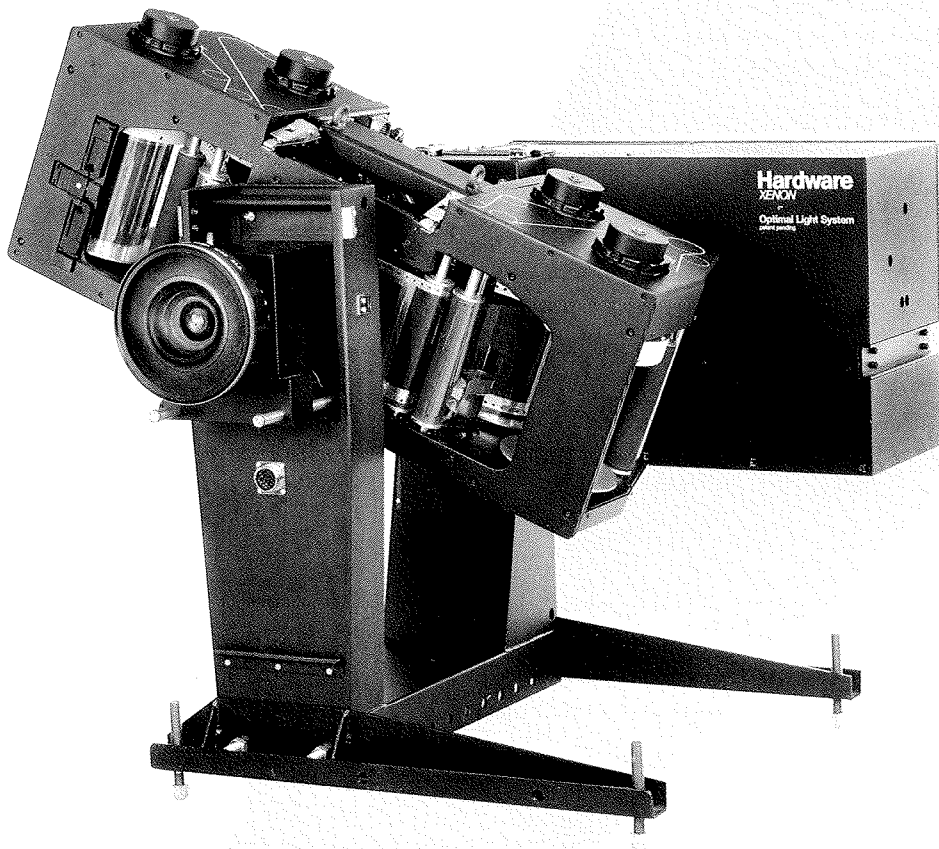


# New State of the Art High Power Projection



Hardware Xenon is the pioneer in high power Xenon projectors, and created the first 1000 Watt projector in 1978. By 1987, the first 7000 Watt Xenon projector with switching power supply was ready. Developments in electronics and optics, combined with Hardware Xenon's own experience in the field, allowed the company to introduce a new generation of projectors using a patented major optical innovation: the Optimal Light System.

