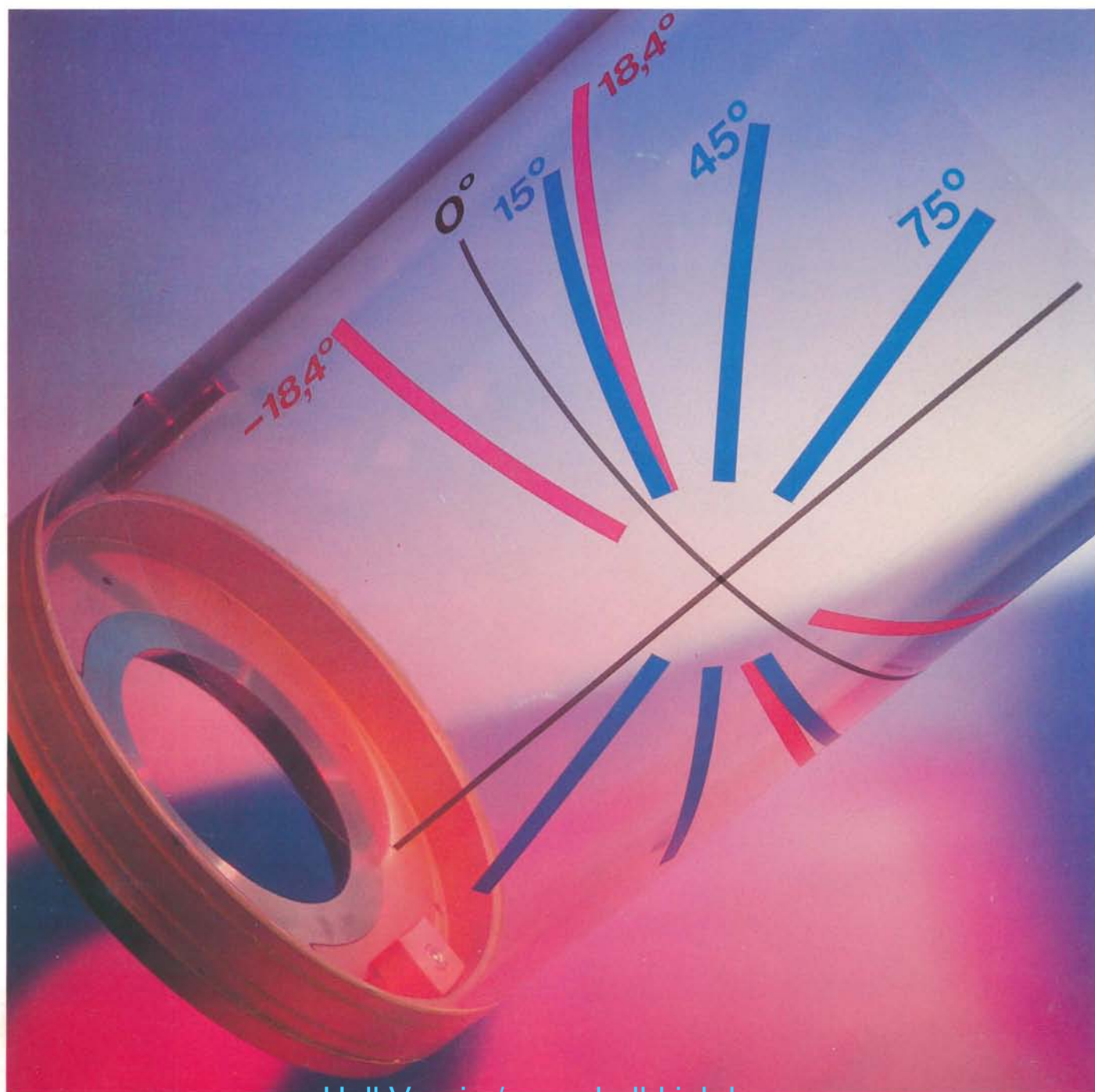

















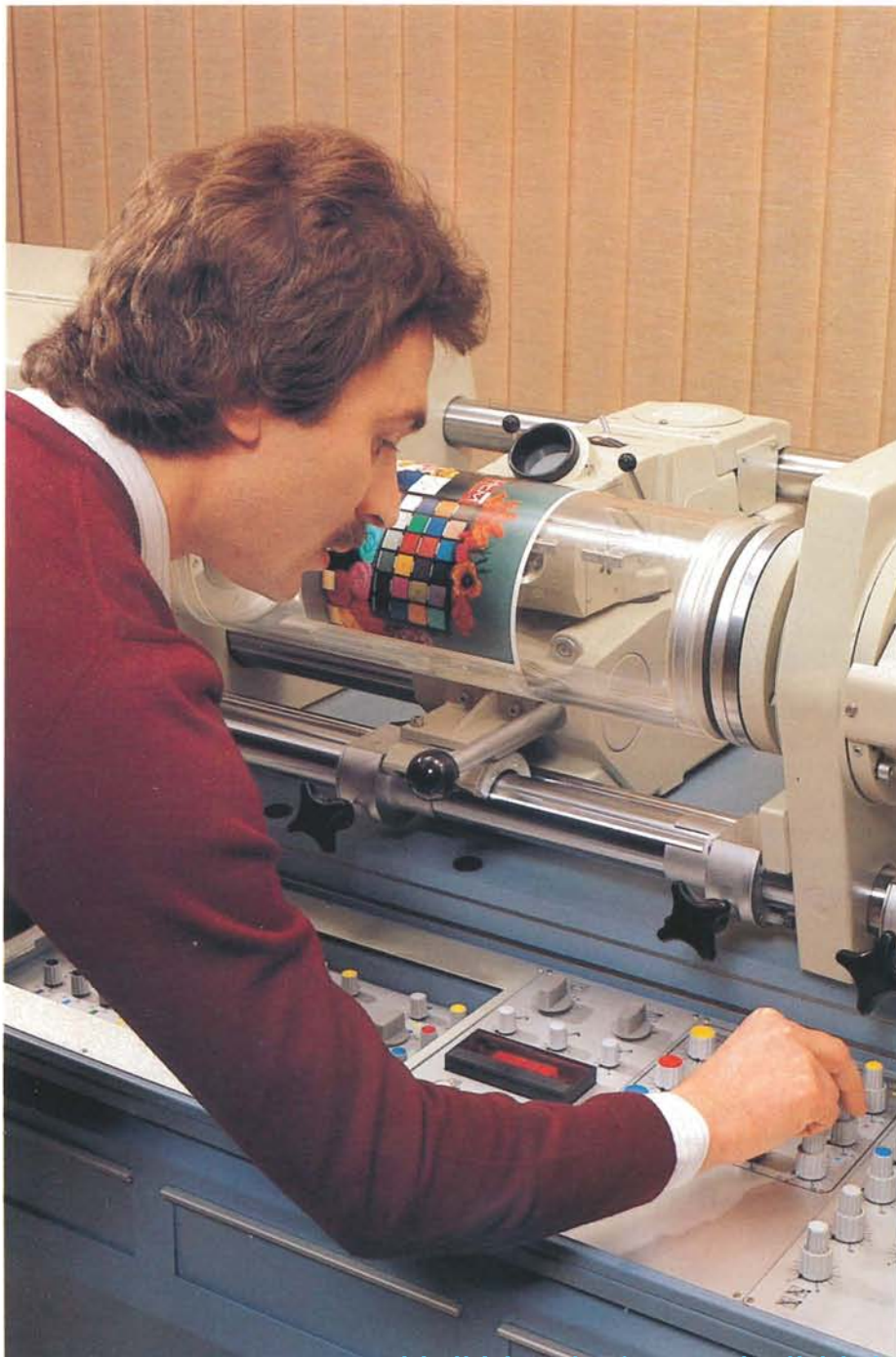
Process technology

Chromagraph DC 350

Scanner for top-quality colour reproduction



Keyboard input needed for recording density and many other functions	 	Microprocessor-controlled functional keyboard
Beginning and end of scan difficult to set precisely		Scanning start and stop programmable via keyboard input
Zoom lens system should be set automatically		Automatic zoom
Simultaneous reading of all four separation densities would help	 	4-colour digital readout
Film linearisation takes too long		Automatic film linearisation
Manual scanning head resetting interferes with Multicolour mode	 	Automatic scanning head return
Occasionally very smooth tones show tone breaks		256 density steps
Register marks and colour symbols would simplify subsequent handling		Register and colour marks on every separation
We don't like unconventional screen angles	 	Conventional screen angles
Access needed to several screen programs		All screen programs on floppy discs
Insufficient shadow definition in dark colours		Dark colour saturation Improved colour correction
The scale table is complicated	 	Direct scale input via keyboard
There should be standard gradations		8 standard gradations to be stored
It should be possible to expose all four colours one under the other		Multiple recording (from quadruple up to 63 repeats)



Your feedback is fertile
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Profitability – A high priority

Rationalisation and quality are not just everyday economic slogans but involve intensive new engineering and development. That means heavy research and development investment into new products.

In process technology, too, latest electronic progress provides increasingly convenient equipment with simpler and more reliable operation. The electronic system of the Chromagraph DC 350 offers precisely the engineering features demanded in a modern scanner.

Special attention was paid to *operating convenience*. Apart from high recording speed, reduced setting-up time has improved efficiency for higher productivity.



Salient features of this scanner are a clear operating sequence, short run-through times, low material consumption, extensive correction possibilities and supremely versatile applications. *Faster setting-up* is particularly important. Controls and indicating signals are clearly laid out in functional groups. Faster setting up becomes possible by entering setting parameters via a functional keyboard and automatic *micro-computer-controlled* execution. Equally important: These input values can be stored for reuse. When recording on film, the *Multi-colour system* provides further scope for improved efficiency.

Depending on the final size, two, three or four colour separations or several multiples of a separation can be recorded together.

