax.

To be sure you are not experiencing eye-parallax, position your eye in front of the meter needle so the reflection of the needle is not visible in the mirror band behind it. If the reflection is visible, move your head or the instrument until you no longer see the reflection of the needle, and then proceed with the nulling operation.

MOVING THE PROBE SWITCH

It is extremely important for the probe aperture to be "reading" the exact same spot during each step of the PROGRAMMING, or ANALYZING sequence. To insure that the probe is not accidentally moved when changing the probe switch from one position to the next, PUSH SLIGHTLY DOWN on the probe box with your left hand while moving the probe switch with your right hand.

The third section of this instruction booklet details three alternative methods for PROGRAMMING and ANALYZING color negatives. Each method has advantages and applications.

SECTION III

PROGRAM AND ANALYZE THE SAME COLOR

The function of a color analyzer is to aid the operator in reproducing the color which has been programmed into it. The area being "read" while the UNKNOWN negative is being analyzed is the area on the print where the programmed-in color will be reproduced.

If a color is programmed into the analyzer, and then, while the UNKNOWN negative is being analyzed, a similarly colored area is "read" by the probe, the result will be excellent: All colors will be properly reproduced on the color print. If, however, a dissimilarly colored area is read during the analysis of the UNKNOWN negative, all of the colors will be reproduced incorrectly and the print will likely be unsatisfactory.

Thus, working from a medium flesh tone program, if you place the probe under the projected image of a medium flesh tone area of your UNKNOWN negative, the result will be a good print, but if you place the probe under the projected image of

some green grass, you may get a print with flesh colored grass!

ALWAYS ANALYZE THE SAME COLOR IN THE UNKNOWN NEGATIVE THAT IS PROGRAMMED INTO THE ANALYZER. Remember that a flesh tone program can only reproduce the color of *flesh*: no other color!

Since a very high percentage of your pictures are likely to have people in them (flesh tone areas), your flesh tone program will probably be your single most useful program, but remember that its only application is in reproducing the color of *flesh*!

ADDITIONAL COLOR PROGRAMS

You can easily establish an analyzer program for any color, or for white or black. These additional programs may then be used to analyze negatives which contain neither flesh tones, nor grey areas.

Take another look at your REFERENCE negative. In addition to the good flesh tone, does it also contain other colors which might frequently appear in your pictures? If so, it might be very helpful to establish an analyzer program for each of these colors.

For example: if you do a lot of shooting out-of-doors in sunshine, it is probable that a lot of your pictures will contain substantial blue sky areas. Why not establish a "blue sky" program? You can use it to analyze outdoor, blue sky scenes in which there are no people to match against a flesh tone program. (You might even create a "blue" sky, plus an "over-cast" sky program.)

Similarly, a "green grass" program might be very useful, as might a program for any other color which might appear in your photographs with some regularity.

If your original REFERENCE negative doesn't contain every color for which you'd like to establish a program, keep on the look-out for other negatives which do contain the colors you're looking for. When you find one, use it as a REFERENCE negative: print it, and establish an analyzer program from it.

There's no limit: You can collect as many analyzer programs and REFERENCE negatives as you have a use for.

Alternately, you might establish an analyzer program for one color (such as 18% grey) and then "cause" that one color to appear in every picture.

GREY CARD PROGRAM

Once a program has been established for it, analyzer readings taken from the projected image of an 18% grey card are the most accurate method for evaluating correct color balance and exposure from an UNKNOWN negative.

The traditional method for getting the grey card image recorded onto the film is to physically place the grey card in a corner of every picture. (You can crop it out later when making the print.) From a practical point of view, a single picture which includes the image of the grey card should suffice for all pictures shot during the course of one shooting session. (All pictures shot under the same conditions should require the same filtration and exposure as will the picture which contains the image of the grey card.) Analyzing the projected image of the grey card (against a grey card program of course) should yield a perfect print the first time. The same filtration should yield correct color on the rest of the negatives shot under the same conditions and it shouldn't even be necessary to analyze the rest of the negatives. Remember that if the shooting conditions change (i.e., a change in lighting, angle, or exposure), a new grey card exposure will be required.

