



HQ

# DFT POLAR HQ

native 8K archive scanner

dft





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DFT POLAR HQ is our next generation film scanner. It is designed predominantly for the film archive market to handle aged or damaged film stocks but is equally suited for SCANONCE new film production workflows. DFT POLAR HQ has been created using a unique modular concept that enables the new adoption of individual components in the future. This marks a step-change in the way DFT film scanners will be built going forward.

Using the latest state-of-the-art 9.3K monochrome

sensor in combination with its brand new Smart Motion Film Gate system, DFT POLAR HQ is perfectly equipped to handle a range of challenging film-related issues, whilst delivering ultra-high resolution native 8K deliverables. DFT POLAR HQ does not employ up-conversions, Bayer technology or pixel-shift technologies. DFT POLAR HQ facilitates a next level of performance for mastering or remastering film into 4K and 8K deliverables.

# KEY FEATURES

- Film scanner based on native 8K monochrome sensor
- 8K and Super 4K deliverables
- Smart Motion Film Gate
- Unique splice handling
- Designed for archive film and new film stock
- Touchless film handling
- Optical Pin Registration
- WetGate ready
- Visible shuttle
- Dual & Triple HDR modes
- Keykode
- Diffuse light source
- Optional (IR) Infrared
- Optional Audio

## Native 8K RGB Resolution

DFT POLAR HQ offers uniquely ultra-high resolution 8K deliverables and is the only true native 8K scanner on the market that does not use micro-scanning. Using a 9.3K monochrome field array sensor, it manages full edge-to-edge scans, that includes both sets of perforation holes critically at full resolution. Liberating an overscan of 5 % and higher (depending on user settings) in vertical direction also allows for visual confirmation up to the adjacent images. This range of adjustment gives the user the option to overscan material

allowing for future proofing on content.

## Super 4K scanning

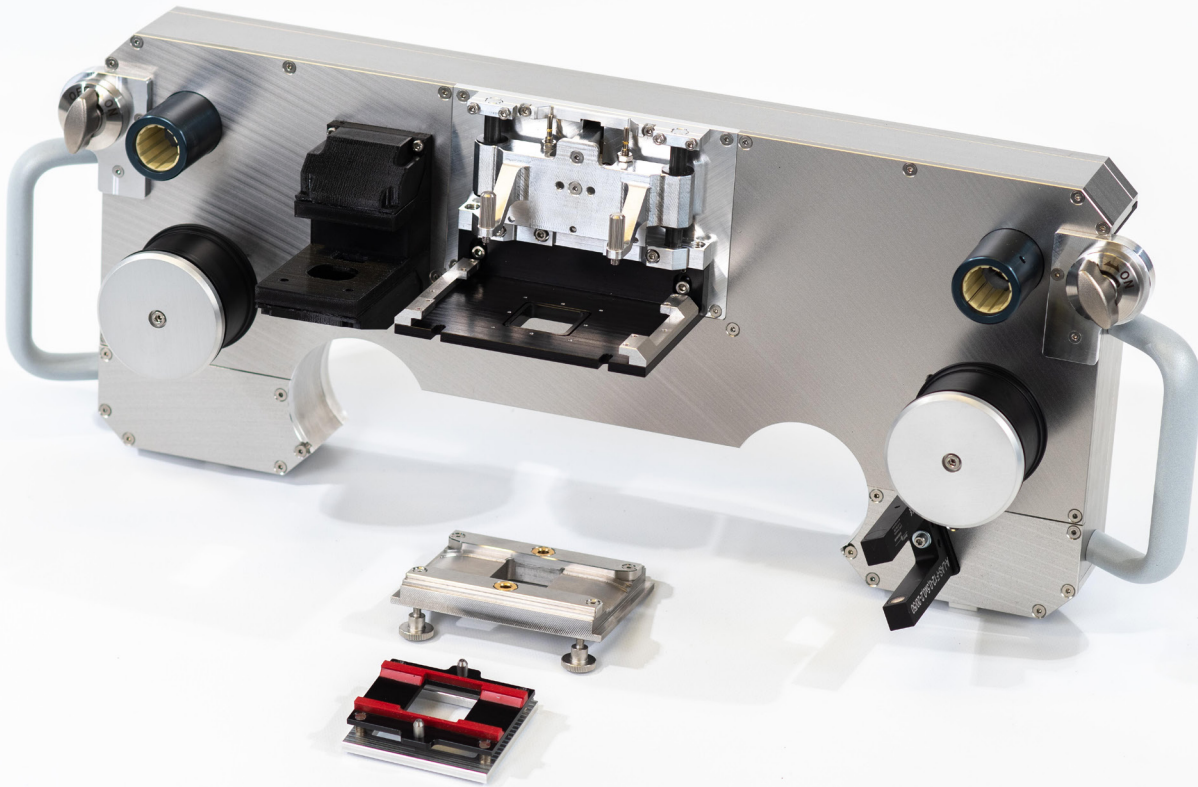
Super 4K deliverables are based on a native 8K scan, scaled to 4K resolution performed by the scanner's own signal processing. The result is a Super 4K oversampled output that also shows a superb S/N quality over normally scanned 4K scans. This entire design concept is unique in the film scanning industry as the DFT POLAR HQ is the only native 8K film scanner without the need for microshift technology.

