MO:DCA Reference (SC31-6802-07) Addendum 1 - Image Resolution Triplet

Date

August 12, 2008

Background:

Not all image formats specify their actual physical dimensions. The JFIF and GIF formats specify the number of pixels in the x and y directions, but not the resolution in the x and y directions. A presentation device that renders such a format then needs to make an assumption on the resolution which may or may not be correct. For example, a device may assume that the resolution of the image matches the device resolution. However, in that case a 600 pixel x 1200 pixel image would print as a 1 inch by 2 inch image on a 600 dpi printer, but as a 2 inch by 4 inch image on a 300 dpi printer. Or, a device may assume a fixed resolution for the image, such as 300 dpi. But in that case, if the image was created at 72 dpi, the printer will print the image at roughly 1/4 of the real size. Other image formats, like IOCA and TIFF, specify the native resolution and therefore allow an output device to render the image at the right size regardless of the resolution of the device.

Change Details:

The base document level used for the changes is the April, 2006 edition of the MO:DCA Reference, SC31-6802-07.

1. Add the following triplet to the "MO:DCA Triplets" chapter.

Image Resolution Triplet X'9A'

The Image Resolution triplet specifies the resolution of a raster image.

Triplet X'9A' Syntax

Offset	Type	Name	Range	Meaning	M/O	Exc
0	UBIN	Tlength	10	Length of the triplet, including Tlength	M	X'02'
1	CODE	Tid	X'9A'	Identifies the Image Resolution triplet	M	X'00'
2-3				Reserved; must be zero	M	X'06'
4	CODE	XBase	X'00'–X'01'	Unit base for image resolution in the X direction: **X'00'** 10 inches **X'01'** 10 centimeters	M	X'06'
5	CODE	YBase	X'00'–X'01'	Unit base for image resolution in the Y direction: **X'00'** 10 inches **X'01'** 10 centimeters	M	X'06'
6–7	UBIN	XResol	1–32767	Number of image points in X direction per X unit base	M	X'06'
8–9	UBIN	YResol	1–32767	Number of image points in Y direction per Y unit base	M	X'06'

Triplet X'9A' Semantics

Tlength Contains the length of the triplet.

Tid Identifies the Image Resolution triplet.

XBase Specifies the unit base for the image resolution in the X direction.

YBase Specifies the unit base for the image resolution in the Y direction.

Note: A X'01' exception condition exists if the XBase and YBase values are not identical.

XResol Specifies the resolution of the image in the X direction in number of image points per X-direction unit base.

YResol Specifies the resolution of the image in the Y direction in number of image points per Y-direction unit base.

Architecture Note: The presentation space size of a raster image, such as an image in TIFF format, is determined by two parameters - (1) the pixel count in the x and y directions, and (2) the resolution of the pixels in the x and y directions. The use of these two parameters when presenting an image depends on the mapping option that is in effect.

- When the mapping option is scale-to-fit or scale-to-fill, the pixel counts are sufficient since the intent is to scale the complete raster into the object area.

- When the mapping option is position, position-and-trim, or center-and-trim, both the pixel counts and the resolutions are needed to define the physical dimensions of the image, since the intent is to render a portion of the image at its native size into the object area.

Structured Fields Using Triplet X'9A'

- CDD
- IOB
- PPO

2. Allow the Image Resolution triplet on the Container Data Descriptor (CDD) structured field as an optional triplet that may occur once, as follows:

Triplets Appear in the Container Data Descriptor structured field as follows:

Triplet	Type	Usage
X'9A'	Image Resolution	Optional. May occur once. Specifies the resolution of the image for containers that carry a raster image object; ignored for all other object types. See page 2. This triplet overrides any resolution specified inside the image. If the resolution is not specified outside the image or inside the image, the default is to assume that the image resolution is the same as the output device resolution.

3. Allow the Image Resolution triplet on the Include Object (IOB) structured field as an optional triplet that may occur once, as follows:

Triplets Appear in the Include Object structured field as follows:

Triplet	Type	Usage
X'9A'	Image Resolution	Optional. May occur once for non-IOCA raster image object types defined by ObjType = X'92' - "other object data"; ignored for IOCA image objects and all other object types. Specifies the resolution of the raster image object. See page 2. The IOB triplet overrides any image resolution specified in the Data Object RAT, on the CDD, or inside the image. If the resolution is not specified outside the image or inside the image, the default is to assume that the image resolution is the same as the output device resolution.

4. Allow the Image Resolution triplet on the Preprocess Presentation Object (PPO) structured field as an optional triplet that may occur once, as follows:

Triplets Appear in the Preprocess Presentation Object structured field as follows:

Triplet	Type	Usage
X'9A'	Image Resolution	Optional. May occur once for non-IOCA raster image object types defined by ObjType = X'92' - "other object data"; ignored for IOCA image objects and all other object types. Specifies the resolution of the raster image object. See page 2. The PPO triplet overrides any image resolution specified on the CDD or inside the image. If the resolution is not specified outside the image or inside the image, the default is to assume that the image resolution is the same as the output device resolution.

5. Allow the image resolution to be specified in a Data Object (DO) RAT, defined in the "Resource Access Table (RAT)" appendix, by adding the following new table vector to the DO RAT. Changes to the table structure are marked with revision code "|".

Table Vector Definitions for Data Object Resources

Following are the table vectors defined for data object resources. The table vectors must appear in the order shown. Unless indicated otherwise, each table vector must occur once, regardless of whether its data parameter is specified or not. If a table vector contains no data, its length must be set to X'02' to indicate that the table vector data is not specified. This is also referred to as an empty table vector. Table vectors within a RAT repeating group must be compact. This means that for a table vector that can be repeated, all occurrences of the vector must specify valid content, that is, the vectors cannot be empty unless there is only one occurrence of that vector.