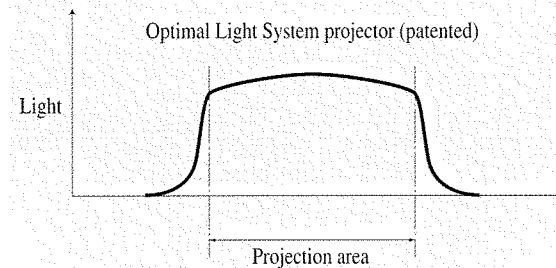
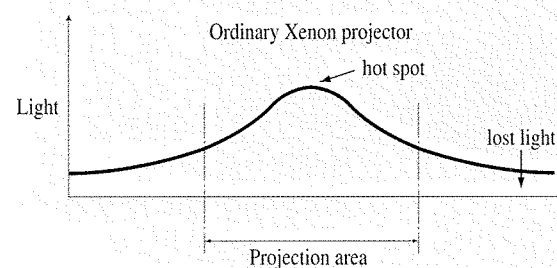
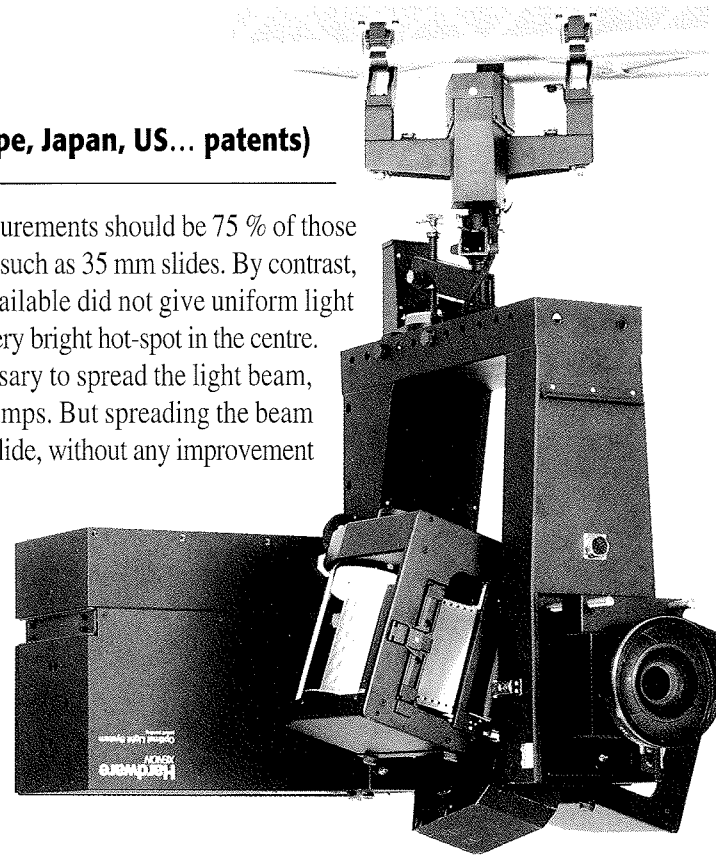
**Hardware**  
**Xenon**

## The Optimal Light System projector (Europe, Japan, US... patents)

To obtain good light distribution, the screen edge measurements should be 75 % of those at the centre. This is relatively easy using small formats such as 35 mm slides. By contrast, with 18 x 18.5 cm slides, the optical systems so far available did not give uniform light distribution, and the image showed dark corners and a very bright hot-spot in the centre. To avoid burn-out of the central hot-spot, it was necessary to spread the light beam, particularly when using powerful 7000 Watt Xenon lamps. But spreading the beam meant that much of the light was dissipated outside the slide, without any improvement in corner light levels.

Hardware Xenon therefore obtained a patent on a device called Optimal Light System (OLS) allowing suppression of the hot-spot whilst still keeping all the light on the slide itself. The Optimal Light System projector offers the following advantages:

- Much more light on the screen
- Excellent light distribution, even with very wide angle lenses (105 mm, 77 mm and 57 mm)
- Unmatched image quality
- Use of the full power offered by a 7000 Watt lamp on a 18 x 18.5 cm slide without risk of deterioration



The Optimal Light System projector also offers the exclusive advantages of the Xenon lamp:

- A point source - the Xenon lamp provides the same projected image quality at short or long range
- Long service life
- Constant colour temperature
- Constant light level

## Light measurements in lumen

Tests show that a dark 18 x 18.5 cm slide deteriorates at 80,000 lumen after five minutes exposure. Using an Optimal Light System projector, there is no deterioration at 75,000 lumen. Distortion is almost non-existent because of the absence of a central hot-spot and the uniform light distribution across the whole slide.

Ordinary 7000W projector			Optimal Light System 7000W projector fitted with a 105 mm lens		
33 000	54 000	36 000	74 000	81 000	77 000
+	+	+	+	+	+
43 000	80 000	45 000	75 000	79 000	75 000
+	+	+	+	+	+
32 000	51 000	35 000	76 000	80 000	73 000
+	+	+	+	+	+
100 cm			100 cm		
66 cm			66 cm		

## High definition lenses

A series of high definition lenses has been specially designed by Hardware Xenon incorporating all the advantages of the light distribution exclusive to the Optimal Light System:

- A very wide angle 77 mm lens providing excellent image quality on a 20 metre base at a distance of 10 metres
- 105 mm
- 140 mm
- 185 mm
- 57 mm lens for hemispherical or spherical projection
- Motorised zoom 220-500 mm



## Special effects

All special effects are obtained using motorised units: scrolling, slide changing, 360° rotation, enlargement, focusing, horizontal and vertical projector movement.

