INTERNATIONAL STANDARD

ISO 10758

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Graphic technology — Prepress digital data exchange — Online transfer from electronic prepress systems to colour hardcopy devices

Technologie graphique — Échange de données digitales de préimpression — Transfert en ligne en provenance de systèmes de préimpression électronique vers des copies papier couleur

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Contents

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10758 was prepared by the American National Standards Institute (as ANSI IT8.4-1989) and was adopted, under a special "fast-track procedure", by Technical Committee ISO/TC 130, *Graphic technology*, in parallel with its approval by the ISO member bodies.

Introduction

The technical content of this International Standard is identical to that of American National Standard IT8.4-1989. The ANSI document was circulated for ISO approval as a fast track document at the request of the 1989 plenary meeting of ISO/TC130 and subsequent to its approval was restructured to be in accordance with part 3 of the ISO/IEC Directives. The IT8 document itself resulted from the joint efforts of an international industry group that included participants representing all of the major prepress vendors in the world. This group, initially identified as the DDES (Digital Data Exchange Specification) Committee, later became the founders of the ANSI IT8 (Image Technology) accredited standards committee which is responsible for electronic data exchange standards in graphic arts prepress.

The data formats are modelled on ISO 10755 and ISO 10756. The transport definition is implemented via ISO 9316.

This International Standard is organized to separate the data format and transfer protocol used at the application level from that used at the transport level. A primary reason for this distinction is the desire to ease the adaptation of this International Standard to transport mechanisms other than SCSI.

Clause 4 includes definitions. Clauses 7 and 8 describe the application level protocol for proof transfer and the data format at the application level. These clauses will remain valid for future CEPS to DDCP connections that might use other transport media.

Clause 9 describes the SCSI transport medium as it is used for CEPS to DDCP communication in this International Standard, and clause 10 describes each of the SCSI commands as they are used to implement this International Standard.

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Graphic technology — Prepress digital data exchange — Online transfer from electronic prepress systems to colour hardcopy devices

1 Scope

This International Standard specifies the mechanical, electrical, protocol and data format characteristics to permit online transfer of digital colour proof data between colour Electronic Prepress Systems (CEPS) and Direct Digital Colour Proofing (DDCP) systems. The transfer protocol neither requires nor provides a mechanism to guarantee a sustained data rate. The mechanical and electrical characteristics and the transport level protocol make use of the Small Computer System Interface (SCSI).

This International Standard takes precedence if a conflict exists with respect to the standards indicated in clause 3.

2 Conformance

A DDES implementation shall be in conformance with this International Standard if it meets the requirements of clauses 6 through 10.

3 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 646:1991, *Information technology — ISO 7-bit coded character set for information interchange.*

ISO 9316:1989, *Information processing systems — Small Computer System Interface (SCSI).*

ISO 10755:1992, *Graphic technology — Prepress digital data exchange — Colour picture data on magnetic tape.*

ISO 10756:1994, *Graphic technology — Prepress digital data exchange — Colour line art data on magnetic tape.*

4 Definitions

For the purposes of this International Standard, the following definitions apply.

4.1 Digital Data Exchange Specification (DDES): A method of sharing digitally encoded information between cooperating systems.

4.2 decimal point notation: The expression of a decimal number in a numeric field as a string of numeric characters (ISO/IEC 646 positions 3/0 to 3/9), with optional decimal point (ISO/IEC 646 position 2/14 — full stop).

4.3 contone (colour picture) data: A rectangular array of picture elements ("pixels").

NOTE 1 A pixel is represented by a set of values corresponding to its colour components, and for a four-colour picture consists of four eight-bit bytes, representing cyan ("C"), magenta ("M"), yellow ("Y") and black ("K") process colours.

4.4 line art data: A rectangular array of picture elements ("pixels"), each of which holds one of a limited number of colours. The colours may be defined in a colour palette table, which specifies the values of the colour separation components for each entry in the palette.

NOTE 2 Line art data are generally characterized by having contiguous areas of many pixels of the same palette entry, and not simulating a greater range of colours by "dithering" or "error diffusion" techniques. The spatial information is therefore amenable to run length encoding techniques, which may reduce file size and allow for faster processing.

4.5 vendor-specific data: Data sent at the discretion of the vendor.

4.6 proof: A simulation or prototype of a graphic arts printed image.

