INTERNATIONAL TELECOMMUNICATION UNION

Amendment 1 to

ITU-T

T.4

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(11/94)

TERMINALS FOR TELEMATIC SERVICES

STANDARDIZATION OF GROUP 3 FACSIMILE APPARATUS FOR DOCUMENT TRANSMISSION

Amendment 1 to ITU-T Recommendation T.4

(Previously “CCITT Recommendation”)

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union. The 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 Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

Amendment 1 to ITU-T Recommendation T.4 was prepared by the ITU-T Study Group 8 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 11th of November 1994.

The previous version of ITU-T Recommendation T.4 was approved by the World Telecommunication Standardization Conference (WTSC), (Helsinki, 1993).

NOTE

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

CONTENTS

STANDARDIZATION OF GROUP 3 FACSIMILE APPARATUS FOR DOCUMENT TRANSMISSION

Summary

The amendments include:

– the capability to operate at 64 kbit/s over ISDN is included in T.30 (Annex C), T.4 (Annex F), in conjunction with modifications of T.90 (Annex F);

– the introduction of higher resolutions associated with low transmission speed and with T.6 or T.4 coding, which may result in the transmission of one facsimile line in more than five seconds, the present maximum value. In T.4 this parameter is increased up to 13 seconds;

– the capability to enable continuous-tone colour and gray-scale modes for G3.

1) Append the following sentences to subclause 2.1:

"Optionally, continuous-tone and colour images may be transmitted using Group 3 facsimile apparatus as described in Annex G. A subset of the dimensions listed above, namely those having vertical resolutions of 7.7 lines/mm and 15.4 lines/mm, may be used with the procedure in Annex G. A vertical resolution of 3.85 lines/mm is not supported by Annex G."

2) Subclause 3.2 should be amended as follows:

"3.2 The maximum transmission time of any total coded scan line should be less than 13 seconds. When this transmission time exceeds 13 seconds, the receiver must proceed to disconnect the line. However, a receiver conforming to the 1993 and previous versions of Recommendation T.4 may disconnect the line when the transmission time exceeds 5 seconds.**"**

3) Subclause 4.1.3 should be amended as follows:

"4.1.3 Fill

A pause may be placed in the message flow by transmitting Fill. Fill may be inserted between a line of Data and an EOL, but never within a line of Data. Fill must be added to ensure that the transmission time of Data, Fill and EOL is not less than the minimum transmission time of the total coded scan line established in the pre-message control procedure. The maximum transmission time of Fill bits shall be less than 5 seconds.

Format: variable length string of 0's.**"**

4) Add the following clause to the end of Recommendation:

"13 Continuous-tone colour and gray-scale modes

Continuous-tone colour and gray-scale modes are optional features of Group 3 which enables transmission of colour or gray-scale images. These modes are specified in Annex G.**"**

5) Clause E.6 should be amended to read:

"E.6 Character coded data field

The character coded data field may be up to 256 octets.

A control function "end of character coded slice" (coded CR FF) shall be used at the end of each character coded slice.**"**

6) Clause E.9 should be amended to read:

"E.9 Control functions

The control functions used in simple MM are defined in D.6. The page initiator is used only if the first slice of the page is character coded. The "end of character coded slice" function shall be used at the end of each character coded slice.

No specific function exists to indicate the end of the last character coded page. "End of character coded slice" function is used at the end of the last character coded slice, as for the previous character slices.**"**

7) In Annex F, the title of the annex should be amended to:

"Facsimile Group 3 64 kbit/s option F (G3F)"

8) In Annex F:

– all references to "G3 (UDI)" should be replaced by "G3F"

– all references to "Group 3 64Kbps option", "Group 3 64Kbit/s option", "G3-64K" or "G3-64K facsimile" should be replaced with "Group 3 64 kbit/s option F".

9) Subclause F.2.1 should be amended to read:

"The subclause and annexes of this Recommendation listed below shall not be applied.

Subclause 2.1 (no title)

NOTE – Only the description of equipment with A5 or A6 facilities including Table 1 shall not be applied.

Clause 3 Transmission time per total coded scan line

Clause 5 Modulation and demodulation

Clause 6 Power at the transmitter

Clause 7 Power at the receiver input

Annex A Optional error correction mode

Annex B Optional error limiting mode

Annex C Optional File Transfer for Group 3

Annex D Optional Character Mode for Group 3

Annex E Optional Mixed Mode for Group 3"

10) In subclause F.5.2, Notes 1 to 5 should be amended to read as follows:

"NOTES

1 The document application profile in the session user data (SUD) of CSS indicates "0204" for T.503 and Group 3 64 kbit/s option F as described in F.4.2. The document application profile contained in the SUD of RSSP indicates the capability of the called side by using "0204" for T.503 and Group 3 64 kbit/s option F. CDS indicates one of the document application profiles T.503 ("02") and Group 3 64 kbit/s option F. ("04") in the SUD.

2 When the calling side intends to use NonBasicDocCharacteristics, it emits CDCL command prior to CDS command and negotiates the capability of the called side according to T.62 procedures. The document application profile contained in the SUD of CDCL is either T.503 ("02") or Group 3 64 kbit/s option F ("04").

