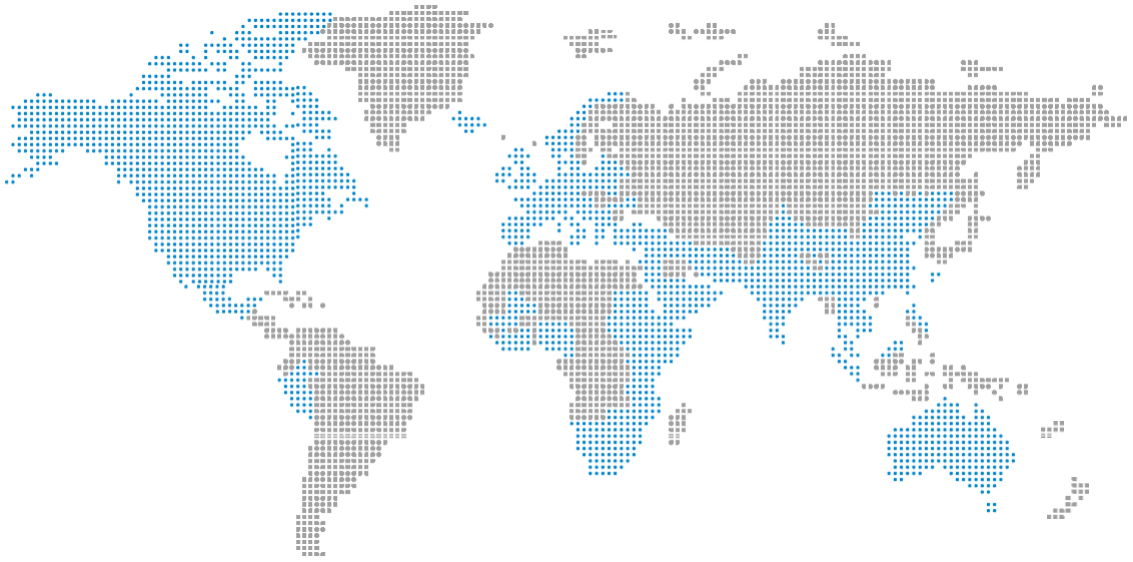
PhotoScribe® Series

PS960/70 Series Imaging Mark Reader

World leading ‘real-time’ data capture technology



Education | Elections | Census

PS960/70 Series Image Mark Reader

The PS960/70 series is built on DRS PhotoScribe® technology and encapsulates the latest developments in high volume data capture. Designed and manufactured by DRS in the United Kingdom, the PS960/70 series can be provided as an integral element in one-off data capture projects or for outright purchase for continual on-site use.

As a robust network-ready product, the PS960/70 series is typicallyused for high volume data capture such as census projects, examination processing, voter registration and complex ballot counts.

A Holistic Approach

DRS takes a holistic approach to time-critical, complex, high volume data capture and although the PS960/70 series has been designed to handle many paper form types, it is primarily intended for use with forms designed for electronic data capture. These are forms printed on high quality paper with design elements that assist quality checking during scanning.

As part of its service offering, DRS provides a specialist and highly qualified forms design and print facility, experienced in producing high quality forms to ensure efficiency and accuracy are maintained throughout the data capture exercise.

Real-Time Data Capture

The key distinguishing capability of the PS960/70 series over traditional document scanners is ‘real-time data capture’. Unlike conventional imaging scanners which only produce an image from which data is later extracted, the PS960/70 series allows an application to retrieve data and images from a form while it is still in the reader. The results can be used to control which output stacker a form goes to or to control what is overprinted on the form. It can even be used to take further conditional actions and collect additional data and images depending on the results retrieved.

This is a very powerful concept that makes the PS960/70 series extremely flexible for demanding data capture tasks. It ensures error correction costs are minimised and accuracy is maximised,whilst sustaining an industry leading throughput of up to 150 A4 pages per minute at a high duty cycle.

