ITUPublications
Recommendations

International Telecommunication Union
Standardization Sector

Recommendation

ITU-T T.86 (V2) (02/2024)

SERIES T: Terminals for telematic services

Still-image compression – JPEG-1, Bi-level and JBIG

Information technology – Digital compression and coding of continuous-tone still images: APPn markers

ITU-T T-SERIES RECOMMENDATIONS

Terminals for telematic services

Facsimile – Framework	T.0-T.19
Still-image compression – Test charts	T.20-T.29
Facsimile – Group 3 protocols	T.30-T.39
Colour representation	T.40-T.49
Character coding	T.50-T.59
Facsimile – Group 4 protocols	T.60-T.69
Telematic services – Framework	T.70-T.79
Still-image compression – JPEG-1, Bi-level and JBIG	**T.80-T.89**
Telematic services – ISDN Terminals and protocols	T.90-T.99
Videotext – Framework	T.100-T.109
Data protocols for multimedia conferencing	T.120-T.149
Telewriting	T.150-T.159
Multimedia and hypermedia framework	T.170-T.189
Cooperative document handling	T.190-T.199
Telematic services – Interworking	T.300-T.399
Open document architecture	T.400-T.429
Document transfer and manipulation	T.430-T.449
Document application profile	T.500-T.509
Communication application profile	T.510-T.559
Telematic services – Equipment characteristics	T.560-T.619
General multimedia application frameworks	T.620-T.649
User interfaces - Accessibility and human factors	T.700-T.799
Still-image compression – JPEG 2000	T.800-T.829
Still-image compression | JPEG XR	T.830-T.849
Still-image compression – JPEG-1 extensions	T.850-T.899

For further details, please refer to the list of ITU-T Recommendations.

INTERNATIONAL STANDARD ISO/IEC 10918-4
RECOMMENDATION ITU-T T.86 (V2)

Information technology – Digital compression and coding of continuous-tone still images: APPn markers

Summary

This Recommendation | International Standard provides definitions for JPEG application specific markers (APPn) found in Rec. ITU-T T.81 | ISO/IEC 10918-1 and Rec. ITU-T T.84 | ISO/IEC 10918-3.

This second edition integrates the provisions of Amendment 1 of ITU-T T.86 (2012) | ISO/IEC 10918-4 (2013) and cancels the provisions concerning the registration authority processes originally defined in the first edition.

ITU-T T.86 is a common text with ISO/IEC 10918-4.

History *

Edition	Recommendation	Approval	Study Group	Unique ID
1.0	ITU-T T.86	1998-06-18	8	11.1002/1000/4394
1.1	ITU-T T.86 (1998) Amd. 1	2012-06-29	16	11.1002/1000/11677
2.0	ITU-T T.86 (V2)	2024-02-13	16	11.1002/1000/15849

Keywords

Application specific markers, coding, compression, continuous-tone still images, JPEG.

* To access the Recommendation, type the URL https://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents/software copyrights, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the appropriate ITU-T databases available via the ITU-T website at http://www.itu.int/ITU-T/ipr/.

CONTENTS

INTERNATIONAL STANDARD
ITU-T RECOMMENDATION

Information technology – Digital compression and coding of continuous-tone still images: APPn markers

1 Scope

This Recommendation | International Standard provides definitions for JPEG application specific markers found in Rec. ITU-T T.81 | ISO/IEC 10918-1 and Rec. ITU-T T.84 | ISO/IEC 10918-3.

2 Normative references

The following Recommendations and International Standards contain provisions which, through references in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical ITU-T Recommendations | International Standards

- Recommendation ITU-T T.81 | ISO/IEC 10918-1, *Information technology – Digital compression and coding of continuous-tone still images: Requirements and guidelines*.
- Recommendation ITU-T T.84 | ISO/IEC 10918-3, *Information technology – Digital compression and coding of continuous-tone still images: Extensions*.

3 Definitions

The definitions used in Rec. ITU-T T.81 | ISO/IEC 10918-1, Rec. ITU-T T.84 | ISO/IEC 10918-3 and the following apply.

3.1 identifier string: The first *m* bytes of the application data APi (for $i = 1$ to m) of an application marker (APPn) segment containing a zero-terminated or multi-glyph character string, generally intended to serve as a unique identifier for the APPn marker segment.

4 Abbreviations and symbols

For the purposes of this Recommendation | International Standard, the symbols described in Rec. ITU-T T.81 | ISO/IEC 10918-1, Rec. ITU-T T.84 | ISO/IEC 10918-3 and the following abbreviation apply:

APPn Application specific marker segment of type n

5 Conventions

None.

6 General

Annex A of this Recommendation | International Standard contains a list of known application markers (APPn) along with identifier strings. APPn markers are reserved by Rec. ITU-T T.81 | ISO/IEC 10918-1 for "application use". While Rec. ITU-T T.81 | ISO/IEC 10918-1 recommends (but does not require) that these markers be removed for interchange between different application domains, readers should be aware that the markers documented in this Recommendation | International Standard are all part of the same application domain, and their removal within this domain is discouraged. Application marker segments based on the same application marker (APPn) can be disambiguated by their identifier string. During parsing, applications should skip over application marker segments they do not understand or do not plan to interpret and should preserve them when updating information.

The intended use of the APPn marker list in Annex A is to identify those pairs of application markers and identifier strings that are reserved, to avoid conflicts when allocating application markers and to serve as a reference for implementations of Rec. ITU-T T.81 | ISO/IEC 10918-1.

7 Purpose of an APPn marker

To make codestreams defined in Rec. ITU-T T.81 | ISO/IEC 10918-1 as flexible as possible, a provision has been made that allows applications to usefully add information to an application marker. It should be noted, however, that such use is application specific and other applications may not recognize these markers. APPn markers can be used to signal anything an application requires. They allow enhanced or expanded capabilities to be implemented.

