TIFF-FX IMPLEMENTATION REPORT

This report describes the implementation and interoperability testing of TIFF-FX, specified in RFC 2301, the Proposed Standard File Format for Internet Fax <ftp://ftp.isi.edu/in-notes/rfc2301.txt>.

The following independently implemented and jointly tested the TIFF-FX profiles listed, and furnished the data for this report:

- Japan Color Document Committee - All profiles
  - Matsushita Graphic Communication Systems
  - Toshiba TEC
  - Sharp
  - NTT Printec
  - Mitsubishi
  - Fuji Xerox
  - Waseda University
- Genoa Technology - All profiles
- Xerox - All profiles
- Intel - All profiles, except L
- Image Power - All profiles, except L and M

This report is organized in 2 sections. Section 1 describes the results of TIFF-FX interoperability testing. Section 2 describes the independent TIFF-FX implementations, by implementor.

Each description includes a series of tables. The first is a general table that lists the TIFF-FX fields, field values and features used by multiple profiles. Following it are tables, one for each implemented profile, that list the TIFF-FX fields and features that either can have multiple values or are optional in that profile.

This report was compiled by Rob Buckley <rbuckley@crt.xerox.com>.

SECTION 1: TIFF-FX INTEROPERABILITY TESTING

To facilitate interoperability testing, a standard set of test cases was specified that exercised all "features and options" of TIFF-FX, per RFC 2026. The test methodology was: generate TIFF-FX files corresponding to these test cases by converting uncompressed TIFF 6.0 source images to TIFF-FX file, exchange the resulting files by e-mail, then read the TIFF-FX files and convert them to uncompressed TIFF 6.0 images for visual checking and comparison with the original source images. For Profile M, both merged and layer source images were available. A subset of the TIFF-FX test files used for interoperability testing will be available soon at <http://www.xerox.com/research/xac/tiff-fx/index.htm>.

In addition, Genoa Technology made available a pre-release version of its TIFF Test System for interoperability testing. The TIFF Test System includes a listing utility, image viewer and file validator.

Intel, Genoa Technology and Xerox demonstrated interoperability for TIFF-FX Profiles J, C and M at the IMC Fax Connect 1 Workshop, December 1-2, 1998 in San Jose, CA. They and other workshop participants also demonstrated interoperability for Profiles S and F. For the final report

on the workshop, see <http://www.imc.org/fc1-final.html>.

The interoperability results are based on testing between at least 2 independent implementations. Fields and features listed as implemented by the Reader were verified with TIFF-FX files created by an independent writer. Fields and features implemented in the Writer were verified by an independent reader, using visual checks (view and print) and, in the case of lossless compression, by pixel comparisons of the original and decompressed source images.

General - apply to multiple profiles

Field/Feature	Writer	Reader
ByteOrder	II, MM	II, MM
DateTime*	Y	Y
FillOrder	1, 2	1, 2
ImageDescription*	Y	Y
ImageWidth	A4/Letter, A3, B4	A4/Letter, A3, B4
NewSubFileType	2, 16, 18	2, 16, 18
Multi-page file	Y	Y
Resolution: b&w		
ResolutionUnit=2	Y	Y
XResolution	200/204,300,400/408	200/204,300,400/408
YResolution	196/200,300,391/400	196/200,300,391/400
ResolutionUnit=3	Y	Y
XResolution	80, 160	80, 160
YResolution	77, 154	77, 154
Resolution: color	100, 200, 300, 400	100, 200, 300, 400
Orientation*	Y	Y
Software*	Y	Y
DocumentName*	Y	Y
PageNumber	Y	Y
GlobalParametersIFD*	Y	Y
CodingMethod*	Y	Y
FaxProfile*	Y	Y
ProfileType*	Y	Y
VersionYear*	Y	Y

Y=Yes, N=No, *=optional field; All profiles use ImageLength, RowsPerStrip, StripByteCounts, StripOffsets

Profile S

Field/Feature	Writer	Reader
ResolutionUnit=2	Y	Y
XResolution	200/204	200/204
YResolution	98/100, 196/200	98/100, 196/200
T4Options	0, 4	0, 4

For all Profile S: ResolutionUnit=2, BitsPerSample=1, Compression=3 SamplesPerPixel=1, FillOrder=2,