General Key Features

Data Options

The PS960/70 series offers an unprecedented range of data capture capabilities, either as standard or as options. Examples of the types of information that can be extracted from a form and actions that can beapplied include:

- full duplex images and clipped regions of interest
- various barcode formats
- real-time Optical Mark Reading (OMR)
- real-time Optical Character Recognition (OCR) - (optional)
- carriage printing (printing data on the form) - (optional)
- stacker extensions allowing for use of forms up to 18” - (optional)

Scanning Intelligence

Application specific validation, flow control and general data processing are provided by the software used to control the reader. However, the firmware in the PS960/70 series handles all interaction with its operator sothat the application does not have to deal with the complexities of handling multiple sheets and exception processing. Although multiple complex operations are running simultaneously in the background, the PhotoScribe® interface presents a very simple model of ‘one sheet at a time’ to the software.

Networked or Standalone

The PS960/70 series software technology is built around the Microsoft Windows operating system. From anadministrator’s point of view, the PS960/70 series appears as a PC on the network. This makes it very easyto integrate into any standard networked IT environment, retaining all of the usual security features and access control.

The PS960/70 series can also be used as a standalone reader where data may be stored directly to its fast, high capacity internal drive and subsequently exported via a memory stick or by writing data to the integraloptical media writer.

Paper Handling

Efficient and Effective

The time wasted on clearing paper jams can have a significant impact to the schedule in large-scale data collection exercises. If an exception occurs it is imperative that it is both detected and resolved as quickly as possible. The PS960/70 series has been designed with an open paper path to allow for quick and easy resolution of any issues. Its aim is to ensure that overall throughput is maintained at the highest possible levels. Similarly, consumable items, such as the transport feed rollers or carriage printer ink are easily accessible and user-replaceable, without any need for downtime.

Doubles Detection and Removal System

The PS960/70 series not only detects double feeds instantly, but it also automatically refeeds thesheets back into the reader using the built-in doubles removal system. This is a mechanism that simply pulls double feeds back into the input hopper and rescans. This further improves throughput by ensuring a reader is not sitting idle waiting for a busy operator to remove double sheets and refeed them. This is a very important aspect in high volume data capture exercises as it reduces the need for costly and time-consuming corrective actions later in the process.

High Capacity

A high capacity input hopper and primary output stacker reduce the amount of loading and unloading of forms. The second and third stackers are used for application specific purposes and will collect forms with anomalies. These forms can then be reviewed at a later stage, whilst ensuring that the main processing can continue at speed.

The hopper and stackers are adjustable to suit the range of paper sizes and ensure the straightest possible stacks are collected.

