QUANTUM FOX-1 FIBER OPTIC PROBE
INSTRUCTIONS

The FOX-1 (Fiber Optic Probe) is used for small area measurements on ground glass and focusing screens and for density measurements of negatives and transparencies.

FOX-1 consists of a 25mm (1") long rigid glass fiber optic rod mounted in a protective sleeve on the FOX-1 turret. There is also a separate light shield "barrel" that fits over the protective sleeve.

Attaching the FOX-1
First remove the turret in use and replace it with the FOX-1. Make sure the probe lies over the sensor of the unit (marked by ^). Also, the FOX-1 measures reflected light, and you must use the reflected window when making settings on the dial.

Reflected Light. Luminance and Contrast Measurements
Take readings as you normally would with the MEASURE button. Hold the fiber optic probe perpendicular to, and in contact with, the ground-glass or other luminous surface. Digital measurements correspond to the luminance (brightness) at the central 3mm (1/8") diameter of the probe. Consult the **Calibrated Measurements** section of your instrument instructions for scientific units.

Contrast measurements may be made on a ground glass or focusing screen, or for films and negatives on a light table. The **difference** in digits between readings of two areas is their contrast ratio in 1/3 stops (1/3 Ev's). Divide by 3 for whole stop contrast ratios, or use the table in the instrument instructions for numerical contrast ratios (see **Specifications** section)

Taking Exposure Measurements Through The Lens
FOX-1 can be used with Calcu-Light or Calcu-Flash to determine correct exposure from a ground glass or focusing screen of a camera. This is very useful in many situations since the effect of lens/bellows extension, filters and lens transmittance are automatically compensated for.

First, it is necessary to calibrate FOX-1 to the camera system focusing screen for which it will be used. The procedure is:

1-Set up the camera 3 meters (10 feet) or more from a subject with a large area of constant tone (an 18% grey card is ideal). This is the reference object.
2-Take a normal reflected light reading of the reference object independent of the camera system. Use the Calcu-Light or Calcu-Flash standard turret. Set the computer dials to this reading using the correct film speed. (ASA or DIN).
3-Now, take a reading of the reference object image on the camera's focusing screen with the camera lens aperture set to a specific f-number (usually the largest aperture).
4-Compare the two readings: Add to the ground glass reading (3) the number of digits required to make it equal the reflected light reading (2). This is your digital calibration factor that must be added to focusing screen exposure measurements. This factor applies only to the camera system, f #, and focusing screen from which it was determined.
5-A film speed calibration factor can also be determined, in place of step (4). Simply change the film speed setting so that the digital reading of step (3) results in the same exposure as that obtained in step (2). Record the ASA/DIN value and compare it to the true film speed. The number of 1/3 stops change should equal the digital calibration value in step (4), and this is your film speed calibration factor which can be applied to any film. (Remember the smallest gradations on the film speed scales equal 1/3 stop each).
6-Make all ground glass measurements with the same f-stop setting on the camera lens. Otherwise a new calibration value will be needed.

Density Measurement
The FOX-1 attachment also converts Calcu-Light or Calcu-Flash to a useful photographic densitometer for

negatives, transparencies, and other variable density materials. A strong diffuse light source, such as a light table or photo flood bulb with diffusing screen (or even the sun with diffusing screen) is required. First test the light source screen by measuring light values at various places on it. (Readings within 1 or 2 digits across the screen will result in density measurements accurate to 0.1 or 0.2 units of density.) Record the digital value of screen luminance (ex. digit '42'). This is your reference value. Next place the film on the screen. Make measurements in the areas of interest with the FOX-1 probe. Record your measurements -they will be less than or equal to the reference value - in the example case, '42' or less.

Finally, subtract your measurements from the reference, then divide the result by 10 to get density. Example: you measured '36' on an area of the film with a reference value of '42'. The difference is 6. The density is 0.6.

Digit difference	contrast ratio
0	0
1	1.3:1
2	1.6:1
3	2:1
4	2.5:1
5	3:1
6	4:1
7	5:1
8	6:1
9	8:1
10	10:1
11	13:1
12	16:1
13	20:1
14	25:1
15	32:1

Digit difference	contrast ratio
16	40:1
17	50:1
18	64:1
19	80:1
20	100:1
21	128:1
22	160:1
23	200:1
24	260:1
25	320:1
26	400:1
27	500:1
28	650:1
29	800:1
30	1000:1
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