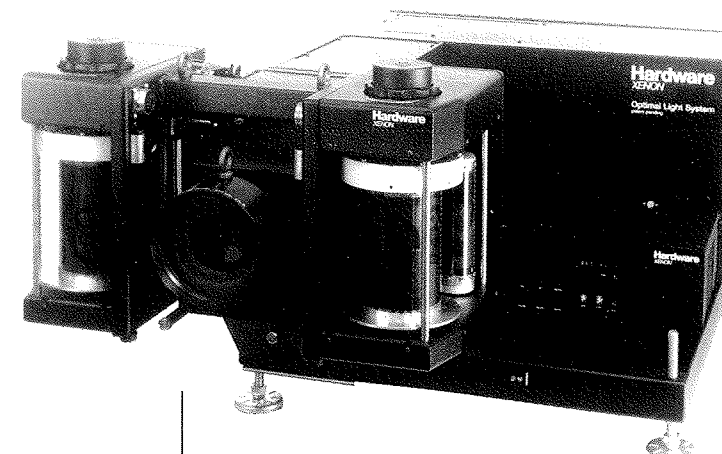
Hardware Xenon has now introduced a new concept in special effects control: the Universal Digital Controller.

Each controller can handle up to 10 DC motors, and each motor can perform a different function depending on the software being used. One UDC can simultaneously control two single or double scrollers - with or without 360° rotary holder - or two automatic slide changers, a motorised zoom, a motorised yoke for truss suspension, a motorised lens mount or any other existing or future special effects device.

Each controller has a 16 bit computer and 4 megabyte memory. It is DMX 512 compatible and can be programmed or operated directly through either a lighting console, a PC with DMX 512 adapter, by multimedia systems including Electrosonic, Dataton, etc, or via Hardware Xenon's graphics programming software. This powerful computer enables all future developments to be incorporated by a simple modification to the software.

### The Universal Digital Controller

- Ten motor commands with a maximum of 4 million steps and fully controllable speed from 0 to full speed
- Position control by optical encoder
- LCD display of active functions
- Bi-directional link via DMX 512 adapter with PC display
- Remote monitoring of all functions, including lamp, via PC



### The Scroller

The scroller uses perforated 18.5 cm film of up to 30 metre strips. The format of the image is 15.5 x 15.5 cm. Scrolling speed is from 0 to 80 cm/second with positioning accuracy of less than one-tenth of a millimetre. With the double scroller two strips up to 30 metres long can be used.

Particular care has been taken to ensure that the film remains in good condition even during long periods of operation. The large diameter rubber-covered rollers protect the film against scratching and strain on the splices, while the lateral film guides prevent damage to the perforations.

Film creation - cutting to 18.5 cm width, perforation and assembly - is no problem with the easy to use editing kit.

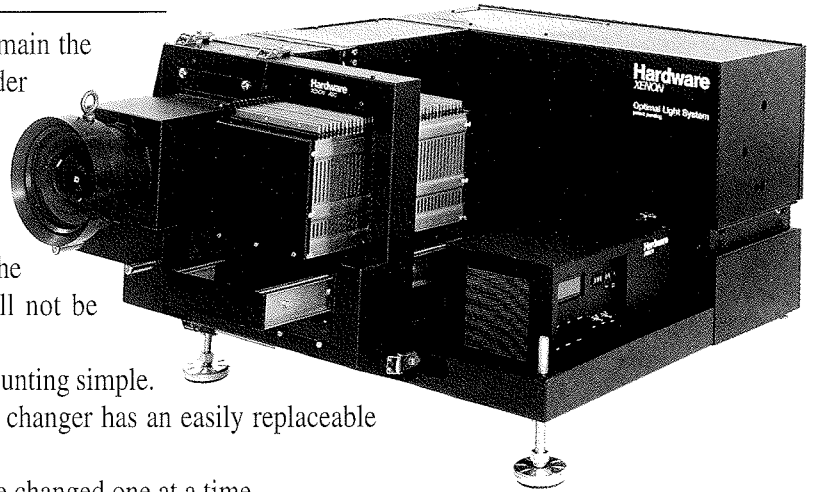
## Slide projection

Large format slides (18 x 18.5 cm) remain the ideal solution for image projection under the difficult conditions of maximum illumination and prolonged projection of one particular image - especially appropriate in the case of backdrops and décor. Transparencies mounted in the Hardware Xenon glassless frame will not be distorted by heat.