Quality Approach

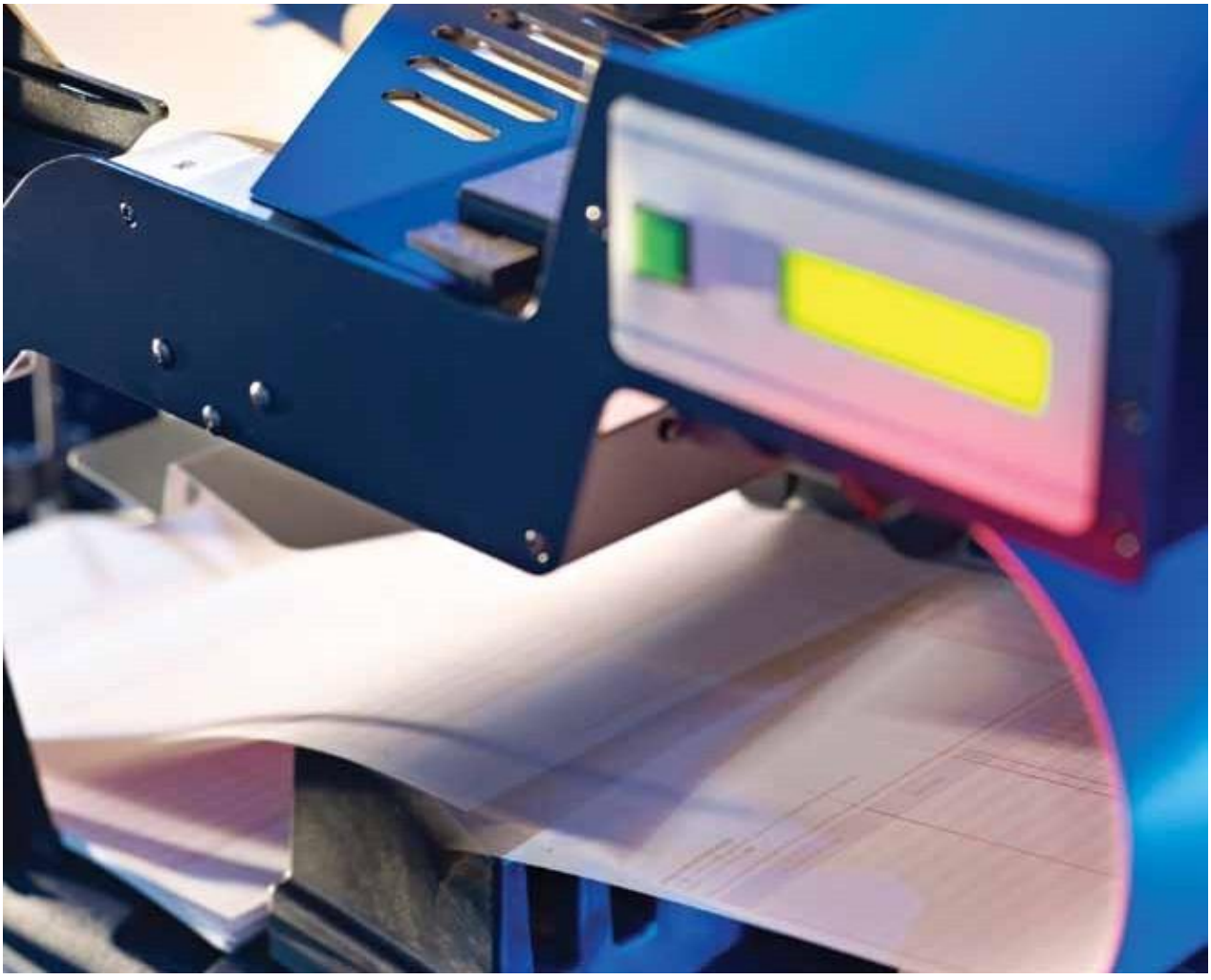
Images

The PS960/70 series boasts an impressive array of sophisticated features to ensure consistent, high qualityimages are captured using Contact Image Sensor technology.

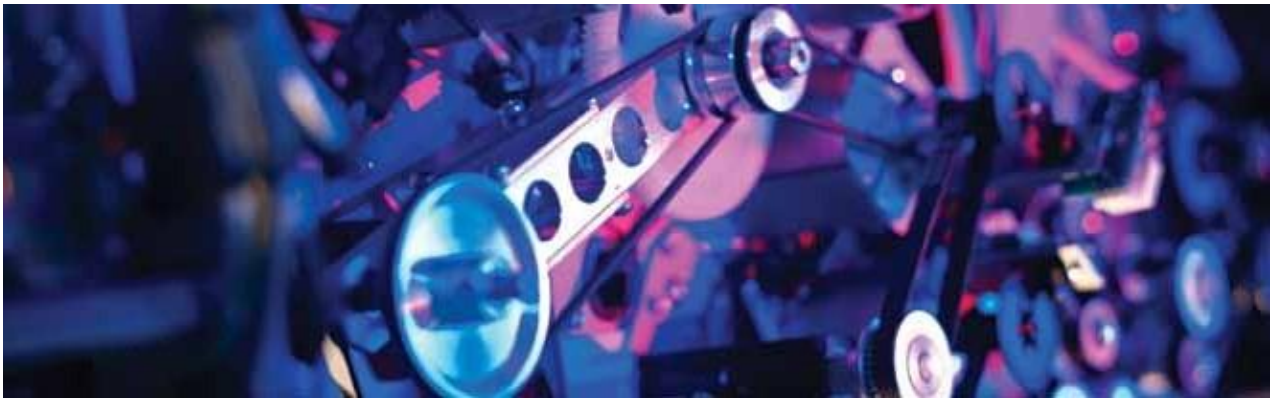
Quality checks are applied in real-time as each form is processed by the reader. The aim is to ensure data correction is eliminated wherever possible and that quality issues are detected and resolved at source.