That halves recording times achieved till now with electronic screening. In addition any colour separation can be cropped rectilinearly and bordered with any required density. This provision saves recopying and film material.

Electronic screening (with keyboard control of screen ruling, angling and dot shape) with *laser exposure* permits the use of line films. That improves subsequent development consistency.

Quality – The process standard



Chromagraph scanners are used successfully in nearly all fields of process technology. They yield top-quality electronically masked colour separations from transparency or reflection copy in colour.

In electronic reproduction direct enlargement ensures outstanding detail definition on the film. The images are recorded on commercial films. Where standard reproduction is inadequate with poor originals, the Chromagraph DC 350 offers the process operator a wide range of features for electronic improvement.

Electronic colour correction goes far beyond the scope of photomechanical colour masking. That greatly reduces and often completely eliminates manual retouching. Selective correction controls provide extensive control scope beyond basic correction. Specific gradation control permits correction of tone value distortions generated by different printing processes. For this purpose preset standard gradations can be selected by a switch.

In addition, further individual gradations for specific applications can be stored on diskettes and called up by push-button control.

The Chromagraph DC 350 covers the density range with 256 steps – a further feature of top reproduction quality with which soft image detail is reproduced as brilliantly as hard outlines.

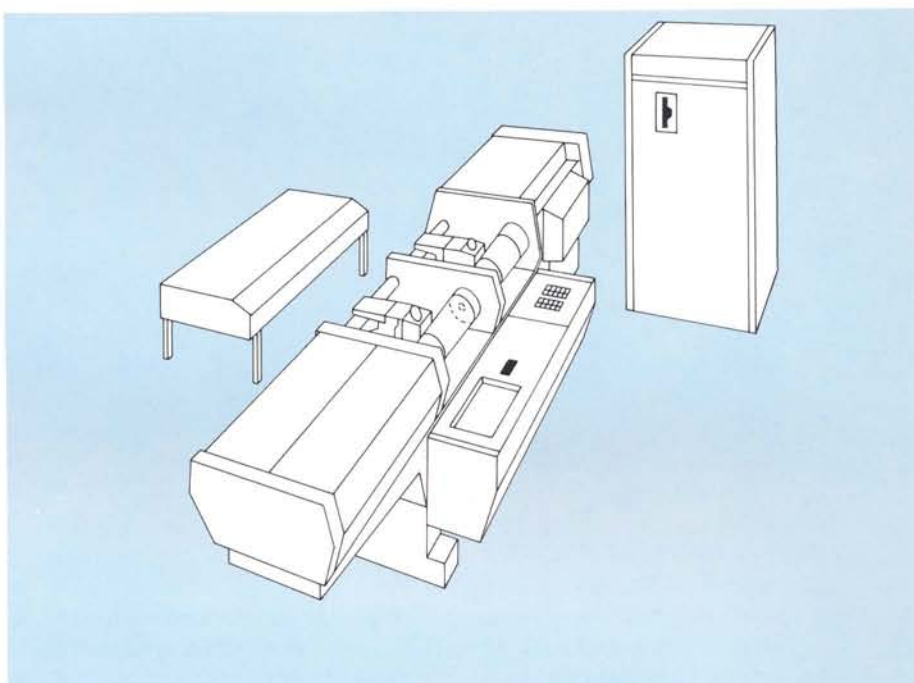
Last but not least is a new electronic screening system for top quality. By providing "conventional" screen angles in 15° steps, this HELL scanner reduces screen interference textures yet provides maximum light output with electronic screening using laser exposure. Process operators have for many years called for "conventional" screen angles – HELL has made that possible.

Chromagraph DC 350 – Simultaneous scanning and recording

The Chromagraph DC 350 comprises three elements: The scanner itself, the electronic control cabinet and the laser unit.

The top section of the scanner carries the scanning and control cylinder and the optical scanning heads. At the left, covered by a hood, is the scanning light source. The right-hand section is closed light-tight and contains the recording unit with recording cylinder. An asynchronous motor ensures even running of the drums. Separate high-precision drives feed the scanning and recording units.

At the front is the control panel with the colour computer and functional keyboard for scanner settings by digital electronics. The microcomputer programs are stored on diskettes. This arrangement greatly increases the handling convenience of the Chromagraph DC 350.



Procedure

As with all Chromagraph scanners, the colour computer of the DC 350 uses a 4-channel system. The scanning light source is a tungsten-halogen lamp. The scanning beam is split into four component beams and converted to electrical signals. The four signals are processed in the colour computer and control the recording light source. With large sizes this records each separation separately, with small sizes one recording pass covers a whole separation set.

The colour separations may be recorded either in continuous-tone or with electronic screening. Electronic half-tone recording in particular provides high running rates and reliable exposure and processing for the film.

Originals

Originals may be flexible transparency or reflection copy up to 40 × 50 cm or 16 × 20 inches. Light barriers control the start and end of the scanning run. Where multiple scanning is required, for instance with larger sizes or repeat images, this permits precise repetition of a defined scanning track. The scanning direction is selected by push-button keys for right-reading or laterally reversed recording.