## Smart Motion Film Gate

DFT POLAR HQ uses the state-of-the-art Smart Motion Film Gate. This all-new servo technology combines the advantages of both common film drive principles, continuous capstan film drive, and a short, delimited waiting period, in which the optical system captures the image multiple times with the native monochrome sensor. This new innovative approach provides gentle film handling while delivering highly stable precise transfers with best-in-class S/N performance.



Smart Motion Film Gate



### Unique splice handling

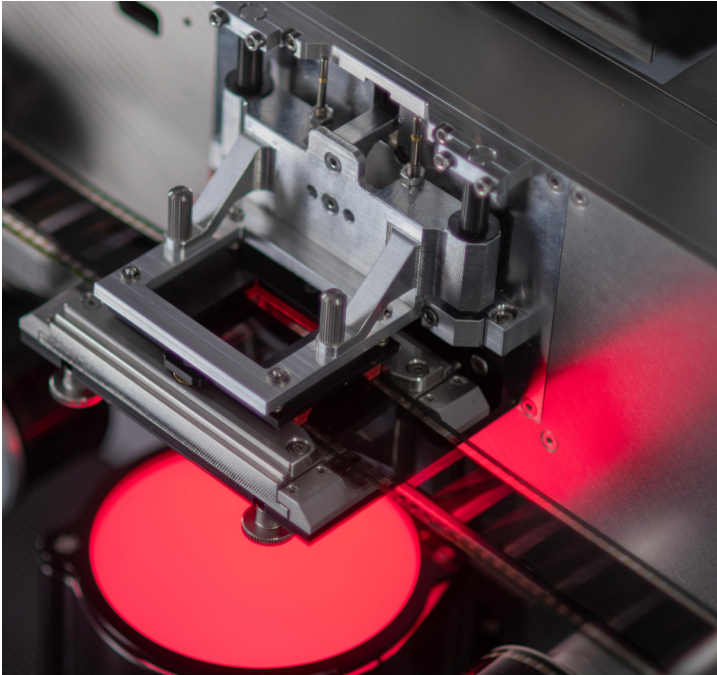
The Smart Motion Film Gate ensures super smooth splice handling through flat image capturing. Archive films generally have a range of physical issues, often including bad splices that need to be handled accurately by the scanner. DFT POLAR HQ has been designed specifically to meet this challenge. DFT has developed a user-adaptable hold down plate mechanism, which suits a range of splice considerations. Used in combination with the Optical Pin Registration system,

this ensures that a range of splices are accommodated physically, whilst maintaining optimal horizontal and vertical stability.