Dynamic Normalisation

Dynamic Normalisation ensures the background of a form is clean and white while protecting foreground content such as faint marks and writing. This standard feature ensures text and images are always of the best possible contrast and quality. In addition, a clean white background will compress far better than an image that has not been processed this way, thus reducing total data storage needs and bandwidth requirements.



Key Data Capture Options



OMR

The PS960/70 series is a fully functional Optical Mark Reader (OMR) utilising the advantages of Contact Image Sensor technology.

OMR remains the cheapest and most accurate way to collect simple category information from forms in a high volume or time-critical environment. Backward compatibility with the DRS range of OMR readers is maintained.

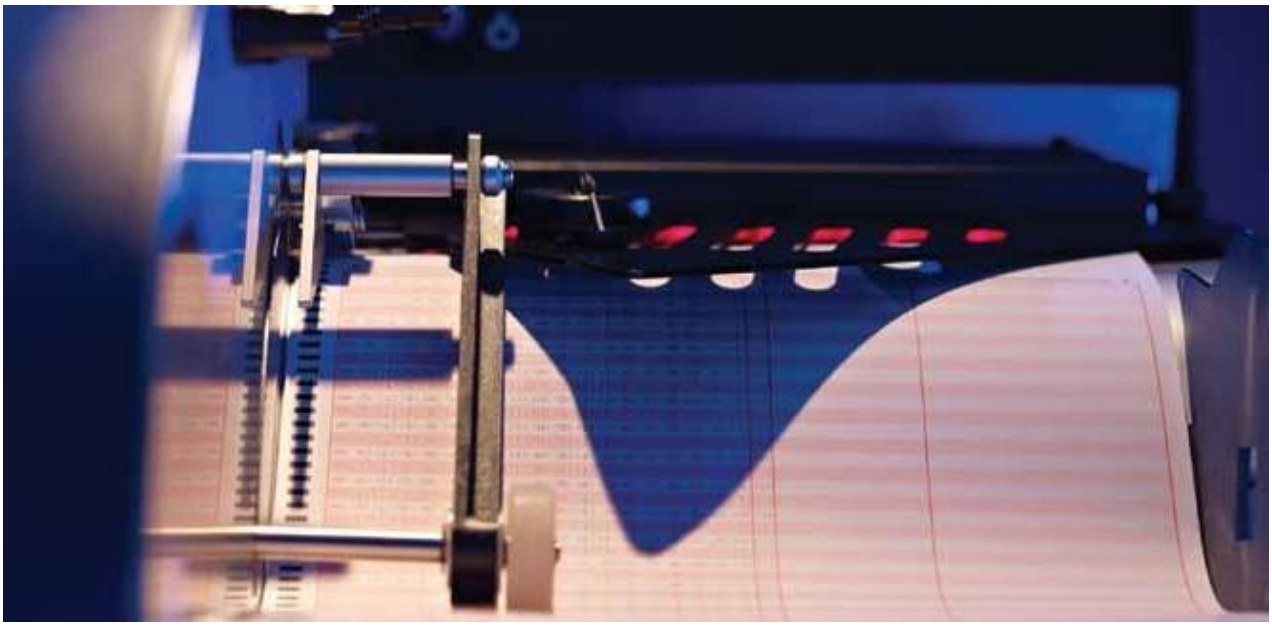
Image Clipping

A number of image clips can be captured from each page and saved to disk or retained in memory for real-time processing. Clips can be of an entire page or just a region of interest. The resolution and bit depth of each clip is independently controllable.