4.7 Direct Digital Colour Proofer (DDCP): An output device capable of producing a proof directly from digital data.

4.8 image set: A logical grouping of data (contone picture data, line art data, vendor-specific data) used to create a rectangular area of a proof.

5 Symbols and abbreviations

The following symbols and abbreviations are used in this International Standard:

BP: Byte position within a label. For ease of use with ISO 9316, byte positions start with 0.

L: Length of field in number of byte positions.

SPACE or ƀ: The character coded in position 2/0 of ISO/IEC 646.

ZERO: The character coded in position 3/0 of ISO/IEC 646.

h: Hexadecimal numbers are identified by the digits 0 to 9 and the letters A to F followed by the lower case "h" (e.g. 3F6Ah).

6 General requirements

A proof shall be a single sheet of output medium and shall contain one or more image sets. Each image set shall cover a rectangular area with sides parallel to the edges of the media. No two image sets shall overlap.

Each image set shall contain at least one of the following data files: contone picture data file, line art data file or a vendor specific data file. No more than one of each type shall be included in an image set. When both a line art file and a picture file are present within an image set, the line art file shall take precedence (i.e. the transparency or opacity of the line art data will determine the visibility of the underlying picture data).

All files within an image set shall have identical placement, orientation, length of line and breadth of area (i.e. will overlay exactly).

Data transport between the CEPS and DDCP shall utilize ISO 9316 as defined within this International Standard. The application layer shall communicate with the transport layer via application level commands and data descriptors shall be used to transfer relevant information between the CEPS and DDCP.

7 Application level protocol for proof transfer

The application layer communicates with the transport layer via application level commands. These commands convey data attribute information by means of descriptors.

Twelve types of data descriptors are specified for proof transfer; seven are used to describe the information sent from the CEPS to the DDCP and five are used to describe the information sent from the DDCP to the CEPS.

The descriptors for transfer to the DDCP are Job Descriptor, Separation Descriptor, Image Set Descriptor, Contone Picture File Descriptor, Line Art File Descriptor, Vendor Specific File Descriptor and Set Device Feature Descriptor.

The descriptors for transfer from the DDCP are Job Status Response, Device Status Response, Device Capability Response, Current Feature Response and Error Response.

7.1 Application level commands

The following commands are specified for communication with the transport level: SEND JOB, STOP JOB, GET JOB STATUS, GET DEVICE STATUS, GET DEVICE CAPABILITY, SET DEVICE FEATURE, GET CURRENT FEATURE and REPORT STATUS.

The first five shall always be used and must be implemented. The last three shall be used to support the optional "spontaneous status report" feature.

The responses to commands shall either be GOOD or ERROR. If the response is GOOD, processing continues. If the response is ERROR, the error response data structure contains error information. The error response data structure is described in 8.12.

The manner in which the transport layer implements these application level commands is dependent on the particular transport medium used. A SCSI implementation is described in this International Standard.

7.1.1 SEND JOB

A job shall be started by sending the following information, in the order described, from the CEPS to the DDCP:

— Job Descriptor (8.1);

— the first Separation Descriptor (8.2);

— other separation descriptors;

— the first Image Set Descriptor (8.3);

— the first Contone Picture File Descriptor (8.4) and Contone Picture Data (if it exists);

— the first Line Art File Descriptor (8.5), colour table (8.5.1) and Line Art Data (if it exists);

— the first Vendor-specific File Descriptor (8.6) and Vendor Specific Data (if it exists);

— other image set descriptors, file descriptors and data.

EXAMPLE (Sample sequence of data transfer)

This example shows the order in which the descriptors and data are sent for a proof consisting of two image sets, the first containing both contone and line art data and the second containing contone data only.

- Job Descriptor
- Separation Descriptor (Sep. 1)
- Separation Descriptor (Sep. 2)
- Separation Descriptor (Sep. 3)
- Separation Descriptor (Sep. 4)
- Image Set Descriptor (Set 1)
  - Contone Picture File Descriptor
  - Contone Picture Data
  - Line Art File Descriptor
  - Colour Definition Table
  - Line Art Data
- Image Set Descriptor (Set 2)
- Contone Picture File Descriptor
- Contone Picture Data

7.1.2 STOP JOB

A job that is currently transferring data to or executing on the DDCP can be aborted by sending the STOP JOB command. The CEPS may send this command at any time.