Profile F

Field/Feature	Writer	Reader

Compression	3, 4	3, 4
PhotometricInterpretation	0, 1	0, 1
ResolutionUnit	2, 3	2, 3
T4Options	0, 1, 4, 5	0, 1, 4, 5
T6Options	Y	Y
StripOffsets	single, multiple	single, multiple
BadFaxLines	Y	Y
CleanFaxLines	Y	Y
ConsecutiveFaxLines	Y	Y

For all Profile F: BitsPerSample=1, SamplesPerPixel=1

Profile J

Field/Feature	Writer	Reader
PhotometricInterpretation	0, 1	0, 1
ResolutionUnit	2, 3	2, 3

For all Profile J: BitsPerSample=1, SamplesPerPixel=1, Compression=9

Profile C

Field/Feature	Writer	Reader
BitsPerSample	8	8
SamplesPerPixel	1, 3	1, 3
ChromaSubsamping	(1, 1), (2, 2)	(1, 1), (2, 2)
Decode	Y	Y

For all Profile C: ResolutionUnit=2, PhotometricInterpretation=10, Compression=7, ChromaPositioning=1

Profile L

Field/Feature	Writer	Reader
1-bit RGB	Y	Y
1-bit CMY	Y	Y
1-bit CMYK	Y	Y
ITULAB	Y	Y
BitsPerSample	4, 8	4, 8
SamplesPerPixel	1, 3	1, 3
Decode	Y	Y
Indexed (Palette)	Y	Y
BitsPerSample	8	8

For all Profile L: ResolutionUnit=2, Compression=10
- 1-bit RGB: BitsPerSample=1, SamplesPerPixel=3, PhotometricInt=2
- 1-bit CMY: BitsPerSample=1, SamplesPerPixel=3, PhotometricInt=5
- 1-bit CMYK: BitsPerSample=1, SamplesPerPixel=4, PhotometricInt=5
- ITULAB: PhotometricInterpretation=10
- Indexed: Indexed=1, SamplesPerPixel=1, PhotometricInt=10

Profile M

Field/Feature	Writer	Reader
Number of layers	1, 2, 3	1, 2, 3
Mixed Resolutions	Y	Y
ImageLayer	Y	Y
ModeNumber*	Y	Y
Foreground/Background	Y	Y
Compression	7, 10	7, 10
Mixed color spaces	Y	Y
XResolution,YResolution	100, 200, 300, 400	100, 200, 300, 400
Decode	Y	Y
XPosition, YPosition	Y	Y
DefaultImageColor	Y	Y
As Primary IFD	Y	Y
Mask	Y	Y
Compression	3, 4, 9	3, 4, 9
XResolution,YResolution	100, 200, 300, 400	100, 200, 300, 400
T4Options	Y	Y
T6Options	Y	Y
StripRowCounts	Y	Y

For all Profile M: ResolutionUnit=2, Mask:PhotometricInterpretation=0
Mask uses SubIFDs field to point to Foreground/Background
Mixed Resolutions means Mask & Foreground/Background have different resolutons, Mixed Color Spaces means Foreground and Background have different PhotometricInterpretation values.

SECTION 2: TIFF-FX IMPLEMENTATIONS

Japan Color Document Committee

Japan Color Document Committee Implementor No. 1
Name of implementation: MGCS TIFF-FX reader/writer
Organization: Matsushita Graphic Communication Systems Inc.
Platform: Windows 95/98/NT
Origin of code: All original source code
Location of code: proprietary to MGCS Inc.
Contact: Yoshinori Aoki <aoki@rdmg.mgcs.mei.co.jp>
Sub-implementor: Sharp (operation only)
Platform: Windows 95
Contact: Hideaki Yamada <yamada@trl.mkhar.sharp.co.jp>
Sub-implementor: Toshiba TEC Corp. (operation only)
Platform: Windows 95
Contact: Ryuji Iwazaki <iwa@rdl.toshibatec.co.jp>
Profiles implemented: S, F, J
Fields/Features tested:

General - apply to multiple profiles

Field/Feature	Writer	Reader
ByteOrder	II	II, MM
DateTime	N	-
FillOrder	1, 2	1, 2
ImageDescription	N	-

ImageWidth	A4/Letter, A3, B4	A4/Letter, A3, B4
NewSubFileType	2	2
Multi-page file	Y	Y
Resolution: b&w		
ResolutionUnit=2	Y	Y
XResolution	200/204,300,400/408	200/204,300,400/408
YResolution	196/200,300,391/400	196/200,300,391/400
ResolutionUnit=3	N	-
XResolution	-	-
YResolution	-	-
Resolution: color	-	-
Orientation	N	-
Software	N	-
DocumentName	N	-
PageNumber	Y	Y
GlobalParametersIFD	N	-
CodingMethod	N	-
FaxProfile	N	-
ProfileType	N	-
VersionYear	N	-