GREY NEGATIVE PROGRAM

Similar in purpose to the grey card concept, this method has the advantage of not requiring the judicious placement of a grey card. Instead, a small $2\frac{3}{8}" \times 2\frac{3}{8}"$ opal diffuser (Beseler Light Integrator, Prod #8163) is held over the camera lens while a picture of the sun, or principal light source is made at some point during each shooting session.

When the film is processed you'll have an entire grey negative area to match against a previously established "grey negative" analyzer program.

WHOLE AREA INTEGRATION

This method of programming and analyzing operates on an entirely different principle which does not require the presence of a flesh tone, or of any particular color, or of a grey area on the negative. The only additional item needed is the Beseler Light Integrator.

Any color negative may be analyzed by the INTEGRATION method against an INTEGRATION program, irrespective of the pictorial content of the negative, which makes this a practically "do all" method of analysis for negatives which do not contain a flesh tone, a grey area, or any color for which you have established a program.

SETTING UP FOR INTEGRATION PROGRAMMING

No actual color prints need be made. A known REFERENCE negative is placed in the enlarger and the corresponding filter pack and enlarger settings are recreated which have previously produced a good print from this negative.

Attach a Beseler Universal filter holder (Cat. #8917) under your enlarging lens and place the light integrator in it in such a manner that the light integrator is not farther than 1/2" below the enlarging lens. (With a Beseler Enlarger simply place the Integrator in the sliding filter drawer above the lens.)

INTEGRATION PROGRAMMING

- 1—Place the probe aperture on the easel directly under the center of the enlarging lens and insert the Beseler Light Integrator into the light path. (Disregard the subject matter entirely.)
- 2—Program the analyzer exactly as described on page 4, steps 1-5. (Programming the analyzer.)
- 3—Remove the Beseler Light Integrator from the light path.

INTEGRATION ANALYZING

- 1—Place the probe aperture on the easel, directly under the center of the enlarging lens.
- 2—Insert the Beseler Light Integrator into the light path.

- 3—Follow the analyzing procedure described on page 4 steps 1-5.
- 4—Remove the Beseler Light Integrator from the light path and make your exposure.

SECTION IV

WHAT ABOUT CYAN?

Most color negatives can be brought into correct color balance with only yellow and magenta filters in the filter pack.

A cyan and yellow filter pack (no magenta), or a cyan and magenta filter pack (no yellow) may, however, be required to make good prints from some negatives.

Color negatives which require cyan filtration are frequently the result of an illumination mis-match such as occurs when a tungsten balanced film is exposed in daylight without a conversion filter.

CYAN & YELLOW FILTER PACKS

When analyzing an UNKNOWN negative, if the analyzer will not null on Magenta, even with zero Magenta filtration left in the pack, proceed as follows:

- 1—With the probe switch still on MAGENTA, adjust the enlarging lens aperture to null the meter.
- 2—Move the probe switch to YELLOW, and add or subtract Yellow filtration to null the meter.
- 3—Move the probe switch to CYAN, and add enough Cyan filtration to the filter pack to null the meter.
- 4—Repeat steps 1, 2, and 3 until a continuous null reading is indicated in the Magenta, Yellow and Cyan positions.
- 5—Move the probe switch to the WHITE position, and open or close the aperture of the enlarging lens to superimpose the meter needle over the "standard" printing time. (Expose for the "standard" printing time.)

CYAN & MAGENTA FILTER PACKS

When analyzing an UNKNOWN negative, if the analyzer will not null on Yellow, even with zero Yellow filtration left in the pack, proceed as follows:

- 1—With the probe switch still on YELLOW, adjust the enlarging lens aperture to null the meter.
- 2—Move the probe switch to MAGENTA, and add or subtract Magenta filtration to null the meter.
- 3—Move the probe switch to CYAN, and add enough Cyan filtration to the filter pack to null the meter.
- 4—Repeat steps 1, 2, 3 until a continuous null reading is indicated in the Yellow, Magenta, and Cyan positions.
- 5—Move the probe switch to the WHITE position and open or close the aperture of the enlarging lens to superimpose the meter needle over the "standard" printing time. (Expose for the "standard" printing time.)