This has enormous benefits where a range of image types must be collected from a single form. For example, in a registration exercise using photographs it would be typical to collect bitonal images of write-in areas and to capture the photograph in greyscale. A traditional scanner must capture the page at the highest resolution and bit depth and then convert to the formats required as a separate process. This creates a lot of data traffic that is completely wasted and adds time-consuming image manipulation.

The PS960/70 series allows the photograph alone to be captured in 8 bit greyscale while other portions of the form are captured as bitonal, with no intermediate conversion required. This reduces network traffic, lowers total storage requirements and reduces the number of process stages.

PS960/70 Series Image Mark Reader



OCR

In some situations barcodes may not be an appropriate technology. There may be difficulty in producing forms with unique barcodes, some applications may preclude the use of barcodes or there may already be a legacy of existing form stock that uses printed numbers or letters instead.

Once again, the real-time processing capabilities of the PS960/70 series provides a solution. Regions with machine printed numbers are defined in exactly the same way as barcodes or image clips and the PS960/70 series will accuratelycapture them in real-time.
Reader throughput is maintained at 100% for any reasonable length of printed characters. With check digits encoded into the number, the Optical Character Recognition (OCR) on the PS960/70 series is so accurate that it is a suitable replacement for barcodes. This offers another option for reducing costs and complexity in the form production stages.

Barcodes

The PS960/70 series supports a variety of barcode formatsand can very quickly use these to return information to an application. Barcodes are typically used to identify a form type as it is scanned or to uniquely identify a particular form among a batch.

Barcodes can also be used to determine the orientation of a form as the form is scanned. This enables full advantage to be taken of clipping particular image areas from forms fed in any orientation.

Carriage Printing

Using the optional carriage printer, a single line of characters can be printed along the length of each form in any horizontal position.

If the data printed is automatically generated such as date, time or document sequence number, then the full rated throughput of the reader is maintained. However, if what is printed is derived from data extracted from the form then some application delay may be introduced, e.g. printing the result of a multiple choice exam on the test paper after reading the answers and calculating a score. However, even in a scenario such as this, a speed of 4,000-6,000 forms/hour is still achievable.

It is the combination of all these key features that make the PS960/70 series an efficientand effective solution to many document processing challenges.

Technical Specifications

Dimensions

Physical	417mm depth x 650mm width x 548mm height
Weight	40Kgs

Environmental

Normal operating temperature range	18 - 25 degrees C
Minimum operating temperature	10 degrees C
Maximum operating temperature	35 degrees C
Minimum operating humidity	40%
Maximum operating humidity	80% (non-condensing)

Power

Maximum consumption	220 watts
Supply	Universal 100 - 250V 50-60Hz

Form Dimensions

Nominal form size	297mm x 210mm (A4)
Minimum form size	200mm x 90mm
Maximum form size	356mm x 227mm
Maximum form size (long sheet mode)[1]	457mm x 227mm
Nominal form weight	85 - 95gsm
Minimum form weight	80gsm
Maximum form weight	135gsm

Hopper and Stackers

Input Hopper maximum capacity	600 sheets
Stacker 1 maximum capacity	600 sheets
Stacker 2 maximum capacity	200 sheets
Stacker 3 maximum capacity	50 sheets

Operator Controls

LCD display 2 lines, 32 characters	Start Up / System messages
Front panel push button (Green)	Operator Control (context sensitive soft key)
Rear panel switch	Power isolation
Push button (Blue)	*(reserved for future use)*

Operating System and Platform[2]