### Designed for archive film and new film stock

DFT POLAR HQ can handle new film stocks and historically aged film material from archives. One of the main challenges of aged film is that of physical shrinkage, so the DFT POLAR HQ automatically compensates for film shrinkage up to 5% in horizontal direction and virtually limitless in vertical

direction (within the limits of the film drive system). If shrinkage exceeds 5% horizontally, a customized skid plate can be used to accommodate even higher rates of shrinkage. The same considerations have been applied to warped film; the standard gate supplied is highly suited for scanning warped film materials. If the deformation exceeds a certain level, an optional customized pressure plate will assist in resolving this issue.



### Touchless film handling

A well proven continuous film drive allows for both high-speed shuttling and for gentle film handling during the scan. This is achieved by using a traditional capstan drive in combination with the new Smart Motion Film Gate, which provides enough time to capture all the details from the film, whilst still delivering superb film management. The capstan drive is the only part of the DFT POLAR HQ film scanner that has any direct contact with the image area.

### Optical Pin Registration

Perforation holes are registered optically, without

any physical intervention, so that no harm or wear to precious film stocks occurs. Full pixel shifting is applied to compensate for detected physical movement. No image stabilization rendering is used. This approach ensures that the film is not interfered with and critically delivers a virtual PIN level of image stability. The stability is better than the SMPTE specification requirements (better than  $\pm 10\mu\text{m}$ ).