Technical data

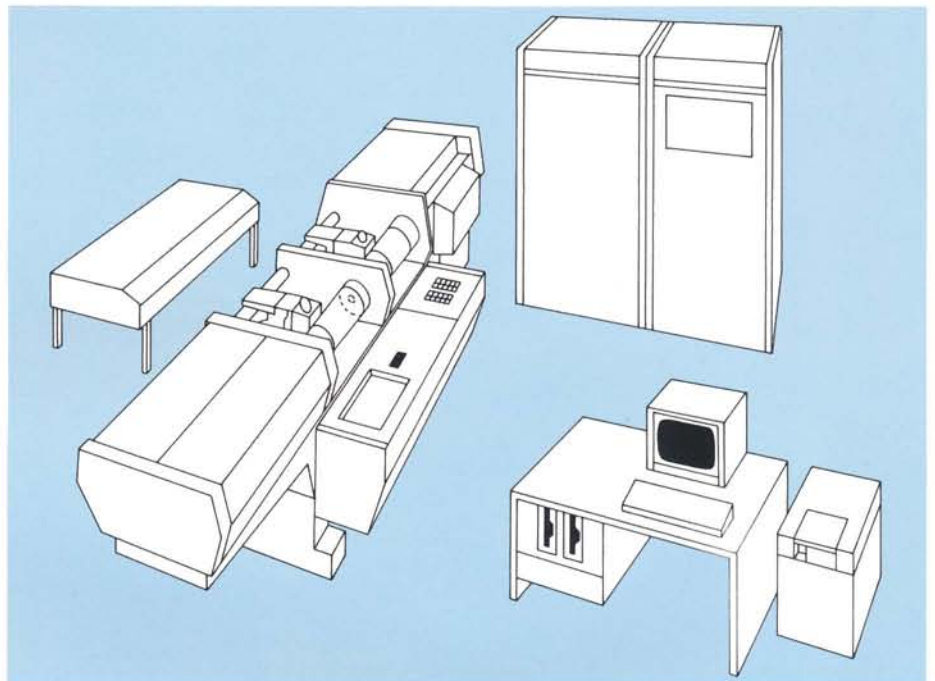
Chromagraph DC 350/DC 350 S

Setting the size

The maximum recording size is 40×49.5 cm (16×20 inches). The scale can be set from 35 % to 1950 % in very fine steps. The percentage values are simply keyed in – separately for axial and circumferential scanning. Thus the subject can be compressed or extended to modify the dimensions of an image or for special effects.