Operating system	Windows 7 Professional
Mainboard	Industrial Standard ATX x86 platform
Processor	Intel P4 3.0GHz (minimum)
Storage media	HDD SATA, 250GB minimum [3] DVD Writer
Memory	4GB DDR2
Ports	USB, Parallel, RS232, Video
Network	10/100/1000 Base-T

Interconnections[2]

Keyboard	USB / PS2
Mouse	USB / PS2
Video	15-Way D
Parallel port	25-Way D
Serial port	9-Way D
USB ports	4 x USB, A
Network	RJ45, Cat 5

PS960/70 Series Image Mark Reader

Speed and Forms Throughput[2]

Transport speed	1177mm/sec
Sheet throughput	Up to 10500 forms per hour (A5) 10000 forms per hour (Letter) 9000 forms (A4) 7500 forms per hour (356mm x 227mm) 5000 forms per hour (457mm x 227mm)

Image Heads

Type	Single array Contact Image Sensor (front & rear)[2]
Illumination	Red light with red light dropout imaging[4]
Resolution / Depth	200 dpi, 256 levels of greyscale
Maximum image width	215mm

OMR Features

Format	Software selectable: European standard (5 tracks per inch, 40 data tracks) USA standard (6 tracks per inch, 47 data tracks)
Barcode types	2 of 5 interleaved, Code 39, Code 128
Minimum barcode element size	0.5mm
Barcode orientation	Vertical
Maximum number of barcodes	64 mixed per side
Sheet routing	Real-time sheet sorting based on OMR and Barcode data
DRS SOS decode	Compatible

OCR Features[2]

Maximum number of OCR regions	16 per data request
Minimum font size	8 points
Character set	Latin alphabet upper and lower case letters, digits, punctuations and maths symbols

Image Features

Image resolution	8 bit greyscale, approx. 200 x 200 dpi
Image cropping	Automatic sheet edge detection
Skew detection	Software selectable
Image orientation	Automatic under application control
Image clipping (ROI)	Software selectable
Maximum number of clip regions	16 per data request
Compression	Selectable per clip
Compression formats	8 bit JPEG. 1, 4 or 8 bit TIFF RLE or Group IV
Clip capture	Memory or disk
Threshold	Software selectable per clip
Contrast and brightness	Software selectable per clip
Barcode types	2 of 5 interleaved, Code 39, Code 128
Orientation	Vertical or horizontal
Maximum number of barcode regions	16 per data request
Maximum number of barcodes	64 mixed per data request

Other Features

Document feed	Automatic
Document path	Open path for easy access
Separation	User adjustable
Doubles detection	Contactless electronic self-calibrating
Doubles removal system	User configurable automated separation attempts
Feed wheels / Rollers	Push on and user replaceable
Jam detection	Automatic with position reporting
Hopper / Stacker status	Automatic empty/full detection
Construction / Duty cycle	Robust design and construction suitable for continuous production use[5]
Transport printer	Post scanning inkjet printer for audit trail printing (optional)
Stacker extension	Stacker extensions for long forms up to 457mm (optional)

[1] Hopper extensions required
[2] Dependent upon model version
[3] Additional internal hard disk optional
[4] Illumination alternatives for non dropout imaging available upon request
[5] Subject to routine preventative maintenance and checks

Award Winning Scanning Technology

Designed and manufactured by DRS for high volume accurate data capture, the award winning PhotoScribe® imaging mark readers set a new standard in data and image processing and are integral to DRS' solutions.

Contact DRS

To discuss how DRS and the PS960/70 series can work in partnership with you to ensure the successful datacapture of your next project, you can get in touch by:

Phone: **+44 (0)1908 666088** or email: **enquiries@drs.co.uk**

Further information about the PS960/70 series is available from DRS and an online enquiry form is available at **www.drs.co.uk**

DRS Data Services Limited
1 Danbury Court
Linford Wood
Milton Keynes
MK14 6LR
England

Tel: +44 (0)1908 666088
Fax: +44 (0)1908 607668

Email: enquiries@drs.co.uk
Web: www.drs.co.uk