SECTION V

BALANCING FOR A NEW PAPER EMULSION

An emulsion number is generally printed on the outside of each box of color paper. Each emulsion number will generally require slightly different filtration and exposure to bring it into balance. The filtration and exposure adjustments required to balance the new emulsion are generally printed on the outside of the box and balancing instructions are usually packed inside.

Analyze your REFERENCE negative and then print it on a sheet of paper from the new box. If this print is less than satisfactory, make the necessary filtration and exposure corrections, and then re-program the analyzer for this new box of paper. (If you have several boxes of paper, each with a different emulsion number, you'll probably need to establish a different analyzer program for each box.)

It's a good idea to purchase a large quantity of one emulsion number and store it in your refrigerator until needed.

SPECTRAL CHARACTERISTICS DIFFER

The spectral absorption characteristics of the dyes formed in one color film may be quite dissimilar from those for a different type (or a different brand) of color film. Since a color analyzer measures the dye density over a fixed wavelength spread, an analyzer Program for one type of film may not be useful for analyzing films of a different type.

From a photographic point of view, the best results will be obtained by establishing a different analyzer Program for each type (and each different brand) of color film which you will be printing.

ENLARGING LAMPS

The color temperature and the light intensity of tungsten types of enlarging lamps changes considerably during the first few minutes of its burning life. It is therefore a good idea to "burn-in" a new lamp for about 30 minutes before using it for color printing.

The lamp continues to change as it ages, but at an ever declining rate. Reprinting your REFERENCE negative from time to time will determine if any adjustment should be made to the Program stored in the analyzer to compensate for the aging of the enlarging lamp (or of your printing filters.)

VOLTAGE FLUCTUATIONS

Fluctuations in the AC line voltage being fed into the enlarging lamp will cause the color of the light to change. For consistent results it is essential that the enlarger be plugged into a voltage stabilizer.

Ask your dealer about the voltage stabilizers manufactured by Beseler.

The PM2L color analyzer has its own (built-in) voltage stabilizer and may be connected directly to any nominal 117 Volt AC outlet.

SECTION VI

TRI-COLOR: THE ADDITIVE SYSTEM

By "trial and error", make a perfect 8" x 10" color print by the three exposure, Tri-Color method. Record the printing time which you used for the red filter exposure. Also record the green filter and the blue filter printing times.

Leave the REFERENCE negative in the enlarger and do not alter the lens aperture or the enlarger magnification. Place the probe on the easel so as to "read" the desired area of the projected image.

TRI-COLOR PROGRAMMING

- 1— Move the probe switch to the CYAN position and adjust the CYAN programming knob to superimpose the meter needle directly over the printing time used for the RED filter exposure.
- 2— Move the probe switch to the YELLOW position and adjust the YELLOW programming knob to superimpose the meter needle directly over the printing time used for the BLUE filter exposure.
- 3— Move the probe switch to the MAGENTA position and adjust the MAGENTA programming knob to superimpose the meter needle directly over the printing time used for the GREEN filter exposure. (Disregard WHITE entirely.)

TRI-COLOR ANALYZING

Put an UNKNOWN negative into the enlarger and turn on the enlarger. Turn off all room lights, including safelights, and adjust the magnification to yield the desired print size. Focus and compose the image in the normal way and then position the probe on the easel so as to "read" the desired area of the projected image. Analyze the negative in the following manner:

- 1— Move the probe switch to the CYAN position and adjust the aperture of your enlarging lens until the previously recorded RED filter printing time is indicated on the EXPOSURE scale. (Write down the RED filter printing time.)
- 2— Move the probe switch to the YELLOW position and note

the meter reading on the EXPOSURE scale. (This is the blue filter printing time for the UNKNOWN negative: Write it down.)

- 3— Move the probe switch to the MAGENTA position and note the meter reading on the EXPOSURE scale. (This is the green filter printing time for the UNKNOWN negative: Write it down.)