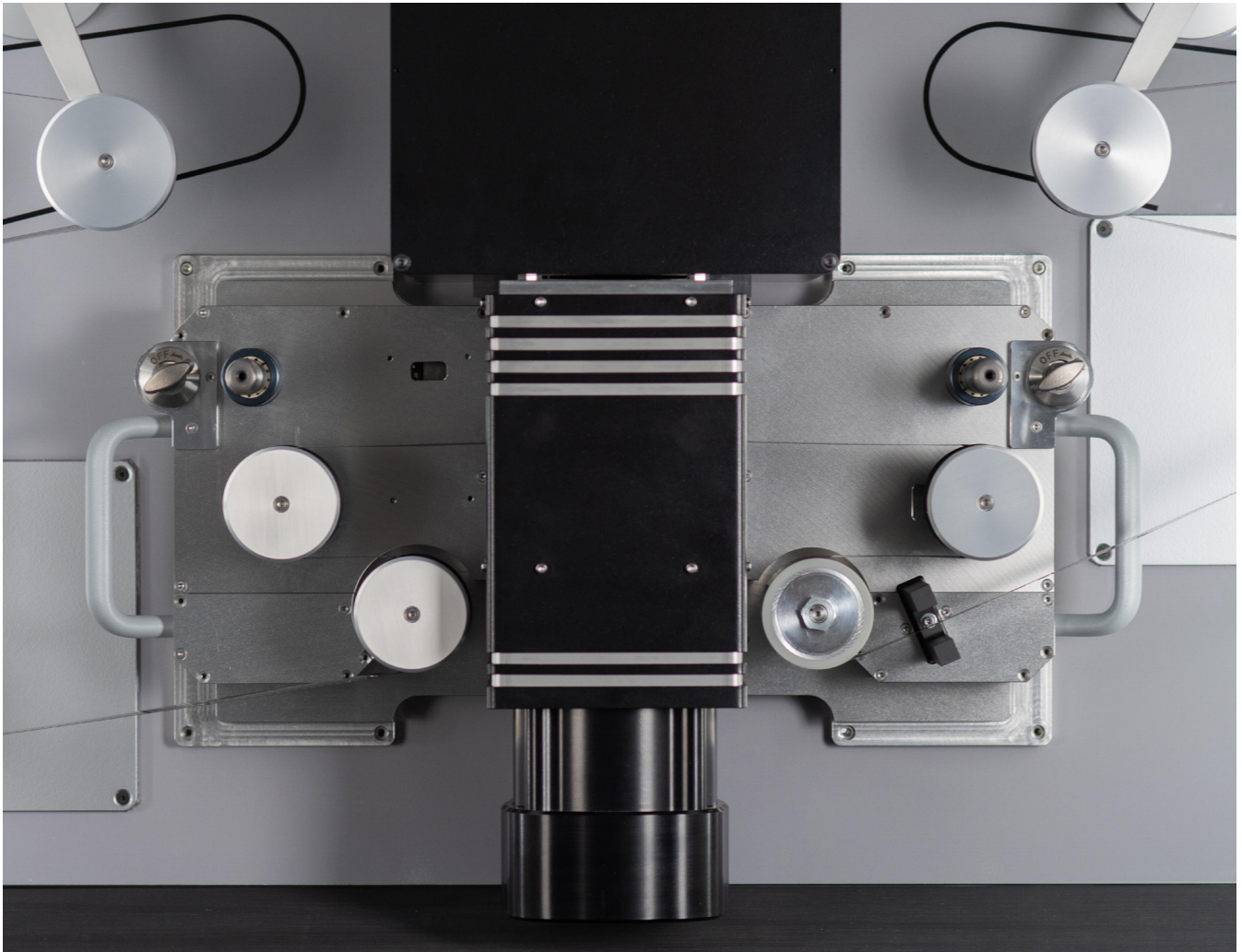
### WetGate ready

DFT POLAR HQ is fully prepared for DFT's market proven WetGate technology. The DFT POLAR HQ WetGate option is integrated into the

machine and fully enclosed in the main body of the scanner. This new design approach does not require an external plant system. Further, a fully integrated dryer system makes sure that the film material- once wet scanned- is completely dry before roll take-up.

### Single frame scanning mode | Visible shuttle

In addition to the continuous scanning mode for scanning the entire roll of film, or for scanning film sections or sequences based on EDLs, DFT POLAR HQ also offers single frame scanning. Settings can be done on a live single frame, allowing for fine tweaking the settings in case



of critical film stocks. Visible shuttle is possible at 4 times the scanning speed.

### **HDR mode (high dynamic range)**

DFT POLAR HQ offers two different HDR color or black/white scanning modes. Users can choose between two-stage or three-stage HDR scanning, which results in an improved signal to noise performance, as might be required providing for a higher

