SilverFast iSRD® - infrared Dust and Scratch Removal

Slides and negatives always have small dust particles and tiny scratches on them, even when handled very carefully. There are several software-based technologies to remove these defects more or less by considering the surrounding image information. LaserSoft Imaging has developed a more reliable solution for this problem:

iSRD - Smart Removal of Defects using infrared technology

Contrary to conventional techniques SilverFast's dust and scratch removal functionality iSRD is based on the hardware. It is using the scanner's infrared channel for defect detection. Infrared light has a very wide wave-length, which allows it to pass through film emulsion of negatives and slides without resistance, as opposed to scratches and dust particles that reflect it. iSRD utilizes this behavior as follows. The image is getting scanned two times - the first is the regular RGB scan and the second is the additional infrared scan that captures defects like dust and scratches only. Then the calculative dust and scratch removal takes effect, only where the infrared channel has detected any defects without losing any important details.

without iSRD

with iSRD

« I'm excited about the future of SilverFast, especially the new 64-bit HDRi feature. Finally, photographers have the ability to scan the full dynamic range of their film, with the added benefit of scanning the infrared channel for dust & scratch removal. […] The performance gains of iSRD over Digital ICE are impressive, and the quality of the scans amazes not only me, but my clients as well." »

Timothy Gray, professional photographer

SilverFast iSRD® vs. Digital ICE®

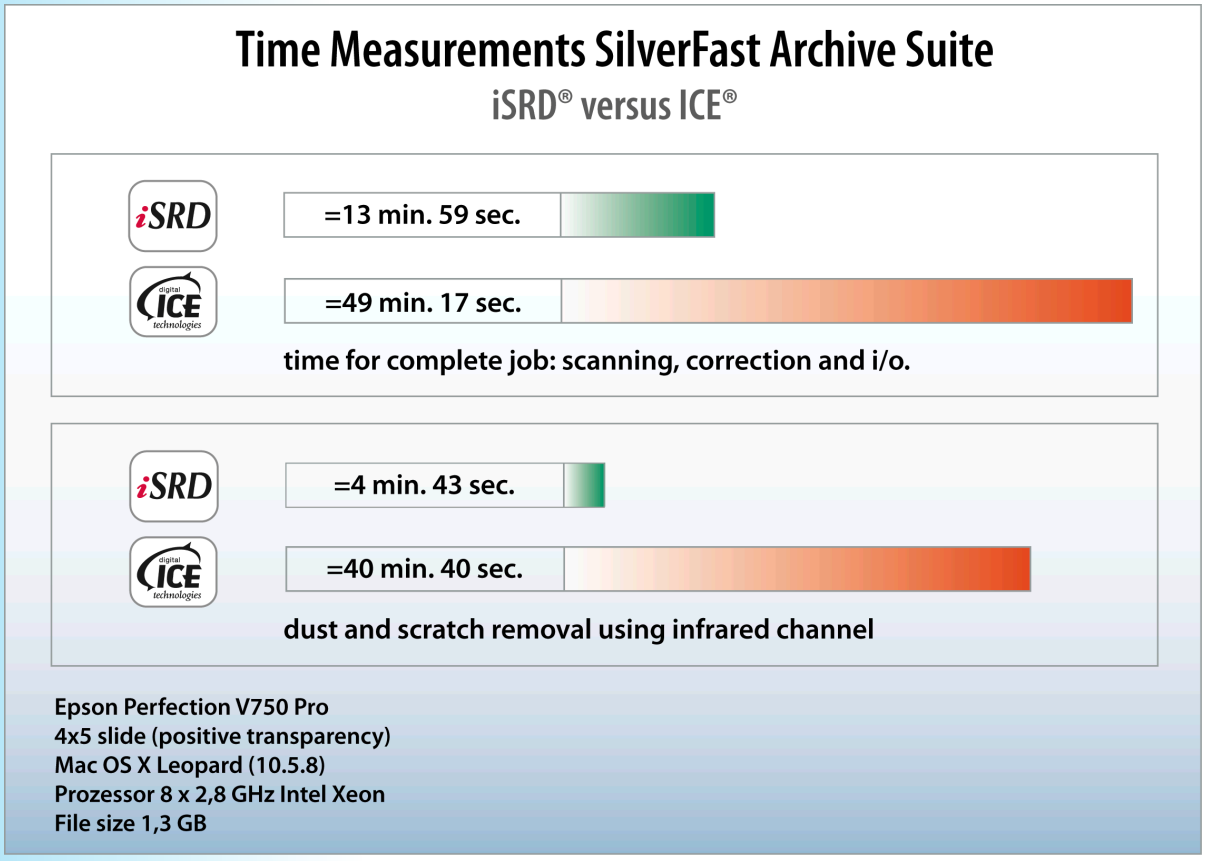
Digital ICE is a similar technology to remove dust and scratches developed by Kodak's Austin Development Center. Some scanner manufacturers still use ICE for their devices. But where ICE is a technology that hasn't seen many improvements over the years, iSRD is always up-to-date due to regular updates.