The UNKNOWN negative is now completely analyzed. The red filter, blue filter and green filter printing times which you have written down are the printing times to use when exposing this negative by the three exposure TRI-COLOR method through the appropriate red, blue and green filters.

SECTION VII

REVERSAL PRINTING

The versatile PM2L can also be used to determine both the filtration and the exposure for color prints made directly from color transparencies. (Direct positive color paper and chemistry, like Color by Beseler RP5, made especially for this process are of course required.)

The procedure for programming and for analyzing from color transparencies is identical to that for programming and for analyzing from color negatives.

First make a perfect "8x10" print from a suitable REFERENCE transparency and then Program that information into the analyzer exactly as described on Page 4. You're now ready to analyze any number of "UNKNOWN" transparencies exactly as described on Pages 4 & 5.

For the purpose of both programming and analyzing, exposure (density) can be determined from either the midtone or detailed highlight areas of the color transparency. Different color analyzer programs will be required for each different brand of color transparency film you will be using.

SECTION VIII

BLACK & WHITE PRINTING

In addition to its use as a color analyzer, the PM2L may also be used to determine paper grade or Polycontrast® filter, as

well as exposure in black and white printing. The PROGRAMMING and ANALYZING procedure for B&W negatives is similar to, but even easier than the procedure for PROGRAMMING and ANALYZING from color negatives.

SETTING-UP FOR BLACK & WHITE PRINTING

- 1—Use your normal B&W paper and chemistry and make a perfect 8 × 10 trial and error print from a suitable B&W REFERENCE negative. The printing time which yielded this perfect print now becomes your “standard” printing time. This perfect trial-and-error print will now be referred to as your “STANDARD” print on this brand of paper.
- 2—Leave the REFERENCE negative in the enlarger and do not alter the enlarger magnification or the lens aperture which produced the perfect print. For future reference, record the magnification, the aperture setting and the “standard” printing time.
- 3—Turn on the enlarger and the analyzer and turn off all darkroom lights including all safelights.

PROGRAMMING FOR GRADED PAPER

- 1—Move the probe switch to CYAN and position the probe aperture under the projected image of the LIGHTEST part of the negative in which some detail is still visible.
- 2—Adjust the CYAN control knob until the meter reads 1 on the EXPOSURE scale.
- 3—Move the probe switch to WHITE and position the probe aperture under the projected image of a shadow area with detail. (This is the shadow detail tonal value which the analyzer will reproduce in prints made from “unknown” negatives.)
- 4—Adjust the WHITE control knob until your “standard” printing time is indicated on the EXPOSURE scale.

- 5—On the outside of your box of paper, record the settings of the Cyan and the White control knobs. Also record the “standard” printing time.

ANALYZING WITH GRADED PAPER

Put an “unknown” negative into your enlarger and size, focus and compose the image in the normal fashion.

- 1—Move the probe switch to CYAN and position the probe aperture under the projected image of the LIGHTEST part of the negative in which some detail is still visible.
- 2—Adjust the lens aperture until the meter reads 1 on the EXPOSURE scale.
- 3—Position the probe aperture under the projected image of the DARKEST part of the negative in which some detail is still visible.
- 4—Read the CONTRAST RATIO directly off the EXPOSURE scale. (A reading of 4 indicates a CONTRAST RATIO of 1:4. Similarly, readings of 8, 15, and 20 represent CONTRAST RATIOS of 1:8, 1:15, 1:20 etc.)
- 5—Consult the CONTRAST RATIO table to determine the correct paper grade to use for this particular negative.
- 6—Move the probe switch to WHITE and position the probe aperture under the projected image of a shadow area in which you wish to retain some detail in the print.
- 7—Read the printing time (1-100 seconds) directly off the EXPOSURE scale, or if you prefer, adjust the lens aperture to arrive at any aperture/printing-time combination of your choice. (The EXPOSURE scale will indicate the required printing time for any aperture setting.)

With many brands of B & W enlarging paper, the printing speed is somewhat different for each contrast grade.

