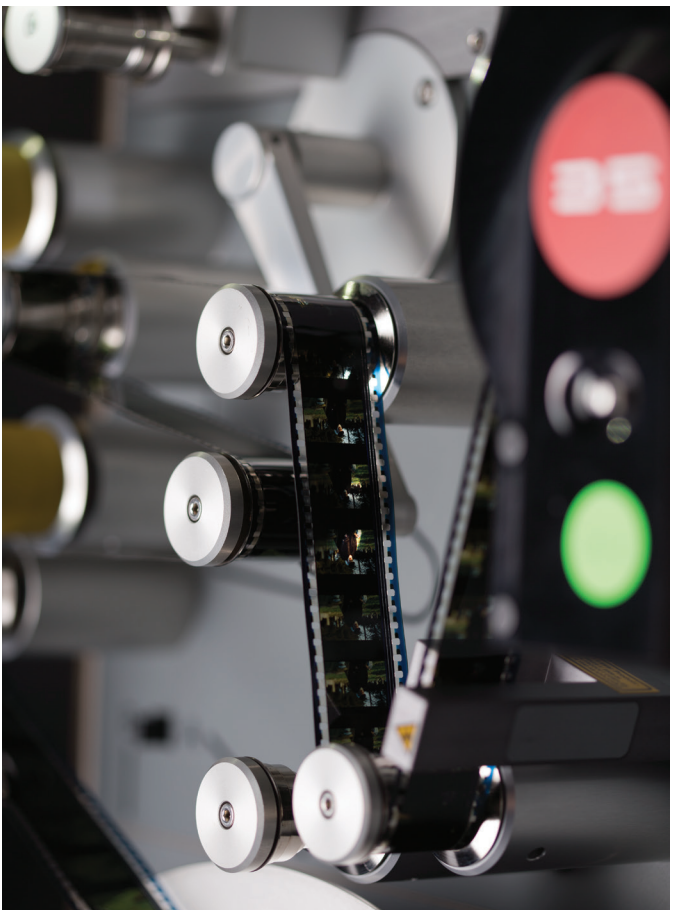
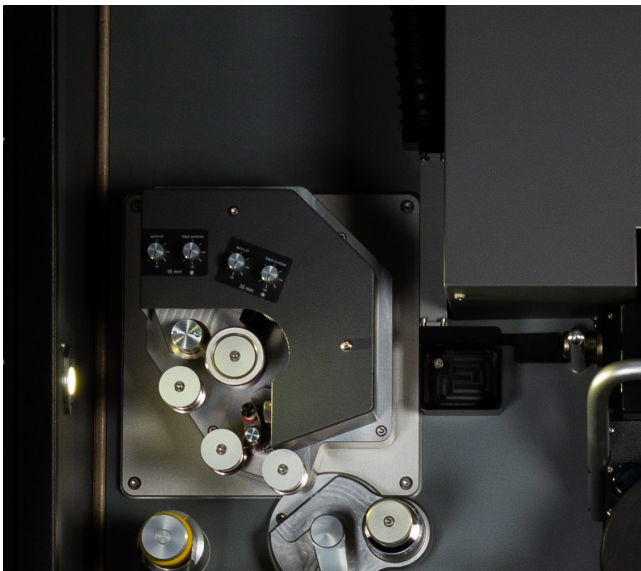


Scanity HDR

high dynamic range film scanner





high dynamic range film scanner

Scanity HDR >>>

A multitude of exceptional and first-to-market features provide Scanity HDR users with cutting-edge technology that addresses the challenges many archives and facilities are facing today. Scanity HDR significantly improves ROI, enhances productivity, works effectively in datacentric workflows and provides a fast and effective solution that reproduces the pristine quality that film warrants.

Scanity HDR serves a variety of film scanning applications, including film archive scanning for mass digitization, EDL-conform scanning, short-form commercials, digital intermediate and new formats like 4K UHD.

Scanity HDR >>>

KEY FEATURES

DFT's state-of-the-art film scanner Scanity HDR excels in the uncompromising ability to handle a range of difficult and historically-aged film issues. Scanity HDR uses highly efficient LED (RGB, IR) light sources and hence low temperature, dedicated hardware processors and fewer, less expensive third-party components. This lowers initial costs as well as on-going operational expenses. Scanity HDR is able to solve a number of key issues that are prevalent when scanning damaged and aged film stock.