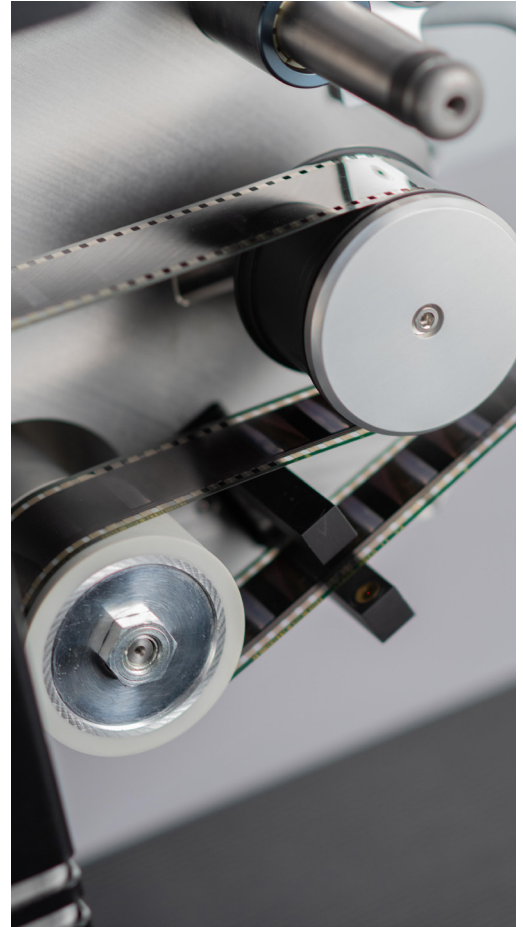
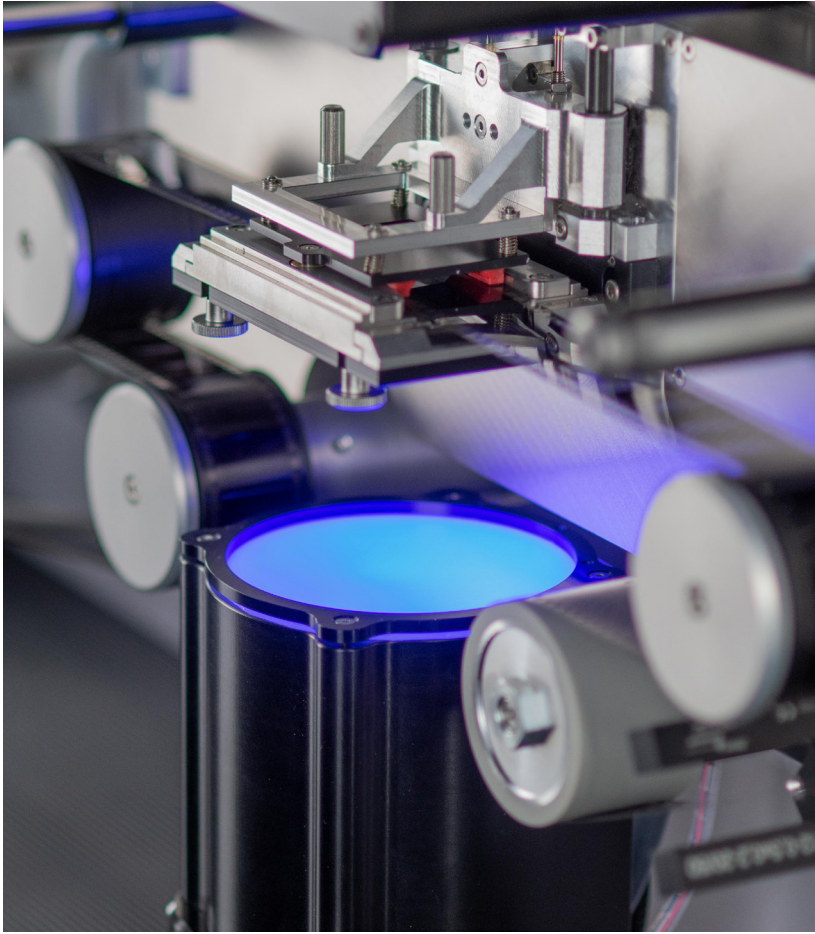
and better dynamic range, depending on the differing density of the film materials. Typically, DFT POLAR HQ can scan a dynamic range with a density range (DR) of up to 4.8, depending on which mode is selected.

### **Infrared alpha channel**

DFT POLAR HQ offers a 16 bit infrared channel for detecting dust and scratches from film. The IR information (matte)

is added as a fourth channel to the output deliverable DPX or OpenEXR format. The machine supports Embedded RGBA which provides an additional channel embedded in the DPX or OpenEXR stuffing bit part. It also supports RGB+A with the IR channel stored as a second "image element" of type "1 bit".





### **Diffuse light source**

The optimized film matched LED light source of DFT POLAR HQ is diffuse in its nature and provides for a high degree of dust & scratch concealment within the optical path. DFT has been at the forefront of this technology, having initiated it for use on Spirit DataCine and more recently Scanity and OXScan. In combination with an additional dust and scratch

solution system via its Infrared scanning or via the use of DFT's WetGate solution, DFT POLAR HQ can accommodate virtually any type of film surface imperfection, revealing the premium quality images.

### **Keycode**

DFT POLAR HQ is equipped with an integrated Keycode reader.

### **Audio**

The DFT POLAR HQ can be optioned for scanning of optical audio film soundtracks, covering either 35mm or 16mm variable area and variable density soundtracks for silver halide, high magenta and cyan dye tracks for prints and negatives. The output offers a choice of WAV files and further digital deliverables.



## WHY DFT?

### QUALITY YOU CAN RELY ON

DFT POLAR HQ is part of a range of high-end film scanners from world renowned Digital Film Technology. With decades of experience in developing high-quality, robust film scanners such as Spirit DataCine, Scanity, and OXScan, DFT's dedicated engineering team builds on proven reliability and passion for innovation, making DFT the market leader to the film scanner industry.