CONTRAST RATIO TABLE

CONTRAST RANGE	PAPER GRADE/FILTER
Less than 1:4	#5
1:4 — 1:6	#4
1:6 — 1:10	#3
1:10 — 1:16	#2
1:16 — 1:25	#1
More than 1:25	#0

POLYCONTRAST® PROGRAMMING

Use a Polycontrast® filter and make a perfect 8"×10" trial-and-error print on Polycontrast® paper.

Do not alter anything. Leave the REFERENCE negative in the enlarger, leave the Polycontrast® filter in the light path, leave the aperture setting and the enlarger magnification exactly as they were when the perfect 8" × 10" trial-and-error print was made. Program the analyzer exactly the same way as Programming for Graded Paper.

POLYCONTRAST® ANALYZING

Put an UNKNOWN negative into the enlarger and using only white light (no filter), size, focus and compose the image in the normal way.

- 1—Determine the CONTRAST RATIO of the "unknown" negative. (See "ANALYZING WITH GRADED PAPER", steps 1-5.)
- 2—Put the appropriate Polycontrast® filter into the light path.
- 3—Move the probe switch to WHITE and position the probe aperture under the projected image of a shadow area in which you wish to retain some detail in the print.

NOTE: Polycontrast® is a registered trademark of Eastman Kodak Co.

- 4—Adjust the lens aperture to superimpose the meter needle over the "STANDARD" printing time. Changing the aperture setting will cause the meter to indicate the required printing time for any aperture setting.

SECTION IX**COLOR PRINTING BY THE "TRIAL AND ERROR" METHOD:****A STEP-BY-STEP APPROACH FOR COLOR NEGATIVES**

Put your REFERENCE negative into the enlarger and adjust the magnification to produce an 8" × 10" image size. Compose and focus the image and then close down the aperture of your enlarging lens exactly three stops from wide-open.

If you're using a continuous filtration colorhead, simply dial-in 40 yellow and 40 magenta: if you're going to be using acetate (CP) printing filters, put a heat absorbing glass and a UV filter into the filter drawer along with a filter pack of 50 Yellow and 90 Magenta. (The heat absorbing glass and the UV filter are necessary when printing with CP filters and should be left permanently in the filter drawer of your enlarger.)

Set your enlarging timer to 10 seconds and expose a test strip for 10-20-30 and 40 seconds. Process and dry the test strip and then evaluate it for correct density (lightness-darkness.) (If you're new to color printing we'd like to suggest Color by Beseler 2-Step Chemistry which is a very simple 2-step process and comes complete with easy-to-understand instructions.) Pick the section which comes closest to having the correct density and write down the exposure time which produced this section.

Evaluate the correctly exposed section for color balance and use the COLOR BALANCING TABLE to assist you in adjusting the filter pack to achieve a properly color-balanced print.

COLOR BALANCING TABLE

PREDOMINANT COLOR CAST		FILTER PACK ADJUSTMENT	ALTERNATE CORRECTION	OVER CORRECTION
Very slightly Slightly too Moderately Greatly too	Y E L L O W	+ .05 YELLOW + .10 YELLOW + .20 YELLOW + .30 YELLOW	– .05 cyan and – .05 magenta – .10 cyan and – .10 magenta – .20 cyan and – .20 magenta – .30 cyan and – .30 magenta	B L U E
Very slightly Slightly too Moderately Greatly too	B L U E	– .05 YELLOW – .10 YELLOW – .20 YELLOW – .30 YELLOW	+ .05 cyan and + .05 magenta + .10 cyan and + .10 magenta + .20 cyan and + .20 magenta + .30 cyan and + .30 magenta	Y E L L O W
Very slightly Slightly too Moderately Greatly too	M A G E N T A	+ .05 MAGENTA + .10 MAGENTA + .20 MAGENTA + .30 MAGENTA	– .05 cyan and – .05 yellow – .10 cyan and – .10 yellow – .20 cyan and – .20 yellow – .30 cyan and – .30 yellow	G R E E N
Very slightly Slightly too Moderately Greatly too	G R E E N	– .05 MAGENTA – .10 MAGENTA – .20 MAGENTA – .30 MAGENTA	+ .05 cyan and + .05 yellow + .10 cyan and + .10 yellow + .20 cyan and + .20 yellow + .30 cyan and + .30 yellow	M A G E N T A
Very slightly Slightly too Moderately Greatly too	C Y A N	– .05 YELLOW and – .05 MAGENTA – .10 YELLOW and – .10 MAGENTA – .20 YELLOW and – .20 MAGENTA – .30 YELLOW and – .30 MAGENTA	+ .05 cyan + .10 cyan + .20 cyan + .30 cyan	R E D
Very slightly Slightly too Moderately Greatly too	R E D	+ .05 YELLOW and + .05 MAGENTA + .10 YELLOW and + .10 MAGENTA + .20 YELLOW and + .20 MAGENTA + .30 YELLOW and + .30 MAGENTA	– .05 cyan – .10 cyan – .20 cyan – .30 cyan	C Y A N