- Real-time 2K scanning from 35mm, 16mm & 8mm films
- High-speed 4K scanning from 35mm, 16mm & 8mm films
- 4K ultra HD ready
- Exceptional, versatile and safe film handling
- Enhances productivity and workflow efficiency
- Optional WetGate technology
- High Dynamic Range up to 4.8 D
- Shrinkage compensation up to 5%
- Handling of irregular warped or twisted film using contactless scan processing
- Simultaneous audio ingest via COM-OPTICAL or COM-MAG option





Real-time 2K and high-speed 4K scanning

Scanity HDR provides industry leading data ingest speeds, providing up to 2K real-time or 4K up to 15 fps in DPX or TIFF data files.

This high-speed data ingest or capture is unrivaled in the industry, but even more so when contextualized with the uncompromising high dynamic range in color and particularly for black and white films.

Scanity HDR offers a range of user-adjustable speeds, from 96 fps in 0.25K through to 15 fps in 4K. Facilitating both parallel 2K or 4K data capture as well as simultaneously providing a selection of user-definable deliverables via its batch processing facility.

High dynamic range

Scanning normal color negative images for post-

production and visual effects using modern high-end technology allows users to capture the dynamic range of the color negative. Film archives however, typically manage large volumes of historic images, and require specialist equipment, which enables the capture of an even greater dynamic range rather than image resolution. This is particularly important when managing black and white recorded images on either print or negative stocks which have a high dynamic range (HDR). Traditionally, HDR scanning is done using a multiple exposure method during which a scanner 'stops the film' to capture images at different exposure levels. Images are subsequently recombined into a single HDR image, a process that significantly slows the rate of scanning.

Exceptional and versatile film handling

Scanity HDR is a highly versatile and flexible scanner that serves a multitude of scanning applications. Its speed makes it ideal for bulk archive film scanning, mass digitization and EDL-conform scanning of feature films, short-form commercials, dailies, low-resolution browsing and applications that require the immediacy of live moving images.

Scanity HDR is an excellent fit for applications where film is scanned only once. The contactless roller gate makes it perfect for sensitive and fragile film in restoration and archiving applications.



Safe film handling

Scanity HDR uses a uniquely designed film gate mechanism instead of the costly and potentially film damaging skid plates. Film travels on the roller for approximately 170mm (7") during which the image and optical perforation scanning takes place. The film lies stable on the gate roller and the high resolution tachometer (which is attached to the roller) provides control pulses to precisely manage the movement of the film supported by the optical perforation detection. This is the most gentle way to transport and scan the film. Aside from the rollers there are no mechanical parts in contact with the precious film. The continuous capstan drives the film smoothly and securely.

High performance image stability

Scanity HDR provides touch-free pin registration rather than mechanical pins to ensure excellent image steadiness. Several newly designed modules include: an optical perforation detection device with dedicated camera; a precision roller gate for mechanically stabilising the film controlled by a high resolution tachometer and servo system; a continuous motion capstan film transport; and dedicated hardware for 4K image stabilisation processing without delay. With these key elements Scanity HDR combines steadiness with high-speed and gentle film handling.

Optional WetGate technology

Scanity HDR comes pre-prepared with an optional state-of-the-art WetGate technology solution. Filling the surface imperfections with environmentally safe fluid at the point of scan provides near perfect quality transfer results, saving time and downstream processing, and improving the outcome significantly.

Workflow efficiency

Scanity HDR includes two control interfaces: a state-of-the-art touch screen tablet for local operational management of the scanner, facilitating live, on-screen remote control and status updates; and a dedicated high-end workstation with dual displays.