The punching machine makes slide mounting simple.

The automatic Hardware Xenon slide changer has an easily replaceable 40 slide tray.

With the manual changer, slides can be changed one at a time.



## Motorised yoke

The Hardware Xenon motorised yoke provides 270° pan and 30° tilt, and can carry up to 250 kg. Movement of the projector will not distort the image as does the mirror system.

Hardware Xenon 7000 Watt, 5000 Watt and 2000 Watt projectors have a monobloc structure which allows them to be hung in trusses.

## A multi-purpose lamphouse

This new concept makes it possible to adapt all Hardware Xenon projection systems to the same 5000/7000 Watt lamphouse. The movable lamphouse can be attached to a fixed structure or to a structure with 360° rotation.

The fixed structure version can accommodate:

- The manual slide changer
- The automatic slide changer
- The single or double scroller
- The motorised yoke
- The motorised OLS zoom

The 360° rotation version can be used with:

- The single or double scroller
- The motorised yoke
- The motorised OLS zoom
- The motorised lens mount

## Projection into space

The 57 mm lens has an image projection angle of 150°. The projected image is focused regardless of the position, shape or distance of the screen. In rear projection, this lens enables hemispherical (180°) projection with the projector located inside the sphere, or spherical (360°) projection with the projector located outside, against the sphere. Hardware Xenon next developed graphics software that produced a 360° spherical, distortion-free image from three 35 mm slides.

Manufacturers of lighting balloons, Airstar, tested two different sizes of spheres that could work either indoors or outdoors - one with a 3 metre diameter and one with a 5 metre diameter - for hemispherical projection. The OLS 7000 Watt projector, equipped with a single scroller and a 360° rotary holder, was successfully integrated within the spheres.

## Characteristics of Hardware Xenon 1.0 software

Hardware Xenon 1.0 is compatible with Windows 98. It allows the events, (cues such as scrolling, slide changing, shutters, rotation, etc) of the story board to be set by simply clicking and dragging the mouse. All these events are located within specific tracks and referenced in relation to a time scale. During the show, a timeline moves along the time scale and generates the orders when it meets a cue. These events can easily be moved or re-sized with the mouse. The characteristics of each event can also be modified via the keyboard by opening a window.

Four kinds of tracks are shown on figures 1 and 2.

### The "shutter" track

The features of each event (light intensity, rising time, etc) are tracked and modified by simply using the mouse. During the show, a numerical gauge indicates the light level in real time.

### The "Automatic slide changer" track

The random access slide changing cue indicates both the number of the initial slide within the sequence and the number of the subsequent slide, together with an indication of the time it will take to change between slides.

### The film track

The cue, created using the mouse, controls the scrolling time and the subsequent image.

### The rotation track

The rotation track allows the control of the accessories in terms of rotation (rotary holder, motorised yoke, etc). The cue defines the starting angle, the rotation time and the next angle. There is a gauge which enables viewing of the angular position in real time.

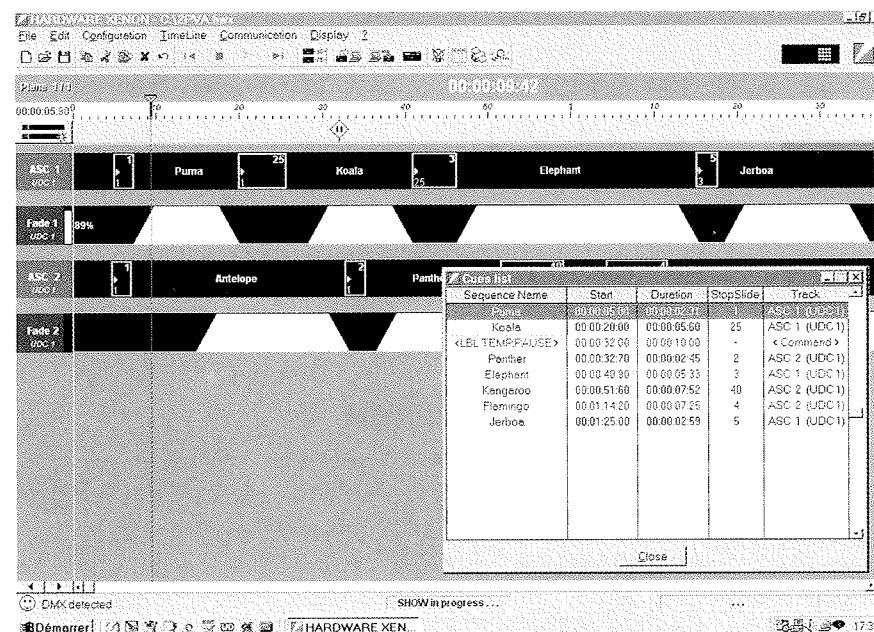


Figure 1: Story board for two projectors fitted with automatic slide changers.