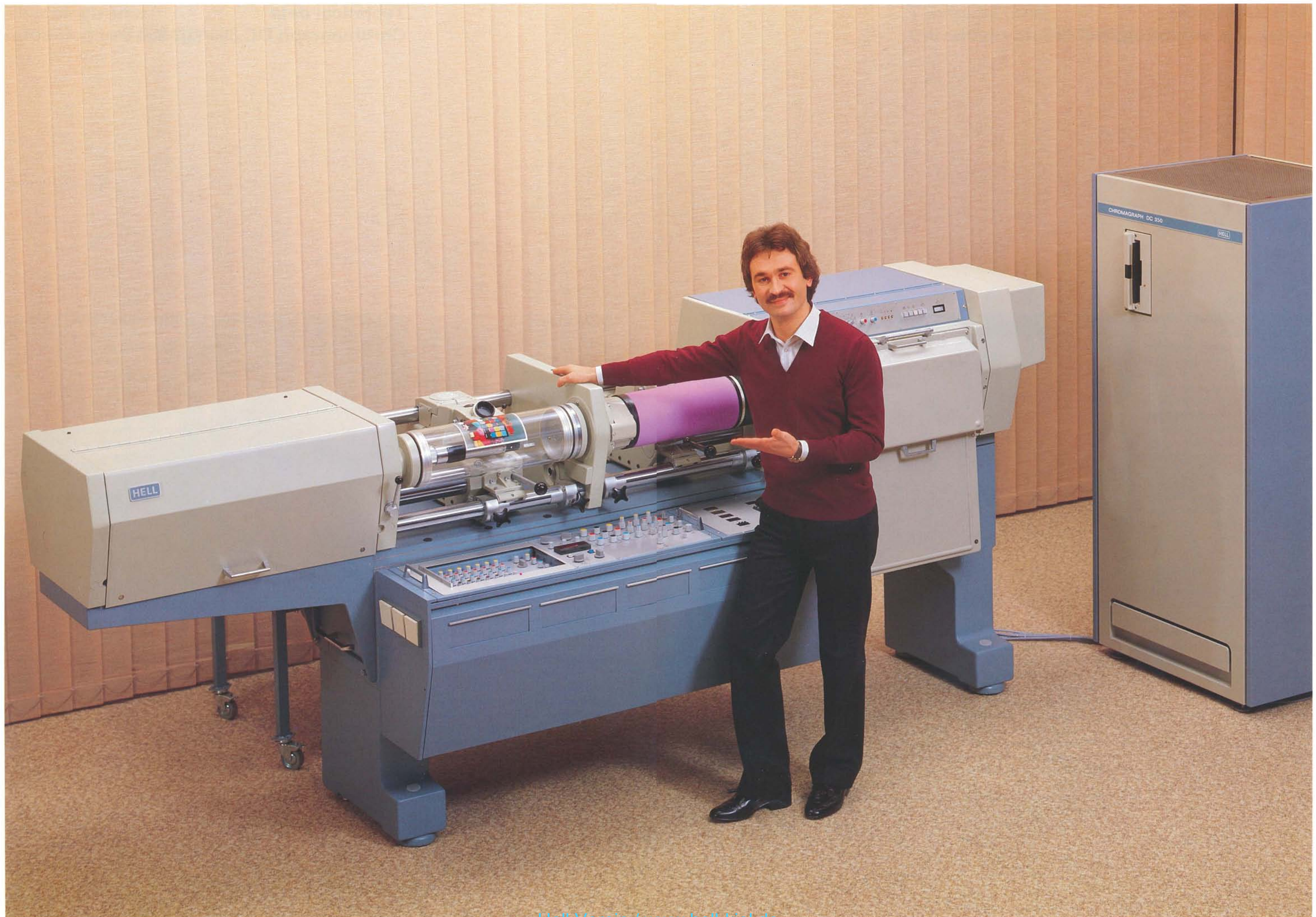
Multicolour system

The Multicolour system of the Chromagraph DC 350 permits extended multiple recording for significantly increased productivity. Depending on the recording format and screening, the unit can record single colour separations, for instance over the full recording size, or simultaneously record two, three or four separations. Separation sets up to 12 cm high can be scanned in one pass, four images underneath each other. A further interesting possibility is multiple copies where the individual colour separations are read out repeatedly for recording. This extends from double recording (in half the recording size) for multiple repetitions, for instance for smaller labels. Postage stamp formats provide about 20 multiples.



The Chromacom system* uses the high-performance Chromagraph DC 350 S scanner. In its scope this is identical with the self-contained Chromagraph DC 350, but uses a modified system-compatible drive. The scanning and recording system includes, beyond the Chromagraph DC 350 S the process computer, data display terminal, two floppy disc drives and a 300 MB magnetic disc drive.

* System for fully electronic page make-up and retouching



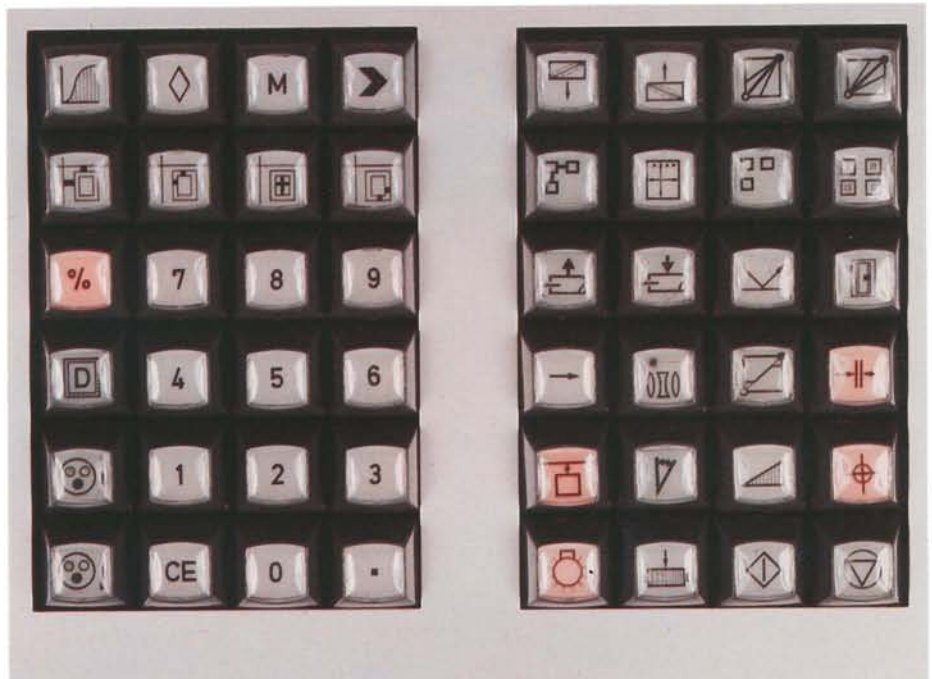
New electronic screening technology

0°– 15°– 45°– 75° screen angles by electronic recall

HELL introduced direct electronic screening in a scanner back in 1972. That provided HELL and all users with a growing fund of experience. The DC 350 takes this further than ever. This Chromagraph provides a new convenient screening system by computer control: Electronic screening that now also produces "conventional" screen angles.