### WORLDWIDE SUPPORT

From day one of the installation throughout the product lifetime, our global network of dedicated and experienced engineers provides customer support from 24/7 telephone or e-mail assistance through to complex servicing or emergency breakdown repair.

## TECHNICAL SPECIFICATIONS

### SMART GATE SYSTEM

Film formats	8mm, S16/16mm, S35mm/35mm
Film type	Color, b/w Negative, internegative, positive, interpositive
Smart Motion Film Gate	16mm 35mm for 2, 3, 4 perf. (6/8 perf. coming soon) Uses continuous film drive for safe handling of film
Gate plates	Exchangable 16mm and 35mm skid plates and pressure plates; Customized pressure plates on request
16mm WetGate (optional) 35mm WetGate (optional)	DFT WetGate system for 16mm DFT WetGate system for 35mm Universal supply unit enclosed in DFT Polar HQ machine cabinet
Dark field scanning technology	Prepared for Dark Field Illumination Gates
Shrinkage	H: up to 5%, V: not limited; optional pressure plates for film stock with higher shrinkage

### FILM TRANSPORT

Film transport	Capstan drive system, pin-less, Smart Motion Technology
Scanning speed (8K RGB)	Up to 6 fps (single exposure) Up to 2 fps (HDR, triple exposure)
Shuttle speed	Max. shuttle speed: 2 m/s Visible fast shuttle: realtime
Delicate film handling	Manual, single step mode, film tension adjustment, Speed and acceleration adjustment Large roller diameters for reduced bending of film
Optical Pin Registration	Stability better than SMPTE requirements (better than +/- 10µm)

### IMAGE FORMATS

Scan Region	Optical zoom user definable up to "edge-to-edge" Electronic zoom ROI (region of interest) setting
8K Specification	Cineon format definition (8.192 pixel per 24,56mm)

### OPTICAL SYSTEM

Camera	Area based sensor for full resolution 9.3K RGB (monochrome CMOS area array with sequential RGB & Infrared capture per pixel) Single, dual, triple image exposure, and fourth flash for handling of critical film
Light source	RGB-IR LED (Cold) diffuse light source
Dynamic range	Density range (DR) 4.8 ND



## AUDIO

Audio (Optional)	Optical audio film soundtracks silver halide, high magenta and cyan dye tracks for prints and negatives
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## OUTPUT DELIVERABLES

File formats	DPX (10 bit, 16 bit), TIFF (16 bit), OpenEXR Second output (rendering on the fly) ProRes, H264, H265, JPEG 2000, JPEG XR*
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\* not all features included in standard configuration; some features available as options

## ADDITIONAL FEATURES

IR channel	Dirt/scratch matte in the alpha channel RGBA or RGB+A
Keykode reader option	Film stock recognition, memory recall, metadata recognition
Focus	Automatic, manual Single frame adjustment in stop mode
Output color space	RAW, presets, user-definable

## SOFTWARE FEATURES

Format selection	Presets for standard format selection
Transfer characteristic controls	Lin/Log, Gamma, LUT-Matrix-LUT, etc.
Image processing	Image resizing/rescaling from native 8K to (Super) 4K or 2K Signal processing: LUT-matrix-LUT, Factory and custom settings, Processing quantization: 16 bit
HDR (High Dynamic Range)	High Dynamic Range - dual & triple exposure up to density range (DR) 4.8
Scanner calibration	Automatic

## WORKSTATION

Operating system	Ubuntu Linux
Monitor	Dual head system, two monitors Integrated touchscreen display for local control
Server	General Purpose Server, using high-quality components from manufacturer of main server and components

## MACHINE SPECIFICATIONS

Dimensions	WHD 1200x1890x760 mm (without door handles)
Weight	375 kg (excl. WetGate)
Power	1-phase current 115-240V, 50/60 Hz   1.500 watts (typical)



## Digital Film Technology



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