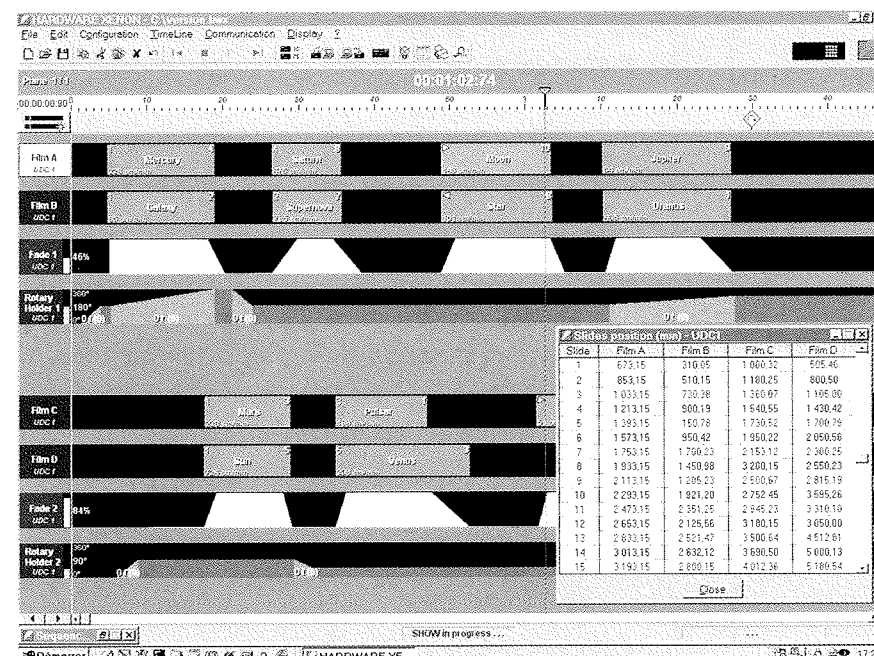
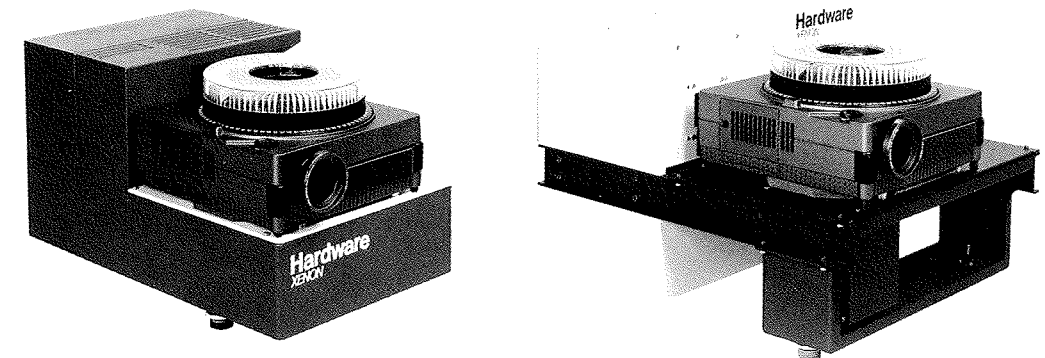


Figure 2: Story board for two projectors fitted with double scrollers and rotary holders.