More precisely, the use of an APPn marker shall not prevent the expansion of the coded image when the marker is not recognized by a given implementation. The utility of the resulting image, however, can be limited by failure to recognize an APPn marker.

NOTE – Some APPn markers have been reserved by ITU | ISO/IEC in additional Recommendations | International standards, and their use can be normatively defined there. Annex A lists some of such markers, along with their origin.

Annex A

Application-specific marker list

(This annex forms an integral part of this Recommendation | International Standard.)

Table A.1 lists pairs of application marker (APPn) code values and identifier strings that have been reserved. They shall only be used for the purposes described in Table A.1. The identifier string is encoded according to Rec. ITU-T T.50 or ISO/IEC 10646.

Table A.1 – List of reserved application markers (APPn)

Marker	Identifier string	Description
APP0	JFIF	Rec. ITU-T T.871 | ISO/IEC 10918-5 JPEG File Interchange Format
APP0	JFXX	JFIF Extension Tags Image Thumbnail
APP0	CIFF	Camera Image File Format (used by some Canon models)
APP0	AVI1	JPEG AVI (Audio Video Interleave) information
APP1	EXIF	CIPA (Camera & Imaging Products Association) DC-010-2020 Exchangeable Image File Format (including maker notes)
APP1	XMP	ISO 16684-1 Extensible Metadata Platform (multi-segment)
APP1	QVCI	Casio QV-7000SX QVCI information
APP1	PIC	Accusoft Pegasus custom fields
APP2	ICC_PROFILE	ISO 15076-1 International Color Consortium (multi-segment)
APP2	FPXR	FlashPix Ready (multi-segment)
APP2	MPF	CIPA (Camera & Imaging Products Association) DC-007-2009 Multi-Picture Format
APP2	PreviewImage	Samsung large preview (multi-segment)
APP3	Kodak Meta	Kodak Meta information (EXIF-like)
APP3	Stim	Stereo Still Image format
APP3	PreviewImage	Hewlett-Packard or Samsung (multi-segment) preview
APP4	Scalado	(presumably written by Scalado mobile software)
APP4	FPXR	FlashPix Ready in non-standard location (multi-segment)
APP4	PreviewImage	Continued Samsung preview from APP3
APP5	Ricoh RMETA	Ricoh custom fields
APP6	EPPIM	Toshiba PrintIM
APP6	NITF	National Imagery Transmission Format
APP6	HP TDHD	Hewlett-Packard Photosmart R837 TDHD information
APP7	NITF0003.A	NITF (National Imagery Transmission Format) directory data segment
APP8	SPIFF	Rec. ITU-T T.84 | ISO/IEC 10918-3 Still Picture Interchange File Format
APP10	Comment	PhotoStudio Unicode Comment
APP11	DD	ISO/IEC 18477-2 Still image extension
APP11	JP	ISO/IEC 18477-3 | ISO/IEC 19566-5 ISO Box-Based Format Extensions
APP12	Picture Info	Textual Picture Information
APP12	Ducky	Photoshop "Save for Web"
APP13	Photoshop IRB	Image Resource Block (multi-segment, includes IPTC)
APP13	Adobe CM	Adobe Color Management
APP14	Adobe	Adobe DCT filter, identical to ISO/IEC 18477-1 Component Decorrelation Control marker
APP15	GraphicConverter	GraphicConverter quality

Bibliography

– Recommendation ITU-T T.50, *International Reference Alphabet (IRA) (Formerly International Alphabet No. 5 or IA5) – Information technology – 7-bit coded character set for information interchange*.

– Recommendation ITU-T T.84 | ISO/IEC 10918-3, *Information technology – Digital compression and coding of continuous-tone still images: Extensions.*

– Recommendation ITU-T T.871 | ISO/IEC 10918-5, *Information technology – Digital compression and coding of continuous-tone still images: JPEG File Interchange Format (JFIF).*

– ISO 15076-1, *Image technology colour management – Architecture, profile format and data structure – Part 1: Based on ICC.1:2010.*

– ISO 16684-1, *Graphic technology – Extensible metadata platform (XMP) – Part 1: Data model, serialization and core properties.*

– ISO/IEC 10646-1, *Information technology – Universal Multiple-Octet Coded Character Set (UCS) – Part 1: Architecture and Basic Multilingual Plane.*

– ISO/IEC 18477-1, *Information technology – Scalable compression and coding of continuous-tone still images – Part 1: Core coding system specification.*

– ISO/IEC 18477-2, *Information technology – Scalable compression and coding of continuous-tone still images – Part 2: Coding of high dynamic range images.*

– ISO/IEC 18477-3, *Information technology – Scalable compression and coding of continuous-tone still images – Part 3: Box file format.*

– ISO/IEC 19566-5, *Information technologies – JPEG systems – Part 5: JPEG universal metadata box format (JUMBF).*

– CIPA DC-007-2009 – *Multi-Picture Format.*

– CIPA DC-010-2020 – *Exif2.32 metadata for XMP.*

– National Imagery Transmission Format Standard (NITFS) – *Bandwidth Compression Standards and Guidelines.*

SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series D	Tariff and accounting principles and international telecommunication/ICT economic and policy issues
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Environment and ICTs, climate change, e-waste, energy efficiency; construction, installation and protection of cables and other elements of outside plant
Series M	Telecommunication management, including TMN and network maintenance
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling, and associated measurements and tests
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	**Terminals for telematic services**
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks, open system communications and security
Series Y	Global information infrastructure, Internet protocol aspects, next-generation networks, Internet of Things and smart cities
Series Z	Languages and general software aspects for telecommunication systems

Published in Switzerland
Geneva, 2024