7.1.3 GET JOB STATUS

The status of a job can be determined by sending the GET JOB STATUS command. The job status response data is described in 8.8.

7.1.4 GET DEVICE STATUS

The status of the DDCP device can be determined by sending the GET DEVICE STATUS command. The device status response data is described in 8.9.

7.1.5 GET DEVICE CAPABILITY

The capability of the DDCP device can be determined by sending the GET DEVICE CAPABILITY command. The device capability response data is described in 8.10.

7.1.6 SET DEVICE FEATURE

Selectable features of the DDCP can be set by sending the SET DEVICE FEATURE command. The Set Device Feature Descriptor is described in 8.7.

7.1.7 GET CURRENT FEATURE

The current status of selectable features of the DDCP can be determined by sending the GET CURRENT FEATURE command. The response is described in 8.11.

7.1.8 REPORT STATUS

The DDCP uses this optional command to spontaneously report the job status. The use of this feature shall be explicitly enabled by the CEPS (via the SET DEVICE FEATURE command) after determining that the capability is supported (via the GET DEVICE CAPABILITY command). The job status response data is described in 8.8.

7.2 Command sequence

A typical sequence of application level commands is shown in figure 1.

GET DEVICE CAPABILITY shall be used on "power-up" and optionally during systems operation to determine specific characteristics and capabilities of the device.

The normal sequence for passing data to a device shall begin with a GET DEVICE STATUS command. If the ERROR condition is returned, no further data will be sent until the condition has been cleared. If the status returned is GOOD, the SEND JOB command is sent. This process can then repeat for all jobs that need to be sent to the device. Optionally, the GET JOB STATUS command may be used to determine the status of a particular job by PROOF ID (see 8.1.2).

The STOP JOB command may be used to stop a job that is currently running. When this command is used, the device may continue until it reaches an acceptable stopping point.

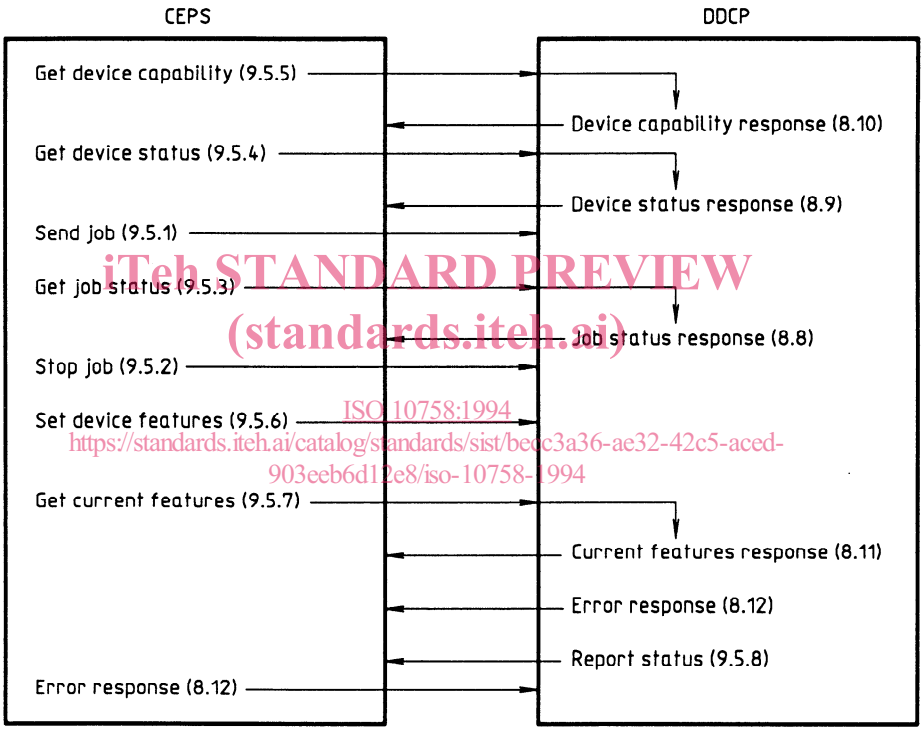

Figure 1 — Graphic arts device command sequence application level

8 Application level data formats for proof transfer

All values used in the descriptors shall be in ISO/IEC 646 representation. Numeric fields shall be right-aligned and ZERO padded, and alphanumeric fields shall be left-aligned and padded with SPACEs.