Key technical features

- High-speed scanning - 4K scanning up to 30 fps (2-perf) and 4K up to 15 fps (4-perf), 2K up to 30 fps (2-perf) and 2K up to 25 fps (4-perf), 1K up to 44 fps, 0.5K up to 69 fps, 0.25K up to 96 fps (speed depending on IT, network and storage infrastructure).
- High dynamic range black and white film scanning up to a density range of 4.8 D in real-time 2K data (2048 x 1556 RGB) and 4K data (4096 x 3112) at 15 fps, 4-perf. Suitable for both print and OCN materials Super 16/16mm and Super 35/35mm.
- Versatile multi-application scanner, archive film scanning, mass digitization, EDL-conform scanning, low resolution browsing and highly suited for restoration and archiving, commercials and 'video-like' applications.
- Customized high resolution optics – capable of resolving 8K equivalent image details.
- Sprocketless transport for ultimate protection of archival film.
- Time Delay Integration (TDI) sensor technology for extremely fast and sensitive film scans - 4300 horizontal active pixels, 96 TDI lines, 6 µm pixel size relative to the film.
- Independent from frame height - film frame aspect ratio is matched by the number of lines.
- Over scanning in horizontal and vertical direction beyond image boundaries.
- LED light source with optimized spectral wavelengths specifically designed for a variety of film stocks including aged archive materials such as nitrate stock.
- Precision roller gate avoids mechanical stress and risk and provides unparalleled smooth and safe film handling.
- Continuous motion capstan film transport.
- Optical perforation detection and touch-free image stabilization to provide pin registered steadiness. Providing for a stability of less than ± half a pixel at 4K in real-time.
- Highly integrated and fast spatial image processing manages content scaling and formatting.
- Dirt and scratch handling capabilities with diffuse illumination and IR channel. Capable of dirt map generation for internal/external processing up to 16 bit dirt matte selectable. Working with a range of third-party products to provide seamless dirt and scratch processing, optimizing the workflow.
- Audio scanning of optical sound tracks on 16mm and 35mm film and magnetic track on 16mm film.
- Parallel scanning of both audio and 2K/4K film ingest to provide single, real-time pass material.
- Long LED life provides stable and cost-effective illumination solution at very low temperatures for extra film protection.
- Integrates seamlessly with third-party software tools such as PF Clean and Diamant Film Restoration Software.
- Capable of handling shrinkage up to 5 percent tolerance.
- WetGate ready deck plate to support both 16mm and 35mm wet scanning.



Resultant HDR Image

A typical HDR picture will use a combination of two, three or more bracketed images to produce the final look.

Using this patented processing technique, increases the effective dynamic range of Scanity up to 4.5 ND and at real-time speeds.



Over Exposure



Medium Exposure

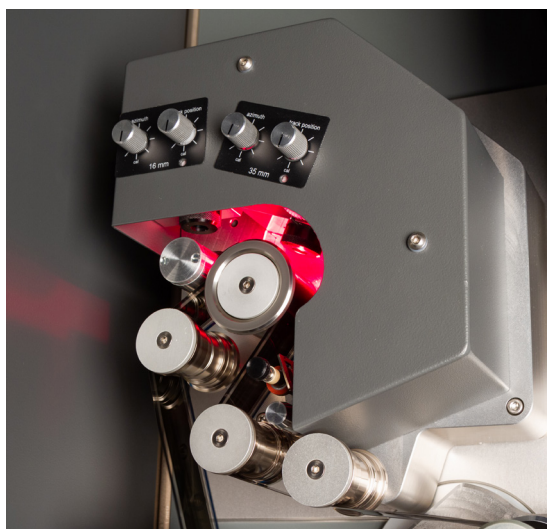


Normal Exposure

Scanity HDR Audio scanning >>>

Scanity HDR provides an audio scanning option facilitating the ingest of analogue optical mono or stereo soundtracks from 16mm or 35mm print and magnetic tracks on 16mm film. This feature eliminates additional and separate image and audio scanning passes. The audio option uses components from Sondor and is mounted into Scanity HDR before the lens gate assembly.

The capstan-driven continuous film transport offers real-time audio scanning in conjunction with real-time 2K film scanning. The soundtrack is picked up by audio heads, converted into WAV files on the Scanity HDR workstation and stored with the images. This means that both the audio and image files are available for further processing or playout via third-party software systems.



Internal processing within the audio scanner compensates for any audio delays that are introduced, as well as any pitch changes due to film shrinkage or other factors. Many archive films contain optical (COM-OPT) or magnetic (COM-MAG) sound tracks that need to be ingested along with the film materials, Scanity HDR can facilitate simultaneous audio and 2K data scanning of these typical soundtracks. With combined features such as extremely gentle film handling and optical or magnetic audio scanning, Scanity HDR is an ideal solution for the film archive market. Scanity HDR - audio scanning seamlessly integrates with both DFT proprietary software

applications and a range of third-party solutions. The optical audio scanner can be ordered as an option with the Scanity HDR or added to existing Scanity or Scanity HDR film scanners in the field.