Profile S

Field/Feature	Writer	Reader
ResolutionUnit=2	Y	Y
XResolution	200/204	200/204
YResolution	98/100, 196/200	98/100, 196/200
T4Options	0, 4	0, 4

Profile F

Field/Feature	Writer	Reader
Compression	3, 4	3, 4
PhotometricInterpretation	0	0
T4Options	0, 1, 4, 5	0, 1, 4, 5
T6Options	Y	Y
StripOffsets	single	single, multiple
BadFaxLines	N	-
CleanFaxLines	N	-
ConsecutiveFaxLines	N	-

Profile J

Field/Feature	Writer	Reader
PhotometricInterpretation	0	0
ResolutionUnit	2	2

Japan Color Document Committee, Implementor No. 2
Name of implementation: Toshiba TEC TIFF-FX reader/writer

Organization: Toshiba TEC Corp.
Platform: Windows 95
Origin of code: Internal interface architecture with Independent JPEG Group public source code and image processing algorithms implemented from scratch
Location of code: proprietary to Toshiba TEC
Contact: Ryuji Iwazaki <iwa@rdl.toshibatec.co.jp>
Profiles implemented: C
Fields/Features tested:

General - apply to multiple profiles

Field/Feature	Writer	Reader
ByteOrder	II	II
DateTime	N	-
FillOrder	1, 2	1, 2
ImageDescription	N	-
ImageWidth	A4/Letter, A3, B4	A4/Letter, A3, B4
NewSubFileType	2	2
Multi-page file	Y	Y
Resolution: b&w	-	-
Resolution: color	100, 200, 300, 400	100, 200, 300, 400
Orientation	Y	Y
Software	N	-
DocumentName	N	-
PageNumber	Y	Y
GlobalParametersIFD	Y	Y
CodingMethod	Y	Y
FaxProfile	Y	Y
ProfileType	Y	Y
VersionYear	Y	Y

Profile C

Field/Feature	Writer	Reader
BitsPerSample	8	8
SamplesPerPixel	1, 3	1, 3
ChromaSubsamping	(1, 1), (2, 2)	(1, 1), (2, 2)
Decode	Y	Y

Japan Color Document Committee, Implementor No. 3
Name of implementation: NTT Printec TIFF-FX Profile L reader/writer
Organization: NTT Printec Corp.
Platform: Unix - Sun Solaris 2.4
Origin of code: JBIG codec (s1r4) for color facsimile test from AT&T
Location of code: proprietary to NTT Printec Corp.
Contact: Makoto Matsuki <mmatsuki@printec.gnet.or.jp>
Sub-implementor: Mitsubishi (operation only)
Platform: Unix - Sun OS 4.1.4
Contact: Fumitaka Ono <ono@isl.melco.co.jp>
Profiles implemented: L

Fields/Features tested:

General - apply to multiple profiles

Field/Feature	Writer	Reader
ByteOrder	II	II, MM
DateTime	Y	Y
FillOrder	1	1
ImageDescription	Y	Y
ImageWidth	A4/Letter, A3, B4	A4/Letter, A3, B4
NewSubFileType	2	2
Multi-page file	Y	Y
Resolution: b&w	-	-
Resolution: color	100, 200, 300, 400	100, 200, 300, 400
Orientation	N	N
Software	Y	Y
DocumentName	Y	Y
PageNumber	Y	Y
GlobalParametersIFD	Y	Y
CodingMethod	Y	Y
FaxProfile	Y	Y
ProfileType	Y	Y
VersionYear	Y	Y

Profile L

Field/Feature	Writer	Reader
1-bit RGB	Y	Y
1-bit CMY	Y	Y
1-bit CMYK	Y	Y
ITULAB	Y	Y
BitsPerSample	2-8	2-8
SamplesPerPixel	1, 3	1, 3
Decode	Y	Y
Indexed (Palette)	Y	Y
BitsPerSample	2-12	2-12