## The Hardware Xenon range of projectors

### 35 mm slides

- 600 Watt projector: 4,000 lumen. For 35 mm slides. Image up to 7 metres wide at 60 metres distance
- 1000 Watt projector: 10,000 lumen. For 35 mm slides. Image up to 10 metres wide at 90 metres distance

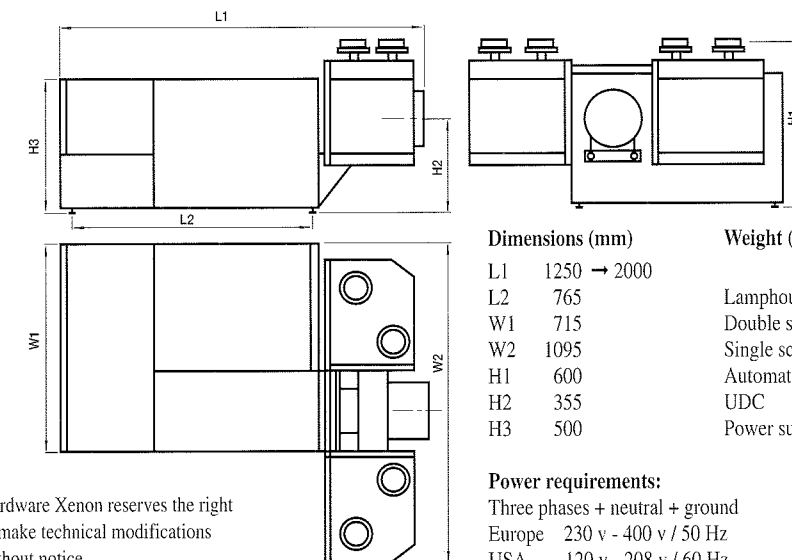


### 18 x 18.5 cm slides

- 2000 Watt projector: 20,000 lumen. For 4 x 5 inches or 18 x 18.5 cm slides. Image up to 16 metres wide at 100 metres distance
- 5000 Watt OLS projector: 55,000 lumen. For 18 x 18.5 cm slides. Image up to 50 metres wide at 330 metres distance
- 7000 Watt OLS Projector: 75,000 lumen. For 18 x 18.5 cm slides. Image up to 60 metres wide at 400 metres distance

Optimal Light System projectors, designed and manufactured by Hardware Xenon, are the ideal solution for outdoor or indoor projection for conventions, events, light shows, concerts, theatres, etc.

### 7000 W OLS PROJECTOR WITH DOUBLE SCROLLER



Hardware Xenon reserves the right to make technical modifications without notice.