INSTRUCTIONS FOR USING THE COLOR BALANCING TABLE:

1–Locate the PREDOMINANT color cast on the table and determine the extent to which this color cast is present on the correctly exposed section of your test strip.

("Slight", "moderate", etc.)

2–Add (+) or subtract (–) the filters recommended in the "FILTER PACK ADJUSTMENT" column and make an 8" × 10" print using the newly corrected filter pack, the exposure time determined by the test strip, and the same aper-

ture setting which was used to make the test strip.

NOTE: If the indicated adjustment will result in a filter pack which contains more than *two* colors, do not make the adjustment. Instead, refer to the "ALTERNATE CORRECTION" column and make *that* adjustment. Also note that if making the indicated adjustment will result in a negative value (– filtration) for any color, remove all filtration of that color and make another test strip. If the same PREDOMINANT color cast is still present on the correctly exposed section of the test strip, refer to the "ALTERNATE CORRECTION" column and make *that* adjustment. Now that you have corrected the filter pack and have determined the proper exposure, make a full 8" × 10" test print. This print should have approximately the right color-balance and should be fairly close to the correct density.

EVALUATING THE TEST PRINT

In addition to its effect on the color-balance, every filter added to (or subtracted from) the filter pack will also have an effect on the density of the print. (Adding filters lightens the print and subtracting filters darkens it.)

Visually assess the density of the 8" × 10" test print. If too light, increase the exposure time. If too dark, decrease the exposure time and make another 8" × 10" test print. (Adjust only the exposure time; do *not* change the aperture setting!) This new test print should have excellent density and should also have fairly good color-balance. If necessary, make still another small adjustment to the filter pack and yet another small adjustment to the exposure time, and then make your final 8" × 10" test print. This print should have perfect density and perfect color-balance. (If it is not perfect, continue to adjust the exposure time and the filter pack until you finally do produce a perfect 8" × 10" color print.)

YOU ARE NOW READY TO SET-UP AND TO PROGRAM YOUR ANALYZER: RETURN TO PAGE 4 FOR INSTRUCTIONS ON HOW TO PROCEED.

SECTION X

HOW THE PM2L WORKS

The Beseler PM2L is more sensitive to small changes in light (sensitivity) than virtually any other color analyzer. It uses a PHOTO-MULTIPLIER light detector which is physically located in the probe box.

The PHOTO-MULTIPLIER consists of a PHOTO-CATHODE which emits electrons when light falls on it. These electrons are attracted to the first of a series of DYNODES, at successively higher potentials. Each electron leaving the CATHODE, causes several electrons to be emitted from the DYNODE. This process is repeated at each DYNODE until the electrons finally reach the ANODE, at which point the original current has been amplified more than a MILLION times!

The PHOTO-MULTIPLIER used in the PM2L has an additional advantage in that it is almost totally INSENSITIVE to infra-red radiation.

Color analyzers which use other types of photo-detectors are prone to false readings, caused by infra-red rays passing thru the color negatives and reaching the light detector.

Most color analyzers will be temporarily "blinded" or the analyzer programming may be destroyed if they are exposed to bright light. (*The white light* in the darkroom may be accidentally switched on while the analyzer is in use.) Patented over-load circuitry in the PM2L protects the unit from becoming "blinded" or damaged by temporary exposure to bright light.