The know-how of electronic screening – the halftone programs – are stored on *diskettes*. The different screen characteristics to match subsequent printing processes are called up from a keyboard.

The computer links program language and image information for the process, yielding finished halftone separations. Whether the separations are required for rotary or sheet-fed offset printing – pressing a few keys enters the preset screen texture, the required screen angle, screen ruling and dot shape.



Screen angles

HELL's new electronic screening permits free choice of screen angles. That makes "conventional" angling steps of 15° and 30° possible. The different angles may be allocated at will to the individual colour separations.

Needless to say, there is also the choice of the established $\pm 18.4^\circ$ screen angles.

That way the user can select the best screen characteristics to meet the quality requirements for the job.

Screen rulings

Keyboard-controlled selection of screen rulings offers extensive freedom in establishing optimum reproduction conditions. Depending on the job requirements, the user can here combine the best quality and recording time compromise.

An ideal combination of aperture and zoom setting at different screen rulings simplifies operation and reduces setting up times. A servo motor drives the zoom lens to the appropriate position. The required zoom value is selected by the functional keyboard.

Dot-for-dot reproduction quality

Laser beam exposure



Programmed dot shapes

The required dot shape is included in the halftone program also stored on diskettes and is generated by the computer. Both elliptical and square dot shapes are available for every screen ruling and angling.

Exposure

In electronic screening the exposure takes place by digitally modulated laser beams. The light generated by an argon ion laser is modulated and fed via light guides to the recording unit in the scanner.

There the film is exposed, dot-for-dot with utmost precision.

Electronic screening is sharper

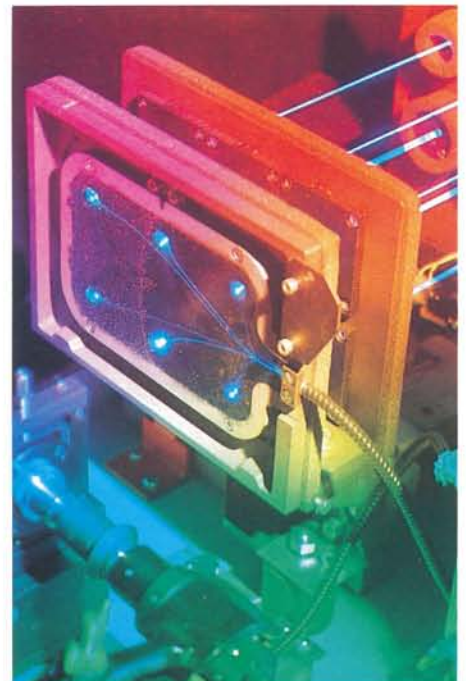
The digital mode of electronic screening yields more even density distribution within the halftone dots. That makes for particularly easy processing of the films which are thus relatively unaffected by development fluctuations. Yet an electronically generated dot is easy to etch.

Alternative recording processes

Apart from electronic screening a further recording light source is available for continuous-tone or contact screened colour separations:

Gas discharge lamp

This proven recording source ensures even illumination.



Film materials

Blue-sensitive or orthochromatic films can be used for recording and processed in normal darkroom conditions.

Electronic screening with laser exposure is suitable not only for lith film but also for less expensive line films that permit rapid and reliable processing.

Commercial continuous-tone films are suitable for continuous-tone recording.

The mask drum
and mask control

Scanner settings



A separate mask drum facilitates image combinations, can introduce geometric patterns and lettering and permits partial image correction. That way it is possible to alter the colour in selected image areas or to modify the detail and contrast in different image parts.

The masks are controlled by the functional keyboard, a switch and two density controls. LEDs indicate the masking colour being controlled at any time.

Analog technique

The colour computer contains the main controls for colour correction, tone correction, undercolour removal and detail contrast enhancement. It is deliberately designed as an analog colour computer, for analog controls make sense for individual matching with a wide range of originals and modification requirements in a colour computer. Every change generated by a control is immediately indicated.

Specifically, the colour computer of the Chromagraph DC 350 has adjustments for the following functions.

- Basic colour correction
- Selective correction
- Gradation controls for highlights, midtones and shadows
- Undercolour removal and colour addition
- Detail contrast enhancement
- Grey balance

Digital electronics

The digital electronic system of the Chromagraph DC 350 is based on a microcomputer which controls all essential scanner adjustment functions. Push-button keys conveniently and quickly program the following operations:

Automatic film linearisation, recording density setting, exposure of register marks in single-colour and multicolour mode, identification of colour separations, a 256-step *test grey scale, image borders* of original sections with rectilinear cropping and finally allocation of any desired *surround density*.

Altogether seven digital readouts, clearly arranged by functional groups, provide an input check: Four readouts for density and halftone dot percentages, two readouts for the scale (horizontal and vertical) and the other functional keyboard inputs, and a basic calibration readout.

Equally easy, again with the functional keyboard, is the input of the scale, Multicolour configuration, screen ruling, screen angle, image start and scanning direction.

All digitized setting parameters for reproduction can be stored on a diskette. This elegant way greatly reduces setting-up times for frequent repeats of similar originals, yet allows also for parameter changes.