A major advantage of iSRD over Digital ICE is speed on modern 64bit multi-core systems.

SilverFast iSRD is faster than ICE

Algorithms to automatically detect and remove defects like fingerprints or dust and scratches from image data are elaborate software technology. A huge quantity of very complex mathematical operations have to be calculated. For high resolution scans this process takes several minutes even on actual desktop computers - minutes the user today often is not willing to wait.

SilverFast iSRD is way faster than ICE using multi-core power. Where iSRD is a 64bit application, ICE is just 32bit and does not benefit from actual 64bit systems. We have benchmarked both technologies using an EPSON V750 Pro producing very huge images of 1,3 GB. See the results below:

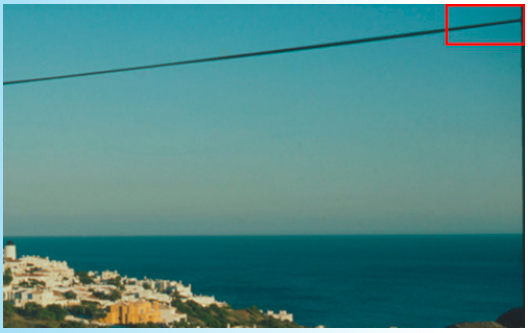


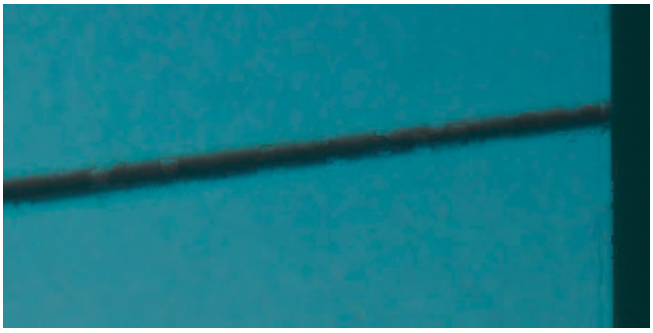
SilverFast iSRD® vs. Digital ICE®

Speed is not the only difference between SilverFast iSRD and Digital ICE. There are many other important distinguishing marks clearly showing the superior functionality of SilverFast iSRD. Digital ICE is either 'on' or 'off', where iSRD is controllable by the user - featuring easy controls for beginners and full controls with possibility to create masks on different layers for experts.

Features Comparison of iSRD and ICE

SilverFast iSRD	Digital ICE
• automatic and/or custom settings	• automatic settings only
• standard controls: 1 slider	• no controls
• expert controls: full controls, correction width several masks and layers, combinable with software-based SRD	• no controls
• highly detailed preview of iSRD effects	• no preview
• 64Bit HDRi export	• no export
• recommended for Kodachrome slides	• not suitable for Kodachrome slides

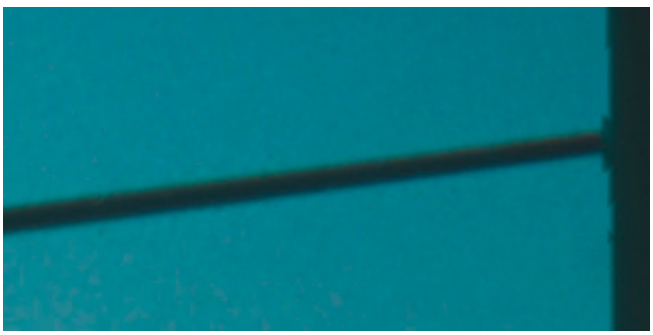




Same slide scanned twice, the detail shows a part of an electric cable.

top: EpsonScan + ICE

bottom: SilverFast + iSRD



SilverFast iSRD® vs. Digital ICE®

SilverFast iSRD is the technically matured infrared dust and scratch removal. In terms of quality, speed and functionality, it wins every comparison with Digital ICE. Meanwhile iSRD has made a name for itself. Customers are directly asking for the availability of iSRD for their scanners as well as professional photographers are recommending it for an efficient workflow.