Key technical features

- High-performance audio for mounting into the Scanity HDR Film Scanner
- Audio components from Sondor are seamlessly integrated and pre-qualified
- Reads optical audio tracks from both 16mm and 35mm positive film (Prints)
- Adjustable tracking and azimuth of optical sound heads
- Compatible for reading cyan-dye high magenta and silver optical tracks

- Variable area: unilateral, bilateral, dual lateral
- Variable density
- Scans analogue audio tracks and converts them into digital audio WAV files
- Reads magnetic tracks on 16mm film
- Eliminates additional and separate image and audio scanning passes
- Real-time audio scanning in conjunction with 2K data ingest
- Generates broadcast WAV files for automatic syncing of images and sound
- Audio base option includes a platform for audio heads, wire harness and 19" 3RU electronics unit
- Compensates audio delays
- Infield upgradable



“What is the main Scanity HDR USP and the benefit to customer?”

Scanity HDR facilitates the ingest of difficult dense black and white materials at real-time speeds using its new proprietary, patented simultaneous triple-exposure technology. This has the advantage over traditional scanners because the triple exposure is executed once, in real-time 2K or up to 15 fps in 4K, which means that instead of having to slow down the scan speed it stays consistently fast. This creates significant time and cost benefits and allows access to previously unseen details from the highlights and lowlights of the film at extraordinary speeds. To further enhance this feature set for all film transfers, B&W and color and to mitigate unwanted surface imperfections, including scrubs, cinch marks, horizontal and vertical scratches, Scanity HDR comes pre-prepared with a new optional state-of-the-art proprietary WetGate technology solution, filling the surface damages with environmentally safe fluid.

at the point of scan provides near perfect quality transfer results saving time and downstream processing, and thereby improving the outcome significantly.

“How can the scanning speed be so fast and yet Scanity HDR does not need a high power light source?”

High-speed scanning is down to the use of new sensor technology. Time Delay Integration (TDI) enables scanner sensitivity that has never before been achieved. TDI sensors accumulate charges of up to 96 lines in the sensor and increase the sensitivity by a factor of more than 50 compared to a single line CCD sensor.

The result is that an LED-based light source can be used and the diffused light from an integration sphere can be utilized. There is also enough light headroom for individual light adjustments in red, green and blue images. Furthermore, TDI technology enables the use of a lens design that has a small

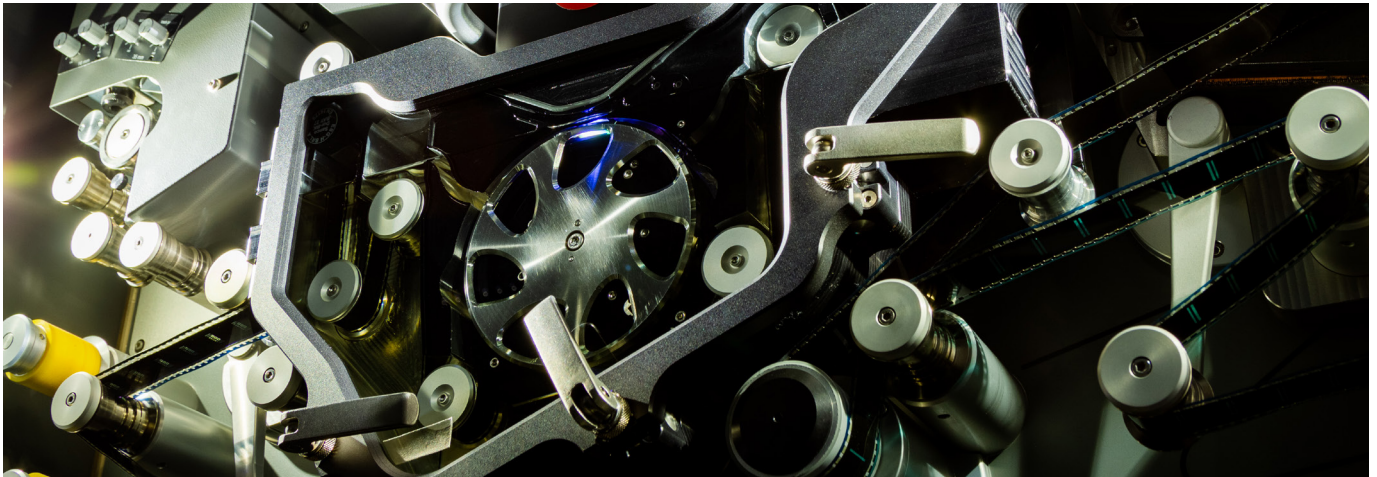
aperture and consequently a large focal depth, which makes focusing an easy task.