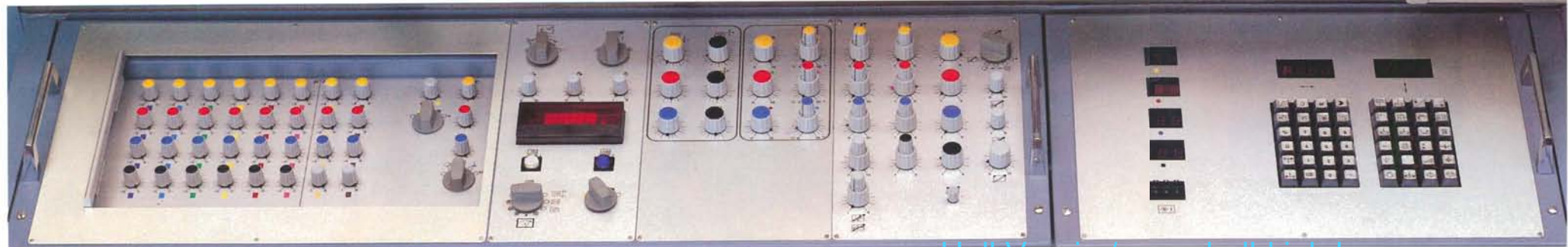
Colour dot storage offers a similar time saving: Once highlight and shadow tones are measured during setting up, there is no need to repeat readings – you just press a key.

Finally – also important for running reliability – there is a diskette with a trouble shooting program for fault diagnosis.

Technical data
Chromagraph DC 350/DC 350 S

Original size up to 40 × 50 cm (15.75 × 19.75 inches)	Film material Commercially available continuous-tone and lith films; line films with electronic screening			
Type of original Flexible single- and multicolour reflection and transparency copy	Recording rates (per 1 cm feed)			
Recording format approx. 40 × 49.5 cm (15.75 × 19.49 inches)	Continuous-tone recording			
Recording output Continuous-tone and halftone colour separations, right-reading or laterally reversed, positive or negative – with register marks.	140 lines/cm:	7.0 seconds		
	200 lines/cm:	10.0 seconds		
Scale changes from 35 % to 1950 %	Electronic halftones			
Colour computer Basic and selective correction, specific colour corrections, gradation control for four-colour printing by all printing processes.	30	3.0 sec.		
	34	3.4 sec.		
	40	4.0 sec.		
	44	4.4 sec.		
	48	4.8 sec.		
	54	5.4 sec.		
	60	6.0 sec.		
	70	7.0 sec.		
	80	8.0 sec.		
Size and weight	Width mm	Depth mm	Height mm	Weight kg
Scanner, complete with accessories	3350 (132")	980 (38.6")	1360 (53.6")	990 (2183 lbs)
Electronic cabinet	780 (30.7")	700 (27.6")	1650 (65.0")	235 (518 lbs)
Laser carriage	1600 (63.0")	570 (22.4")	820 (32.3")	130 (287 lbs)
Current consumption	Approx. 2 kW, or 3 kW with electronic recording			
Vacuum pump	Approx. 3.2 kW			

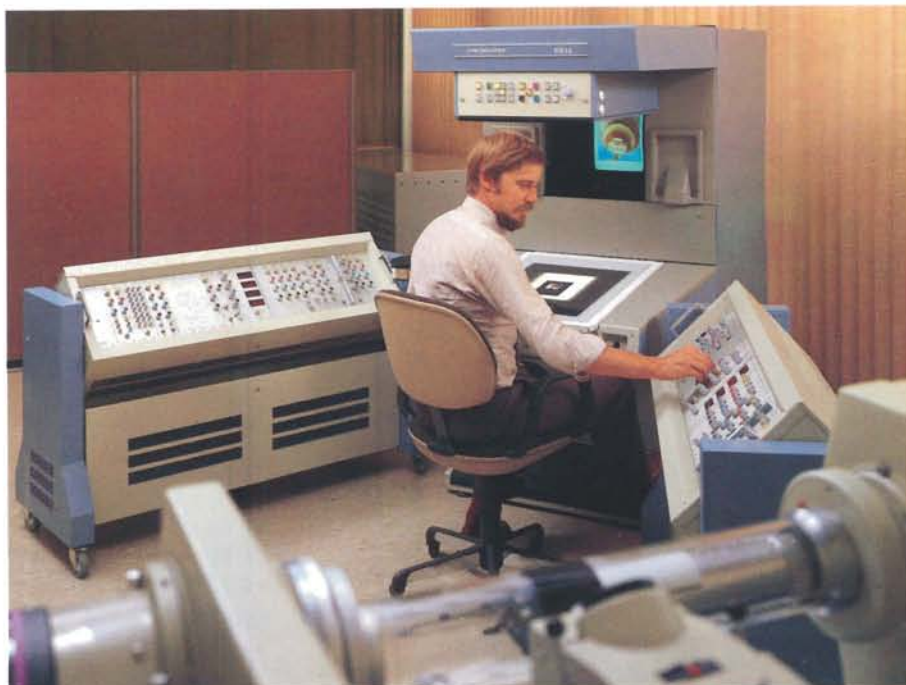
Modifications reserved



Chromaskop – Electronic colour monitoring and correction station

Chromacom –

What follows single-image reproduction? HELL's answer is the Chromacom. This system can already make up the page completely electronically, including all adjustments and retouching. That involves virtually no material consumption and hardly any time.