Summary

- Speed: SilverFast iSRD on multi-core systems is much faster than ICE.
- Speed: The «SilverFast 64bit HDRi Workflow» is much faster using iSRD than using ICE.
- Speed: iSRD is a 64bit application, where ICE is just 32bit.
- Quality of correction is better with iSRD than with ICE, in any case.
- The user has full control with iSRD - no control with ICE.
- iSRD can be used for Kodachrome slides - ICE can not.

without iSRD

with iSRD

« iSRD dust and scratch removal provides the best set of working procedures I've ever seen for safely and effectively removing debris from scanned images with zero or absolutely minimal impact on image detail. The enabling condition is access to the scanner's infrared channel, which is used for identifying debris and distinguishing it from image detail. »

Mark Segal, expert photographer and editor of Luminous Landscape

SilverFast HDRi - 64bit/ 32bit RAW data format

The HDRi feature is the final step for complete HDR scans. The scanner delivers RAW data through SilverFast which contain all readable image information including data from the infrared channel. This files can then be used for later image optimization including infrared dust and scratch removal.

HDRi is a new data format from LaserSoft Imaging containing 48bit color RAW data and 16bit infrared data or 16bit grayscale RAW data and 16bit infrared data.

HDRi Workflow - SilverFast Archive Suite

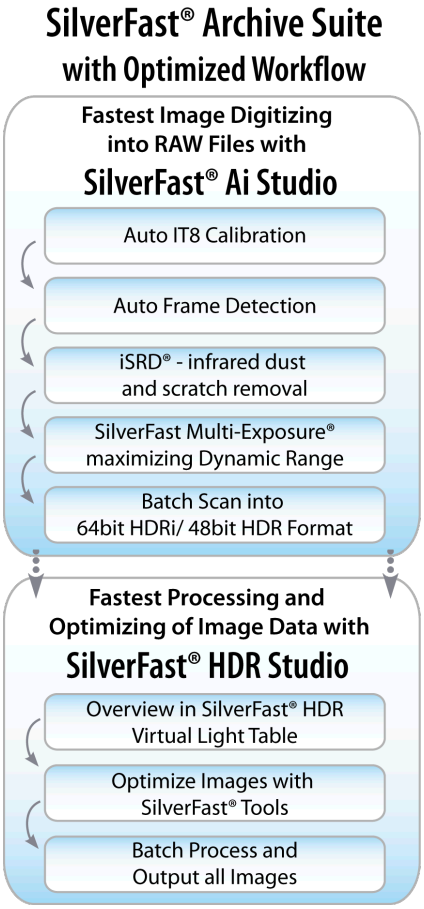
The SilverFast Archive Suite is a software package:

- **SilverFast Ai Studio** scanner software
- **SilverFast HDR Studio** imaging software

As a complete archiving solution with integrated color management the SilverFast Archive Suite is an efficient tool for digitizing slides, negatives and reflective originals.

Using scanner software SilverFast Ai IT8 Studio, 64bit/ 32bit RAW data scans are created. Infrared data is also captured and stored unprocessed (thus time-saving) with the image data.

These RAW files contain all the image's data and are optimized using SilverFast HDR Studio any time later. Processing, including iSRD dust and scratch removal, greatly benefits from fast multi-core systems.



« The unusual beauty of this Archive Suite is its very efficient batch scan capability that includes the infrared iSRD data in a 64bit raw scanner file.
Then when processed [...] the iSRD cleaning can be applied as part of the process to a finished image file. »

David Brooks, senior editor for Shutterbug magazine

Kodachrome Features & SRD®

SilverFast SRD - Smart Removal of Defects

SilverFast SRD is a software-based tool for removing dust and scratches, i.e. in contrast to iSRD it is not using the infrared channel. Thus, it is a great tool for scanners that do not feature any infrared functionality.

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SilverFast SRD is also a great addition to SilverFast iSRD. Both features can be optimally combined to remove defects hardware- and software-based. For finetuning, the user has the ability to apply masks for marking those areas containing defetcs. It's also possible to work on up to 4 different layers for applying special corrections to scratches that are very difficult to remove.

Kodachrome Features & SilverFast iSRD

Kodachrome slides are very challenging to scan due to the silver halides this film material is containing. Most scanner software produce blue casts and infrared dust and scratch removal always fails with Kodachromes. The Nikon CoolScan 9000ED, featuring an advanced version of ICE, was the only device capable of removing dust and scratches from Kodachromes …

… until LaserSoft Imaging has developed a set of Kodachrome features allowing a great variety of scanners to handle Kodachromes. ICC profiles, a special Kodachrome target for IT8 color calibration and, of course, iSRD in combination with SRD enable SilverFast to scan Kodachromes reliably without color casts and free of dust and scratches.