THE ELECTRICAL CONCEPT

Any change in density causes a change in the voltage being supplied to the photo-multiplier. This voltage is then fed into one side of a differential volt meter. The other side of the meter receives a voltage from the PROGRAM KNOBS, so that the meter nulls when these voltages balance at pre-determined light levels.

Any change of light from the pre-determined levels causes the meter needle to deflect away from the null position. An increase in light deflects the needle to the left and a de-

crease in light deflects it to the right.

HOW THE PM2L IS MADE

To insure long, maintenance-free component life, along with the highest possible degree of accuracy and reliability, the Beseler PM2L uses solid state circuitry.

The finest components are used in its manufacture and each component is inspected for compliance with component specifications. This insures that each component meets all aspects of Beseler's stringent quality assurance program which has been established for this product.

Each sub-assembly is tested at several stages of production and every analyzer is individually linearized and adjusted over a light value range of more than 50,000 to one.

WE'D LIKE TO RECOMMEND . . .



SUBTRACTIVE CALCULATOR (Product #8916)

One test print quickly determines correct filtration and correct exposure for any negative, even Kodacolor® 2 and Vericolor® 2. This is the world's first and only 100% DIRECT READING subtractive color calculator. It's the easiest way to make that first trial-and-error print you need to program your color analyzer. It also comes in handy when rebalancing for each new box of paper (i.e. new emulsion number). For filter drawer enlargers and CP filters.

COLOR BY BESELER PROCESSING DRUMS

New improved daylight processing drums which require only half as much chemistry as older style drums. (The 8×10 drum

uses only 1½ ounces to process any 8"×10" sheet of paper!)

Both front and back end caps are removable, which makes it very easy to load the drum and to wash it after each use. These newly designed drums drain quicker and more completely than others, lessening the chances for residual chemical contamination.

Available in 8×10, 11×14, and 16×20 sizes. All drums also come with removable paper holder and small print separator, to allow for the simultaneous processing of multiple small sized prints.

COLOR BY BESELER MOTOR BASE AGITATOR (Product #8921)

Accepts all Color By Beseler processing drums and most other processing drums as well. Eliminates tedious hand rolling of the drum while also adding a greater degree of consistency and repeatability to your color print processing.

COLOR BY BESELER COLOR PRINTING FILTER SET

For use with *subtractive* printing from color negatives and prints from color slides. Contains 22 acetate color printing filters including one UV filter. Total filtration range: 2.5 to 157.5. Available in 3"×3", 5½"×5½" and 6"×6" sizes. Set of 7 red color printing filters also available.

COLOR BY BESELER 2-STEP PRINT CHEMISTRY

A chemistry breakthrough utilizing only two chemical steps followed by a brief wash in ordinary tap water. Process in as little as two minutes, or process at any room temperature with absolutely no temperature control!

Type "A" for Kodak and other "A" type papers.

Type "B" for Agfa, and other "B" type papers.

Available in one quart, 4 quart, one gallon and super economical 3½ gallon sizes.

COLOR BY BESELER RP5 CHEMISTRY

An easy-to-use chemistry to make prints directly from color slides using Eastman Kodak's Ektachrome RC, type 1993 paper. Process reversal prints in as little as ten minutes, or process at room temperature with absolutely no temperature control.

COLOR BY BESELER CN2 CHEMISTRY

Only two chemical steps to process your Kodacolor II, Vericolor II, Fujicolor II or ECN5247 color negative film.

Process at your choice of 85°F or 75°F with quality equal to a custom lab.

BESELER ULTRA FIN BLACK AND WHITE CHEMISTRY.

Specialized chemical products for the processing of black and white films and prints.