The Chromaskop is a system module that shows the anticipated printed result on a colour video screen *while you actually set up* the colour computer. The colour monitor screen directly shows the effect of every tone and colour correction control setting, without recording any film or going to the extent of pulling proofs. Hence you have all the advantages of pre-visualization without expenditure of materials or time.

During subsequent scanning of the originals the Chromagraph DC 350 receives its control signals from the Chromaskop colour computer.

The Chromaskop turns the most important process reproduction step, namely the colour computer settings, into a completely controllable procedure with visual monitoring. Having the process in view permits more effi-

cient production. The Chromaskop is the "window" of the scanner's colour computer and offers important process advantages:

- The colour video monitor permits visual control of colour and tone corrections in any required range.
- It permits full utilization of all setting ranges of the colour computer.
- When two colour computers are in use, one colour computer can be set up while the second one controls the scanning cycle.

HELL scanners and HELL process systems are fast in operation. With the Chromaskop you can stabilize recording and reproduction quality at the highest level. That permits tight and reliable scheduling of the entire process operation.

The computer-assisted Chromacom reproduction system covers scanning and recording with the Chromagraph DC 350 S and electronic page make-up and retouching with the Combiskop control desk.

The Chromagraph DC 350 S provides the input and output in this system, that is for scanning the individual originals and for recording the completely finished page on film. The image data obtained during scanning of the original are not directly recorded on film but stored on magnetic discs. The data from numerous individual originals are then electronically assembled to complete pages on the Combiskop with visual monitoring on the colour video screen.

Here it is possible to introduce backgrounds, cutouts with various corner configurations, soft image edges, frames, graduated tones, cropping, brush retouching, colour and tone modifications.

The resulting made up page is again stored on magnetic discs before the colour separations of the finished page are even recorded at the recording side of the Chromagraph DC 350. On the point of compatibility: When planning investment in a scanner, the scope for extension and compatibility with new engineering developments is a matter of utmost priority. The higher the investment the more important this aspect becomes.

Today's system for tomorrow's integration

With the Chromagraph DC 350 we offer a unit that permits updating and integration with both the Chromacom and the HDP (Helio Data Processing) systems.

We could go on at length over the scope of electronic page make-up and retouching. On request we shall be happy to supply detailed information.



HELL

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HELL stands for outstanding innovation, ingenuity and advanced engineering. It covers inventions that mark a revolution in information, reproduction and typesetting technology – a technology that employs around 2300 people and undergoes constant further development.

Our laboratories, production plants and factories involve constant research, development and manufacture.

Our machines and systems have introduced new methods with unique electronics. They are widely used in the graphic arts and textile industries – and wherever quality, economy and time savings count.



Process technology

Colour scanners

Chromagraph DC 350
Chromagraph CP 340
Chromagraph CTX 330
Chromagraph 299 and 299 L

Colour video monitor

Chromaskop

Full page make-up and retouching system

Chromacom with Combiskop video monitor desk

Electronic engraving systems for gravure forme preparation

Helio-Klischograph 201 and 202

Reproduction and forme production system for gravure

HDP (Helio Data Processing)

Typesetting

CRT typesetting machines

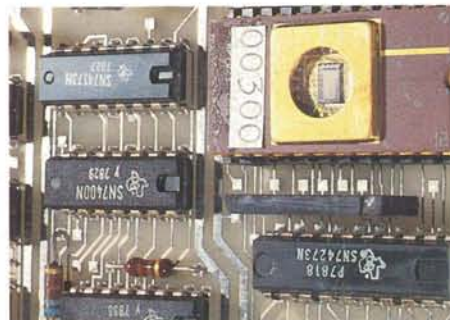
Digiset 20 T Digiset 40 T

CRT typesetting systems

Digiset 200 T Digiset 400 T

Extensive peripheral equipment

DS 2069 video data terminals
Digiskop image control monitors
Digicomp control stations
Digigraph digitizing unit



Textile technology

Colour scanners

Chromagraph CTX 330
Chromagraph CTX 501

Textile printing pattern system

TDP 500 (Textile Data Processing)

Pattern processing system for weaving

Patro with Patroskan, Patroskop, Patrocom

Information technology

PS 1085 image transmitter
PM 4006 image receiver
P 912 Pressfax transceiver
WF 1206 meteorological map transmitter
BS 114 meteorological map receiver
BS 1015 meteorological map receiver
FB 1028 field image transceiver

Electronic test equipment for webset materials

Registat