“What features does the Scanity HDR workstation and software offer?”

The Scanity HDR workstation and software provides a platform for image ingest and monitoring, data management and direct access to standard file systems through Linux. It supports all major SAN systems (CVFS, Store Next and CXFS) and can be backed up to standard IT devices. The workstation uses off-the-shelf IT hardware, which can easily be adapted when technology progresses. The software executes batch processing where scanned images can be further processed, such as look-up tables, color manipulation, format and size transformation, grain and noise reduction. Scanity HDR seamlessly integrates with the third-party software tools, which allow for multi-platform workflows and the use of one common database.

WetGate Option

Manage film imperfections >>>



To overcome film surface imperfections, such as scratches and dirt, Scanity HDR deploys a range of feature tools, the use of clever diffuse illumination and optional infrared (IR) scanning, with real-time user-adjustable automated processing, all designed to minimize and/or remove these undesirable imperfections. However, as film material starts to age further, these digital tools can take time and potentially introduce unwanted artifacts. Also, IR only works on color films and is not suitable for b&w film. To help solve the surface imperfections of aged film, DFT has developed a state-of-the-art WetGate technology solution, capable of operating on both 35mm and 16mm films. The WetGate

technology fills the film surface imperfection with a fluid matching the refraction index of the film base, at the point of scan. This provides a near perfect quality transfer - saving time and downstream processing, thereby improving the time and cost outcome significantly.

The Scanity WetGate system consists of:

- WetGate Assembly (16mm & 35mm)
- Supply Unit and Control

Key benefits

1| The WetGate is a sealed aquarium unit, so there is no need to work with complex vacuums systems that are prone to reliability issues,

expensive to maintain, difficult to set up (time-consuming), and often introduce further issues such as air bubbles on the film scanning surface.

2| The WetGate has been custom-built for the Scanity HDR scanner, so the film receives the same gentle film handling and management characteristics as found in the dry scanning mode, including the ability to accept poor or bad condition splices; but with the added benefit of a wet transfer.

3| The WetGate is an integral part of the fast scanning process, film is simultaneously scanned and then dried at high transfer speeds, saving significant time.

Technical Specifications

Film Transport

Play / Record Speeds - depending on resolution	4K - 15 fps (4-perf) 2K - 25 fps (4-perf) 1K - 44 fps (4-perf) 0.5K - 69 fps (4-perf) 0.25K - 96 fps (4-perf) Variable speed control: speeds can be slowed down according to requirements. Speed depends on the limitations of clients file system, workstation and storage solution.
Optional Lens Gate Assemblies S35/35mm S16/16mm S8/8mm	Roller gate with reference edge on which the film travels Optical perforation registration and evaluation Pressured air supported film gate No parts where the film might slide or wear Optional 16mm, 35mm film gates and associated plant
WetGate for 35mm and 16mm	Includes new master drier assembly for both gates
Film Format 35mm	Maximum scan width: 25.8 mm; Pixel pitch 6.0 µm; 2-perf; 3-perf, 4-perf, 8-perf (VistaVision); Cinemascope Fixed settings for Full Aperture (Super 35) and ACA (Academy Camera Aperture)
Film Format 16mm	Maximum scan width 12.9 mm; Pixel pitch 3.0 µm; S16 or 16mm Fixed settings for S16, N16
Keykode Reader	For 16mm and 35mm films Film stock recognition and film stock memory recall, metadata generation
Local Control	Touch screen display For calibration, major film deck functions, and low resolution image representation film ingest task monitoring and status indication
Focus	Automatically, manually, in stop and in play
Framing	Coarse and fine
Film Length	On cores 2000 feet, 609 m; A/B wind
Visible Navigation	Supported by proxy images from cache; Cache keeps all images of a 2,000 foot film in 0.5K resolution
Step with Image	Instantly from cache (if filled)
Shuttle with Image	Visible forward live and supported by cache (if filled); Backwards supported by cache (if filled)
Spooling w/out Image	2.2 m/s = 120 fps on a 4-perf 35mm film