COLOR BY BESELER COLOR PRINTING GUIDE (#8899)

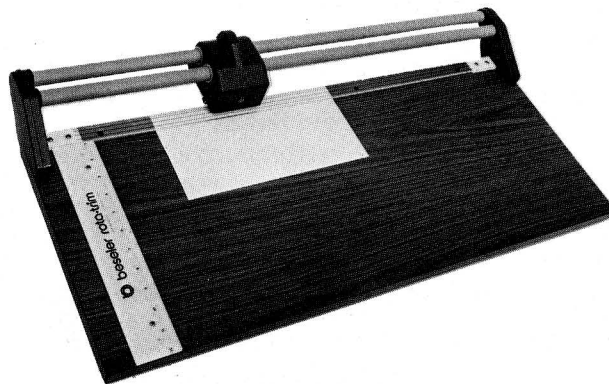
Explains the subtractive method of printing from color negatives as well as the reversal method of printing from color slides. Sliding display panel with full color illustrations simplifies the identification of off-color prints. A series of charts and tables explain what corrections to make in order to achieve the proper color balance and density. The Beseler Two-Step color rule is also explained and illustrated. Use of the Two-Step color rule (in conjunction with the sliding display panel) allows even the beginning color printer to differentiate between magenta and red color casts (which are quite similar in appearance), and between cyan and blue which are also quite similar in appearance.

BESELER 45 MXD ENLARGER (#8210)

This 4 × 5 color enlarger is relied upon by many professional studios because of its inordinate printing fidelity. Features ultra-stable triangular-truss design, convenient dichroic colorhead, and maximum latitude for special and creative effects.

BESELER CB7 DF (#8235)

The ultimate do-anything color enlarger! CB7 is a luxurious completely motorized instrument offering the user unparalleled precision and smooth, effortless fingertip performance. Modular design permits adding components as needs dictate.



BESELER ROTA•TRIM® PAPER CUTTER

Cuts paper, plastic, film, photographs, tissue paper and mount board. Specially-coated twin carriage bars keep the Sheffield steel rotary blade at the correct cutting angle. Laminated baseboard wipes clean with a damp cloth. Available in 15, 24, 42 and 54-inch models.

Write to us for more information on all of these Beseler and Color by Beseler products.

LIMITED ONE YEAR WARRANTY

Beseler Photo Marketing Company, Inc., Florham Park, New Jersey warrants its products (with the exception of lamps), to the original purchaser only, to be free from defects in materials and workmanship for a period of one (1) year from the date of purchase.

This Warranty does not apply to our products which show evidence of accidental damage, misuse or abuse by you. The Warranty also does not apply to our products which are defective or damaged by tampering or attempted repair by an unauthorized Beseler agent.

Beseler exclusively limits this Warranty to repair or replace (at Beseler's option) the defective part of its product. If you decide to send our product to our authorized repair outlet, you must insure the product and prepay all transportation expenses. Beseler will not be liable for damages caused in the course of shipping the product to you. You must allow at least six (6) weeks for correction of the defect.

ANY IMPLIED WARRANTIES OF FITNESS FOR USE, OR MERCHANTABILITY, THAT MAY BE CREATED BY OPERATION OF LAW ARE LIMITED TO THE ONE (1) YEAR WARRANTY PERIOD. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

NO LIABILITY IS ASSUMED FOR EXPENSES OR DAMAGES RESULTING FROM INTERRUPTION IN OPERATION OF EQUIPMENT, DAMAGE TO FILM OR PAPER, OR FOR INCIDENTAL, DIRECT OR CONSEQUENTIAL DAMAGES OF ANY NATURE.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

In the event there is any defect in materials and workmanship of our product you may contact our Customer Service Department at Beseler Photo Marketing Company, Inc., 8 Fernwood Road, Florham Park, New Jersey 07932. This warranty

gives you specific legal rights, and you may also have other rights which vary from state to state. You may also have implied warranty rights. In the event of a problem with warranty service or performance, you may be able to go to a Small Claims Court, a State Court, or a Federal District Court.

IMPORTANT:

THIS WARRANTY SHALL NOT BE VALID AND BESELER SHALL NOT BE BOUND BY THIS WARRANTY IF OUR PRODUCT IS NOT OPERATED IN ACCORDANCE WITH BESELER'S WRITTEN INSTRUCTIONS.

You must prove the date of purchase by producing a sales receipt indicating that you are the original purchaser.



Beseler Photo Marketing Company, Inc., 8 Fernwood Road, Florham Park, N.J. 07932