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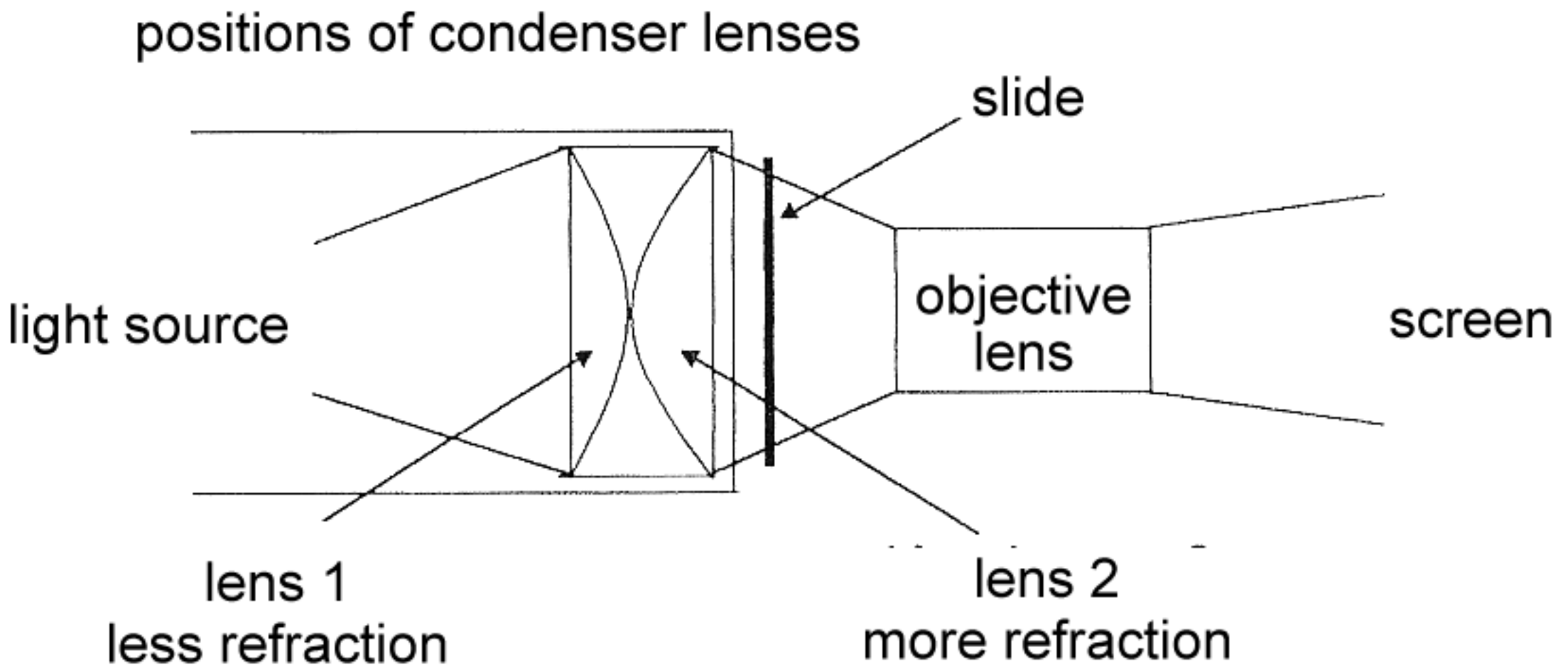
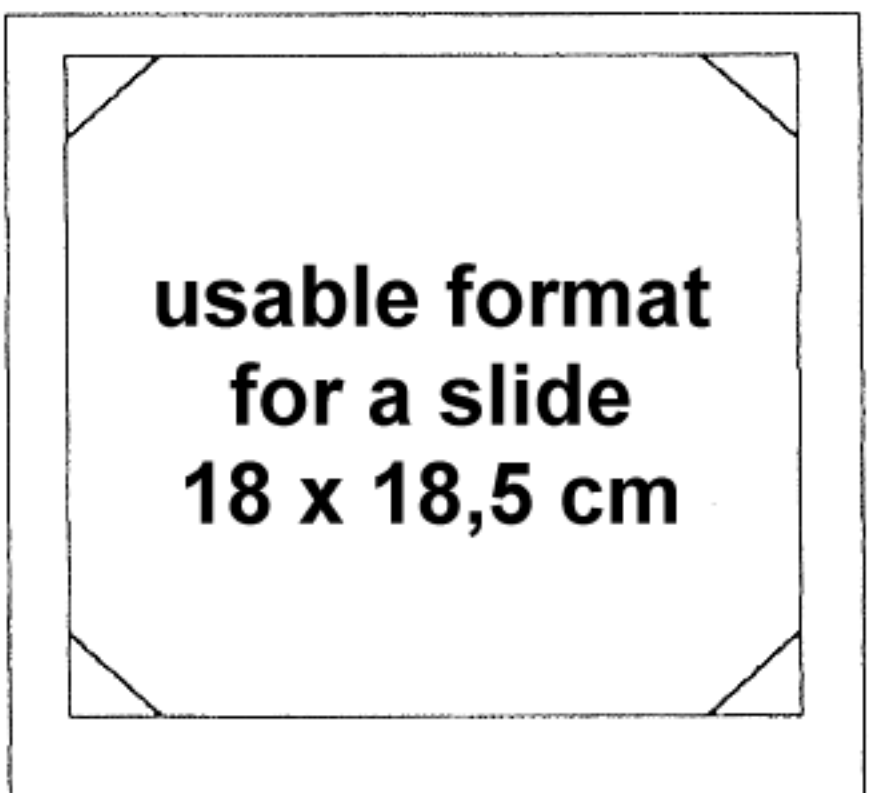
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 Tel 49 2203 18 16 83 / Fax 49 2203 18 16 84

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**TABLE FOR FOCAL LENGTHS FOR A SLIDE 18 x 18,5 cm (usable format 15,5 x 15,5 cm)**