8.1 Job descriptor

There shall be one job descriptor for each job. The job descriptor shall be the first block of data sent for a job transfer from the CEPS. The job descriptor shall be 512 bytes in length. Table 1 gives byte position, field name, length in bytes, and contents for the job descriptor.

Table 1 — Job descriptor

BP	Field name	*L*	Content
00-05	job descriptor identifier	6	"JOBPRF"
06	compliance level	1	"1"
07-12	proof ID	6	
13-52	job name	40	
53-92	originating vendor name	40	
93-132	originating site name	40	
133	job type flag	1	"T" , "N" , "V"
134	output device type	1	"H"
135-138	number of proofs requested	4	
139-178	paper name	40	
179-218	ink set name	40	
219-224	vertical scaling factor (decimal point notation)	6	
225-230	horizontal scaling factor (decimal point notation)	6	
231-232	file disposition	2	
233-234	number of separations	2	
235-250	colour sequence	16	
251-254	value for 0 % dot	4	
255-258	value for 100 % dot	4	
259-260	format of contone data	2	
261-262	format of line art data	2	
263-264	number of image sets	2	
265-387	reserved for DDES use	123	
388-511	reserved for vendor use	124	

8.1.1 Compliance level

Compliance level specifies which version of this International Standard is used by the job. A value of "0" means no compliance is specified; a value of "1" means compliance with this edition of this International Standard.

8.1.2 Proof ID

Proof ID shall be a unique identifier assigned to each proof and is the primary reference to the proof. The CEPS is responsible for ensuring the uniqueness of this identifier in a multi-unit environment.

8.1.3 Job name

Job name shall be a string identifier associated with some logical collection of proofs.

8.1.4 Originating equipment vendor name and site name

Originating equipment vendor name and site name shall be provided for convenience.

8.1.5 Job type flag

Job type flag shall specify "N" for normal, "T" for test, and "V" for vendor-specific jobs. Zero shall be valid for "number of separations" and "number of image sets" only if the "job type flag" is not "N". For test pictures the DDCP may print the user data and include DDCP vendor defined test indicators.

8.1.6 Output device type

Output device type shall identify the type of proofing device. The only value currently defined is "H"; it means that data to be halftoned is provided to the proofing device, and hence, the Separation Descriptor information is meaningful. All other alphabetic characters are reserved for ISO use.

8.1.7 Number of proofs

The number of proofs shall be the number of copies to be printed.

8.1.8 Paper name and ink set name

Space shall be provided for the naming of the paper and ink set to be used. Valid names will be provided by the DDCP vendor.

8.1.9 Scaling factors

The vertical and horizontal scaling factors specify the desired scaling of the output image size as a percentage of the provided image size. Each field shall be 6 bytes in length and will range from 001,00 to 999,00 with resolution of 0,01. The value of 100,00 is the default value and its occurrence means that no resizing shall be required in that direction.

8.1.10 File disposition

File disposition will determine what to do with the data after it has been proofed. The default value shall be zero meaning that the data on the DDCP may be deleted; a value of one means that the data shall be saved. Use and disposition of saved data shall be a DDCP responsibility.

8.1.11 Number of separations

The number of separations shall be the number of individual colour separations. Valid entries in "number of colour separations", BP 233-234, are "01" for one colour to "16" for sixteen colours. The value "00" is valid if the job type flag is not "N"; it means there are no Separation Descriptors.

8.1.12 Colour sequence

The sequence of colours (up to 16 colours in a variety of sequences) shall be defined in BP 235-250. Valid entries in the "sequence of colour" field are, in any sequence:

"Y" "M" "C" "K"	— yellow, magenta, cyan and black inks.
"R" "G" "B"	— red, green, and blue light intensity.
"1" to "9"	— user definable colours or separations such as pink, varnish, etc.
"Q"	— no colour attributes implied.

Colour descriptors shall be contiguous, left-aligned and SPACE padded.

8.1.13 Colour values

The scaling of the colour values contained in the data shall be linear with respect to printing dot percentage. The bytes shall be unsigned and any values from 0 to 255 may be found. The relationship between byte values and