Japan Color Document Committee, Implementor No. 4
Name of implementation: Fuji_Xerox TIFF-FX reader/writer
Organization: Fuji Xerox Co. Ltd.
Platform: Unix - Sun Solaris 2.5.1
Origin of code: Internal interface architecture with Independent JPEG Group public source code, libtiff src code for general I/O formatting, Markus Kuhn free JBIG library, and image processing algorithms implemented from publication
Location of code: proprietary to Fuji Xerox
Contact: Hiroaki Ikegami <Hiroaki.Ikegami@fujixerox.co.jp>
  Sub-implementor: Waseda University (M operation only)
  Platform: Unix - Sun Solaris 2.6
  Contact: Hiroyuki Kasai <kasai@tom.waseda.ac.jp>
Profiles implemented: All - S, F, J, C, L, M

Fields/Features tested:

General - apply to multiple profiles

Field/Feature	Writer	Reader
ByteOrder	II, MM	II, MM
DateTime	Y	Y
FillOrder	1, 2	1, 2
ImageDescription	Y	Y
ImageWidth	A4/Letter, A3, B4	A4/Letter, A3, B4
NewSubFileType	2, 16, 18	2, 16, 18
Multi-page file	Y	Y
Resolution: b&w		
ResolutionUnit=2	Y	Y
XResolution	200/204,300,400/408	200/204,300,400/408
YResolution	196/200,300,391/400	196/200,300,391/400
ResolutionUnit=3	Y	Y
XResolution	80, 160	80, 160
YResolution	77, 154	77, 154
Resolution: color	100, 200, 300, 400	100, 200, 300, 400
Orientation	Y	Y
Software	Y	Y
DocumentName	Y	Y
PageNumber	Y	Y
GlobalParametersIFD	Y	Y
CodingMethod	Y	Y
FaxProfile	Y	Y
ProfileType	Y	Y
VersionYear	Y	Y

Profile S

Field/Feature	Writer	Reader
ResolutionUnit=2	Y	Y
XResolution	200/204	200/204
YResolution	98/100, 196/200	98/100, 196/200
T4Options	0, 4	0, 4

Profile F

Field/Feature	Writer	Reader
Compression	3, 4	3, 4
PhotometricInterpretation	0, 1	0, 1
ResolutionUnit	2, 3	2, 3
T4Options	0, 1, 4, 5	0, 1, 4, 5
T6Options	Y	Y
StripOffsets	single, multiple	single, multiple
BadFaxLines	Y	Y
CleanFaxLines	Y	Y
ConsecutiveFaxLines	Y	Y

Profile J

Field/Feature	Writer	Reader
PhotometricInterpretation	0, 1	0, 1
ResolutionUnit	2, 3	2, 3

Profile C

Field/Feature	Writer	Reader
BitsPerSample	8	8
SamplesPerPixel	1, 3	1, 3
ChromaSubsamping	(1, 1), (2, 2)	(1, 1), (2, 2)
Decode	Y	Y

Profile L

Field/Feature	Writer	Reader
1-bit RGB	Y	Y
1-bit CMY	Y	Y
1-bit CMYK	Y	Y
ITULAB	Y	Y
BitsPerSample	2-8, 12	2-8, 12
SamplesPerPixel	1, 3	1, 3
Decode	Y	Y
Indexed (Palette)	Y	Y
BitsPerSample	2-8, 12	2-8, 12

Profile M

Field/Feature	Writer	Reader
Number of layers	1, 2, 3	1, 2, 3
Mixed Resolutions	Y	Y
ImageLayer	Y	Y
ModeNumber	Y	Y
Foreground/Background	Y	Y
Compression	7, 10	7, 10
PhotometricInterpret.	2, 10	2, 10
Mixed color spaces	Y	Y
XResolution,YResolution	100, 200, 300, 400	100, 200, 300, 400
Decode	Y	Y
XPosition, YPosition	Y	Y
DefaultImageColor	Y	Y
As Primary IFD	Y	Y
Mask	Y	Y
Compression	3, 4, 9	3, 4, 9
XResolution,YResolution	100, 200, 300, 400	100, 200, 300, 400
T4Options	Y	Y
T6Options	Y	Y
StripRowCounts	Y	Y

Genoa Technology

Name of implementation: TIFF Test System
Organization: Genoa Technology
Platform: Windows 95/98/NT4.0
Origin of code: Internal interface architecture with Independent JPEG Group public source code, personalized src code for general I/O formatting, Markus Kuhn free JBIG library, and image processing algorithms implemented with LeadTools 6.0
Location of code: proprietary to Genoa Technology
Contact: Teodor Ceausu <tceausu@gentech.com>
Profiles implemented: All - S, F, J, C, L, M
Fields/Features tested:

General - apply to multiple profiles

Field/Feature	Writer	Reader
ByteOrder	II, MM	II, MM
DateTime	Y	Y
FillOrder	1, 2	1, 2
ImageDescription	Y	Y
ImageWidth	A4/Letter, A3, B4	A4/Letter, A3, B4
NewSubFileType	2, 16, 18	2, 16, 18
Multi-page file	Y	Y
Resolution: b&w		
ResolutionUnit=2	Y	Y
XResolution	200/204,300,400/408	200/204,300,400/408
YResolution	196/200,300,391/400	196/200,300,391/400
ResolutionUnit=3	Y	Y
XResolution	80, 160	80, 160
YResolution	77, 154	77, 154
Resolution: color	100, 200, 300, 400	100, 200, 300, 400
Orientation	Y	Y
Software	Y	Y
DocumentName	Y	Y
PageNumber	Y	Y
GlobalParametersIFD	Y	Y
CodingMethod	Y	Y
FaxProfile	Y	Y
ProfileType	Y	Y
VersionYear	Y	Y

Profile S

Field/Feature	Writer	Reader
ResolutionUnit=2	Y	Y
XResolution	200/204	200/204
YResolution	98/100, 196/200	98/100, 196/200
T4Options	0, 4	0, 4

Profile F

Field/Feature	Writer	Reader
Compression	3, 4	3, 4
PhotometricInterpretation	0, 1	0, 1
ResolutionUnit	2, 3	2, 3
T4Options	0, 1, 4, 5	0, 1, 4, 5
T6Options	Y	Y
StripOffsets	single, multiple	single, multiple
BadFaxLines	Y	Y
CleanFaxLines	Y	Y
ConsecutiveFaxLines	Y	Y

Profile J

Field/Feature	Writer	Reader
PhotometricInterpretation	0, 1	0, 1
ResolutionUnit	2, 3	2, 3

Profile C

Field/Feature	Writer	Reader
BitsPerSample	8	8
SamplesPerPixel	1, 3	1, 3
ChromaSubsamping	(1, 1), (2, 2)	(1, 1), (2, 2)
Decode	Y	Y

Profile L

Field/Feature	Writer	Reader
1-bit RGB	Y	Y
1-bit CMY	Y	Y
1-bit CMYK	Y	Y
ITULAB	Y	Y
BitsPerSample	4, 8, 12	4, 8, 12
SamplesPerPixel	1, 3	1, 3
Decode	Y	Y
Indexed (Palette)	Y	Y
BitsPerSample	8	8

Profile M

Field/Feature	Writer	Reader
Number of layers	1, 2, 3	1, 2, 3
Mixed Resolutions	Y	Y
ImageLayer	Y	Y
ModeNumber	Y	Y

Foreground/Background	Y	Y
Compression	7, 10	7, 10
PhotometricInterpret.	2, 5, 10	2, 5, 10
Mixed color spaces	Y	Y
XResolution,YResolution	100, 200, 300, 400	100, 200, 300, 400
Decode	Y	Y
XPosition, YPosition	Y	Y
DefaultImageColor	Y	Y
As Primary IFD	Y	Y
Mask	Y	Y
Compression	3, 4, 9	3, 4, 9
XResolution,YResolution	100, 200, 300, 400	100, 200, 300, 400
T4Options	Y	Y
T6Options	Y	Y
StripRowCounts	Y	Y

Xerox

Name of implementation: Valen TIFF-X reader/writer
Organization: Xerox Corp.
Platform: Unix - Sun Solaris 2.6
Origin of code: Internal interface architecture with Independent JPEG Group public source code, libtiff src code for general I/O formatting, Markus Kuhn free JBIG library, and image processing algorithms implemented from publication
Location of code: proprietary to Xerox
Contact: Rob Buckley <rbuckley@crt.xerox.com>
Profiles implemented: All - S, F, J, C, L, M
Fields/Features tested:

General - apply to multiple profiles

Field/Feature	Writer	Reader
ByteOrder	II, MM	II, MM
DateTime	N	N
FillOrder	1, 2	1, 2
ImageDescription	Y	Y
ImageWidth	A4/Letter, A3, B4	A4/Letter, A3, B4
NewSubFileType	2, 16, 18	2, 16, 18
Multi-page file	Y	Y
Resolution: b&w		
ResolutionUnit=2	Y	Y
XResolution	200/204,300,400/408	200/204,300,400/408
YResolution	196/200,300,391/400	196/200,300,391/400
ResolutionUnit=3	Y	Y
XResolution	80, 160	80, 160
YResolution	77, 154	77, 154
Resolution: color	100, 200, 300, 400	100, 200, 300, 400
Orientation	Y	Y
Software	Y	Y
DocumentName	Y	Y
PageNumber	Y	Y

GlobalParametersIFD	Y	Y
CodingMethod	Y	Y
FaxProfile	Y	Y
ProfileType	Y	Y
VersionYear	Y	Y

Profile S

Field/Feature	Writer	Reader
ResolutionUnit=2	Y	Y
XResolution	200/204	200/204
YResolution	98/100, 196/200	98/100, 196/200
T4Options	0, 4	0, 4

Profile F

Field/Feature	Writer	Reader
Compression	3, 4	3, 4
PhotometricInterpretation	0, 1	0, 1
ResolutionUnit	2, 3	2, 3
T4Options	0, 1, 4, 5	0, 1, 4, 5
T6Options	Y	Y
StripOffsets	single, multiple	single, multiple
BadFaxLines	Y	Y
CleanFaxLines	Y	Y
ConsecutiveFaxLines	Y	Y

Profile J

Field/Feature	Writer	Reader
PhotometricInterpretation	0	0, 1
ResolutionUnit	2, 3	2, 3

Profile C

Field/Feature	Writer	Reader
BitsPerSample	8	8
SamplesPerPixel	1, 3	1, 3
ChromaSubsamping	(1, 1), (2, 2)	(1, 1), (2, 2)
Decode	Y	Y

Profile L

Field/Feature	Writer	Reader
1-bit RGB	Y	Y
1-bit CMY	Y	Y
1-bit CMYK	Y	Y

ITULAB	Y	Y
BitsPerSample	4, 8	4, 8
SamplesPerPixel	1, 3	1, 3
Decode	Y	Y
Indexed (Palette)	Y	Y
BitsPerSample	8	8

Profile M

Field/Feature	Writer	Reader
Number of layers	1, 2, 3	1, 2, 3
Mixed Resolutions	Y	Y
ImageLayer	Y	Y
ModeNumber	Y	Y
Foreground/Background	Y	Y
Compression	7, 10	7, 10
PhotometricInterpret.	2, 10	2, 10
Mixed color spaces	Y	Y
XResolution,YResolution	100, 200, 300, 400	100, 200, 300, 400
Decode	Y	Y
XPosition, YPosition	Y	Y
DefaultImageColor	Y	Y
As Primary IFD	Y	Y
Mask	Y	Y
Compression	3, 4, 9	3, 4, 9
XResolution,YResolution	100, 200, 300, 400	100, 200, 300, 400
T4Options	Y	Y
T6Options	Y	Y
StripRowCounts	Y	Y

Intel

Name of implementation: Intel Corporation Tiff-Fx reader-writer
Organization: Intel Corporation
Platform: Windows 95/98/NT
Origin of code: Internal interface architecture with Independent JPEG Group public source code, code for general I/O formatting, Markus Kuhn free JBIG library, and image processing algorithms implemented from publication
Location of code: proprietary to Intel
Contact: Bradley Benham <bradley.benham@intel.com>
Profiles implemented: S, F, J, C, M
Fields/Features tested:

General - apply to multiple profiles

Field/Feature	Writer	Reader
ByteOrder	II, MM	II, MM
DateTime	N	N
FillOrder	1, 2	1, 2

ImageDescription	N	N
ImageWidth	A4/Letter, A3, B4	A4/Letter, A3, B4
NewSubFileType	2, 16, 18	2, 16, 18
Multi-page file	Y	Y
Resolution: b&w		
ResolutionUnit=2	Y	Y
XResolution	200/204,300,400/408	200/204,300,400/408
YResolution	196/200,300,391/400	196/200,300,391/400
ResolutionUnit=3	Y	Y
XResolution	80, 160	80, 160
YResolution	77, 154	77, 154
Resolution: color	100, 200, 300, 400	100, 200, 300, 400
Orientation	N	N
Software	N	N
DocumentName	N	N
PageNumber	Y	Y
GlobalParametersIFD	Y	Y
CodingMethod	Y - fixed value	Y - fixed value
FaxProfile	Y - fixed value	Y - fixed value
ProfileType	Y - fixed value	Y - fixed value
VersionYear	Y - fixed value	Y - fixed value