PROJECTION DISTANCE IN METER	OBJECTIVE LENS (focal length in mm)												IMAGE WIDTH IN METER
	1000	800	600	500	400	330	260	220	185	140	105	77	
10	1,5	2,0	2,5	3,0	4,0	4,5	6,0	7,0	8,5	11,0	15,0	20,0	
15	2,5	3,0	4,0	4,5	6,0	7,0	9,0	10,5	12,5	16,5	22,0	30,0	
20	3,0	4,0	5,0	6,0	8,0	9,5	12,0	14,0	17,0	22,0	29,5	40,5	
25	4,0	5,0	6,5	8,0	9,5	11,5	15,0	17,5	21,0	27,5	37,0	50,5	
30	4,5	6,0	8,0	9,5	11,5	14,0	18,0	21,0	25,0	33,0	44,5	60,5	
35	5,5	7,0	9,0	11,0	13,5	16,5	21,0	24,5	29,5	39,0	51,5		
40	6,0	8,0	10,5	12,5	15,5	19,0	24,0	28,0	33,5	44,5	59,0		
45	7,0	8,5	11,5	14,0	17,5	21,0	27,0	31,5	37,5	50,0			
50	8,0	9,5	13,0	15,5	19,5	23,5	30,0	35,0	42,0	55,5			
55	8,5	10,5	14,0	17,0	21,5	26,0	33,0	39,0	46,0	61,0			
60	9,5	11,5	15,5	18,5	23,5	28,0	36,0	42,5	50,5				
65	10,0	12,5	17,0	20,0	25,0	30,5	39,0	46,0	54,5				
70	11,0	13,5	18,0	21,5	27,0	33,0	41,5	49,5	58,5				
75	11,5	14,5	19,5	23,5	29,0	35,0	44,5	53,0					
80	12,5	15,5	20,5	25,0	31,0	37,5	47,5	56,5					
85	13,0	16,5	22,0	26,5	33,0	40,0	50,5	60,0					
90	14,0	17,5	23,5	28,0	35,0	42,5	53,5						
95	14,5	18,5	24,5	29,5	37,0	44,5	56,5						
100	15,5	19,5	26,0	31,0	39,0	47,0	59,5						
105	16,5	20,5	27,0	32,5	40,5	49,5							
110	17,0	21,5	28,5	34,0	42,5	51,5							
115	18,0	22,5	29,5	35,5	44,5	54,0							
120	18,5	23,5	31,0	37,0	46,5	56,5							
125	19,5	24,0	32,5	39,0	48,5	58,5							
130	20,0	25,0	33,5	40,5	50,5								
135	21,0	26,0	35,0	42,0	52,5								
140	21,5	27,0	36,0	43,5	54,5								
145	22,5	28,0	37,5	45,0	56,0								
150	23,5	29,0	39,0	46,5	58,0								
155	24,0	30,0	40,0	48,0	60,0								
160	25,0	31,0	41,5	49,5									
165	25,5	32,0	42,5	51,0									
170	26,5	33,0	44,0	52,5									
175	27,0	34,0	45,0	54,5									
180	28,0	35,0	46,5	56,0									
185	28,5	36,0	48,0	57,5									
190	29,5	37,0	49,0	59,0									
195	30,0	38,0	50,5	60,5									
200	31,0	39,0	51,5										
205	32,0	39,5	53,0										
210	32,5	40,5	54,5										
215	33,5	41,5	55,5										
220	34,0	42,5	57,0										
225	35,0	43,5	58,0										
230	35,5	44,5	59,5										
235	36,5	45,5	60,5										
240	37,0	46,5											
245	38,0	47,5											
250	39,0	48,5											
260	40,5	50,5											
270	42,0	52,5											
280	43,5	54,5											
290	45,0	56,0											
300	46,5	58,0											
310	48,0	60,0											
320	49,5												
330	51,0												
340	52,5												
350	54,5												
360	56,0												
370	57,5												
380	59,0												
390	60,5												
400	62,0												



the thickest lens has to be positioned nearby the slide  
CE<CD<CC

holder	mounting	lens	C1	C2
kurz	140,0	57,0	CC	CC
kurz	140,0	77,0	CC	CC
kurz	130,0	105,0	CC	CC
kurz	120,0	140,0	CC	CC
kurz	120,0	185,0	CC	CC
kurz	120,0	220,0	CC	CC
kurz	120,0	260,0	CC	CC
lang	120,0	330,0	CD	CC
lang	120,0	400,0	CD	CC
lang	120,0	500,0	CE	CC
lang	160,0	600,0	CE	CC
lang	160,0	800,0	frame	CC
lang	175,0	1000,0	frame	CC
Zoom 220 -> 500			CD	CC

theoretical calculation formula:

$$\text{IMAGE WIDTH} = \frac{155 \text{ mm} \times \text{DISTANCE}}{\text{FOCAL LENGTH (mm)}}$$

**Note:** Datas represent reference values. Differences are possible.