Offset	Type	Name	Range	Meaning	M/O
Data Object Resource Name; table vector must be specified only once					
0	UBIN	TVLngth	4–252; even values only	Table vector length	M
1	CODE	TVid	X'01'	Table vector identifier	M
2–251	CHAR	DORName		Name of the data object resource. This parameter must be specified.	M
Data Object Resource File Name; table vector must be specified only once					
0	UBIN	TVLngth	4–252; even values only	Table vector length	M
1	CODE	TVid	X'04'	Table vector identifier	M
2–251	CHAR	FileNme		File name with which the data object resource has been stored in the presentation system's resource library. The file name does not include path information. This parameter must be specified.	M
Data Object Resource Object OID; table vector must be specified only once					
0	UBIN	TVLngth	2 – 131	Table vector length; a length of 2 indicates the table vector data is not specified	M
1	CODE	TVid	X'08'	Table vector identifier	M
2 – (n-1)	CODE	ObjOID		The object OID that is assigned to the data object resource. The length of this parameter must reflect the length of the actual OID; padding bytes are not allowed. The object OID enables the data object resource to be captured and made resident in the printer.	O
Compacted Object File Name; table vector must be specified only once					
0	UBIN	TVLngth	2–252; even values only;	Table vector length; a length of 2 indicates the table vector data is not specified	M
1	CODE	TVid	X'14'	Table vector identifier	M

Offset	Type	Name	Range	Meaning	M/O
2–251	CHAR	FileNme		File name with which the compacted object has been stored in the presentation system's resource library. The file name does not include path information. This parameter is optional and is ignored if RGFlgs bit 5 = B'0'. This parameter must be specified if RGFlgs bit 5 = B'1'. **Implementation Note:** It is recommended that the file name of the compacted object, encoded in UTF-16BE, be formed by prepending the file name of the referenced data object with the character string ″iccr_″.	O
Compacted Object OID; table vector must be specified only once					
0	UBIN	TVLngth	2 – 131	Table vector length; a length of 2 indicates the table vector data is not specified	M
1	CODE	TVid	X'18'	Table vector identifier	M
2 – (n-1)	CODE	ObjOID		The object OID that is assigned to the compacted object. The length of this parameter must reflect the length of the actual OID; padding bytes are not allowed. The object OID enables the compacted object to be captured and made resident in the printer. This parameter is optional and is ignored if RGFlgs bit 5 = B'0'.	O
Data Object Rendering Intent; table vector must be specified only once					
0	UBIN	TVLngth	2, 10	Table vector length; a length of 2 indicates the table vector data is not specified	M
1	CODE	TVid	X'1C'	Table vector identifier	M
2–3				Reserved; must be set to zero.	O
4	CODE	IOCARI	X'00'-X'03', X'FF'	Rendering intent for IOCA objects: **X'00'** perceptual **X'01'** media-relative colorimetric **X'02'** saturation **X'03'** ICC-absolute colorimetric **X'FF'** not specified	O
5	CODE	OCARI	X'00'-X'03', X'FF'	Rendering intent for container (non-OCA) objects; code definitions same as for IOCARI	O
6–7				Reserved; must be set to zero	O
8–9				Reserved; must be set to zero.	O

Offset	Type	Name	Range	Meaning	M/O
CMR Name; table vector must be specified at least once and must be followed by a CMR Descriptor TV (TVid = X'28'); the TV pair may be repeated to specify multiple {CMR name + CMR processing mode} combinations					
0	UBIN	TVLngth	2, 148	Table vector length; a length of 2 indicates the table vector data is not specified	M
1	CODE	TVid	X'24'	Table vector identifier	M
2–147	CHAR	CMRName		Name of the CMR. This parameter must be specified if RGFlgs bit 1 = B'1'.	O
CMR Descriptor; table vector must be specified at least once and must follow the CMR Name TV (TVid = X'24'); the TV pair may be repeated to specify multiple {CMR name + CMR processing mode} combinations					
0	UBIN	TVLngth	2, 4	Table vector length; a length of 2 indicates the table vector data is not specified	M
1	CODE	TVid	X'28'	Table vector identifier	M
2	CODE	ProcMode	X'01',X'02'	CMR processing mode. This parameter must be specified if RGFlgs bit 1 = B'1'. **Value Meaning** **X'01'** process as audit CMR **X'02'** process as instruction CMR	O
3				Reserved; must be set to zero. This parameter must be specified if RGFlgs bit 1 = B'1'.	O
Image Resolution; table vector is optional and may be specified once for non-IOCA raster image objects; ignored if specified for other objects					
0	UBIN	TVLngth	2, 10	Table vector length; a length of 2 indicates the table vector data is not specified	M
1	CODE	TVid	X'30'	Table vector identifier	M
2–3				Reserved; must be set to zero.	O
4	CODE	XBase	X'00'-X'01'	Unit base for image resolution in the X direction: **X'00'** 10 inches **X'01'** 10 centimeters	O
5	CODE	YBase	X'00'-X'01'	Unit base for image resolution in the Y direction; must be the same as XBase: **X'00'** 10 inches **X'01'** 10 centimeters	O
6-7	UBIN	XResol	1-32767	Number of image points in X direction per X unit base	O
8-9	UBIN	YResol	1-32767	Number of image points in Y direction per Y unit base	O

Table Notes:

1. The resolution specified in the Image Resolution TV overrides any raster image resolution specified on the CDD in the OEG of the image object or inside the image.