Mechanical Dimensions

Cabinet	984mm (width) x 194 mm (height) x 811mm (depth) - including door handles
WetGate Supply Unit (option)	Weight: ±320 kg / 705 lb 600mm (width) x 1700mm (height) x 750mm (depth)
Cabinet Transport Crate	1220mm (width) x 2210mm (length) x 1080mm (height); Weight: ± 93 kg / 205 lb
WetGate Supply Unit Crate	770mm (width) x 2140mm (length) x 960mm (height); Weight: ± 100 kg / 220 lb

AC Power Connections

AC Supply	1-phase current 240 V, 50 Hz 2-phase current 208 V, 60 Hz 2-phase current 200 V, 60 Hz
Power Consumption	1.5 kVA, typically

Scanning Front End

Illumination	LED illumination system with dedicated spectral response, Automatically adjusted according to film stock and manually adjustable (overwrite) Integration sphere for diffuse light film illumination for dirt and scratch compression
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Beam Splitter	Splits into Red, Green, Blue and IR
Image Sensors	3 TDI sensors (Time Delay and Integration) for Red, Green, Blue image, 1 TDI sensor detection IR light to generate a dirt and scratch representing image, Resolution 4300 pixels x 96 lines, 7 µm square pixel size resulting in a 6 µm raster on the film level in 35mm, and 3 µm raster on the film level in 16mm
Camera	3 or 4 cameras comprising preamps, ADC, and binning circuitry Camera link interface to image processor
Image Processing	Signal processing: look-up table, matrix, look-up table, factory and custom settings, Spatial processing: for image formatting in scanning speed, including anamorphic unsqueeze 2:1; Processing quantization: 16 bit
HDR	High Dynamic Range - Simultaneous Triple Exposure for Black and White Film material, up to 4.8 D
Scanner Calibration	Automatic

Workstation

Workstation Hardware	Current high-end workstation Dual port graphic card Ubuntu Linux operating system Postgre SQL Database File format DPX according to SMPTE 268M-1994 High Definition dual monitor setup
Remote Interface	Script based via LAN
File Format	10 bit LOG / LINEAR DPX according to SMPTE 268M-1994 16 bit LINEAR TIFF A wide range of streaming deliverable formats and compressed formats through batch processing, please refer sales for latest details. Presets for various image resolution
Components and Packing	3 x 10 bit, RGB, filled to 32 bit with padding at bits 0 and 1 4 x 8 bit, RGBA packed to 32 bit Alpha (A) = space("0") 4 x 16 bit, RGB 3 x 16 bit, RGB 2nd workflow step rendering on multiple Scanity workstations Supports data backup drives

Software, GUI

Ingest Page	Scanner front end control Transfer window Time bar Monitor and Monitoring Metadata window EDL or keycode list based data capture Frame counter, feet and frame, time code, keycode, log list
Monitor, Monitoring	Image monitoring display characteristics selectable via display look-up tables Monitoring: parade or super-imposed waveform, vector, histogram, detail tool
Batch Processing Page	3D look-up tables Primary color correction Transform
Production Set-up	Structure: The workstation is part of Scanity and requires a connection to at least one disk array or a SAN storage via fibre channel (dual 16Gb FC). Note: The achievable data transfer speed depends on the overall system performance and might be subject to variations. Parameters like the connected storage, connections between storage and host and the file system make an impact



www.dft-film.com



Digital Film Technology

115 N. Hollywood Way, Suite 200
Burbank | California 91505
Phone: +1 818 861 7419

Borsigstraße 13
64291 Darmstadt | Germany
Phone: +49 6151 8503 500

28, Arunachalam Road, Saligramam
Chennai 600 093 | India
Phone: +91 44 23764432

E-Mail: sales@dft-film.com

DFT's policy is one of continuous improvements and we reserve the right to change the specification at any time without prior notice.