Profile S

Field/Feature	Writer	Reader
ResolutionUnit=2	Y	Y
XResolution	200/204	200/204
YResolution	98/100, 196/200	98/100, 196/200
T4Options	0, 4	0, 4

Profile F

Field/Feature	Writer	Reader
Compression	3, 4	3, 4
PhotometricInterpretation	0, 1	0, 1
ResolutionUnit	2	2
T4Options	0, 1, 4, 5	0, 1, 4, 5
T6Options	Y	Y
StripOffsets	single, multiple	single, multiple
BadFaxLines	N	N
CleanFaxLines	N	N
ConsecutiveFaxLines	N	N

Profile J

Field/Feature	Writer	Reader
PhotometricInterpretation	0, 1	0, 1
ResolutionUnit	2	2

Profile C

Field/Feature	Writer	Reader
BitsPerSample	8	8
SamplesPerPixel	1, 3	1, 3
ChromaSubsamping	(1, 1), (2, 2)	(1, 1), (2, 2)
Decode	N	N

Profile M

Field/Feature	Writer	Reader
Number of layers	1, 2, 3	1, 2, 3
Mixed Resolutions	Y	Y
ImageLayer	Y	Y
ModeNumber	Y	Y
Foreground/Background	Y	Y
Compression	7	7
PhotometricInterpret.	10	10
Mixed color spaces	N	N
XResolution,YResolution	100, 200, 300, 400	100, 200, 300, 400
Decode	N	N
XPosition, YPosition	Y	Y
DefaultImageColor	Y	Y
As Primary IFD	Y	Y
Mask	Y	Y
Compression	3, 4	3, 4
XResolution,YResolution	100, 200, 300, 400	100, 200, 300, 400
T4Options	Y	Y
T6Options	Y	Y
StripRowCounts	Y	Y

Image Power

Name of implementation: Image Power TIFF-FX reader-writer
Organization: Image Power, Inc.
Platform: Windows 95/NT
Origin of code: Extension to Image Power's Power SDK 1.1 to support TIFF-FX features, using libtiff for basic TIFF support and jbigkit for JBIG support
Location of code: proprietary for Power SDK, other components available on the Internet
Contact: Stephen Swift <sswift@imagepower.com>
Profiles implemented: S, F, J, C
Fields/Features tested:

General - apply to multiple profiles

Field/Feature	Writer	Reader
ByteOrder	II	II
DateTime	N	N
FillOrder	2	2

ImageDescription	N	N
ImageWidth	A4/Letter, A3, B4	A4/Letter, A3, B4
NewSubFileType	2	2
Multi-page file	Y	Y
Resolution: b&w		
ResolutionUnit=2	Y	Y
XResolution	200/204,300,400/408	200/204,300,400/408
YResolution	196/200,300,391/400	196/200,300,391/400
ResolutionUnit=3	N	N
XResolution	-	-
YResolution	-	-
Resolution: color	100, 200	100, 200
Orientation	N	N
Software	N	N
DocumentName	N	N
PageNumber	Y	Y
GlobalParametersIFD	N	N
CodingMethod	N	N
FaxProfile	Y	Y
ProfileType	Y	Y
VersionYear	N	N

Profile S

Field/Feature	Writer	Reader
ResolutionUnit=2	Y	Y
XResolution	200/204	200/204
YResolution	98/100, 196/200	98/100, 196/200
T4Options	0, 4	0, 4

Profile F

Field/Feature	Writer	Reader
Compression	3, 4	3, 4
PhotometricInterpretation	0, 1	0, 1
ResolutionUnit	2	2
T4Options	0, 1, 4, 5	0, 1, 4, 5
T6Options	Y	Y
StripOffsets	single	single, multiple
BadFaxLines	N	N
CleanFaxLines	N	N
ConsecutiveFaxLines	N	N

Profile J

Field/Feature	Writer	Reader
PhotometricInterpretation	1	1
ResolutionUnit	2	2

Profile C

Field/Feature	Writer	Reader
BitsPerSample	8	8
SamplesPerPixel	1, 3	1, 3
ChromaSubsamping	(1, 1), (2, 2)	(1, 1), (2, 2)
Decode	N	N