3 When both application profiles are available at both ends, the document transmitting side selects one of the two profiles by CDCL and/or CDS commands.

4 In this case called side may transmit only T.503 ("02") in the SUD.

5 To support the terminal identification mechanism, Group 3 64 kbit/s option F transmits XID (FI = 84) commands. The structure and usage of XID (FI = 84) are defined in Annex F/T.90."

11) Add the following Annex G to this Recommendation:

Annex G

Optional continuous-tone colour mode for Group 3

(This annex forms an integral part of this Recommendation)

G.1 Introduction

This annex specifies the technical features of continuous-tone colour and gray-scale modes for Group 3 facsimile. Continuous-tone and colour modes are optional features of Group 3 facsimile which enables gray-scale or colour image transfer.

The method for image encoding is based upon the ITU-T Recommendation T.81 (JPEG), Digital compression and coding of continuous-tone still images, and ITU-T Recommendation T.42, which specifies the colour space representation.

The methods for image transfer applied to Group 3 facsimile are a subset of Recommendation T. 81, consistent with the Recommendation.

The description of colour components and colorimetry for colour data is included in Recommendation T.42.

Together with Annex E/T.30, this annex provides specification of the telecommunication protocol and coding for transmission of continuous-tone colour and gray-scale images via Group 3 facsimile service.

G.2 Definitions

The definitions contained in Recommendations T.4, T.30, T.81 and T.42 apply unless explicitly amended.

CIELAB — CIE 1976 (L* a* b*) space. A colour space defined by the CIE (Commission internationale de l'éclairage), having approximately equal visually perceptible difference between equispaced points throughout the space. The three components are L*, or Lightness, and a* and b* in chrominance.

JPEG — Joint Photographic Experts Group, and also shorthand for the encoding method, described in Recommendation T.81, which was defined by this group.

Baseline JPEG	A particular eight-bit sequential Discrete Cosine Transform (DCT) – based encoding and decoding process specified in Recommendation T. 81.
Quantization table	A set of 64 values used to quantize the DCT coefficients in baseline JPEG.
Huffman table	A set of variable length codes required in a Huffman encoder and a Huffman decoder.

G.3 References

- CIE Publication No. 15.2, *Colorimetry*, 2nd. Ed. (1986).
- ITU-T Recommendation T.81 I ISO/IEC 10918-1, *Information Technology – Digital compression and coding of continuous-tone still images, Part 1: Requirements and guidelines. (Commonly referred to as JPEG standard.)*
- ITU-T Recommendation T. 42, *Continuous-tone colour representation method for facsimile.*
- ITU-T Recommendation T. 30, *Procedures for document facsimile transmission in the general switched telephone network.*

G.4 Definition of different multi-level image transfer modes

The following different multi-level image transfer modes are defined:

Lossy gray-scale mode	(LGM)
Lossy colour mode	(LCM)
Lossless gray-scale mode	(LLGM)
Lossless colour mode	(LLCM)

At this time, only LGM and LCM are described. LLGM and LLCM, while available within the coding methods described in Recommendation T.81, are for further study.

G.4.1 Lossy gray-scale mode

Lossy gray-scale mode provides the user of Group 3 equipment with a means to transfer images with more than one bit/pel of monochrome image data. The method is not information conserving, and the amount of lossiness is determined by the quantization tables described in Recommendation T.81. The appearances of the gray-scale levels are defined by the Lightness (L*) component of CIELAB space.

G.4.2 Lossy colour mode

Lossy colour mode provides the user of Group 3 equipment with a means to transfer images with more than one bit/pel of image data in each of three colour components. The colour components are explicitly defined in Recommendation T.42, and consist of CIELAB lightness and chrominance variables. The method is not information conserving and the amount of lossiness is determined by the quantization tables described in Recommendation T.81.

G.5 Coding of the image description

Sufficient image description is specified within the headers of Annex B/T.81, Compressed data format to decode the image data. Other information, such as aspect ratio, orientation, and color space are defined uniquely by the application. In addition, some information required to establish the availability of this service is transmitted as specified in Annex E/T.30. Specifically, the transfer of JPEG-coded data, the use of gray-scale or colour data, and the use of 8 or 12 bits/component/pel data is negotiated and specified in the DIS/DTC and DCS frames as stated in Annex E/T.30.

G.5.1 Lossy gray-scale mode

The image description coding for gray-scale mode is accomplished by parameters specifying JPEG coding of a gray-scale image as specified in Annex E/T.30, as well as by specification of a single component as the number-of-components, Nf, in the Frame Header. The JPEG syntax is more thoroughly described in G.6.

G.5.2 Lossy colour mode

The image description coding for colour mode is accomplished by parameters specifying JPEG coding of a colour image and spatial resolution as specified in Annex E/T.30, as well as by specification of three components as the number-of-components, Nf, in the Frame Header. The colour data are block-interleaved, as specified in Recommendation T.81. In addition, the JPEG subsampling factors and correspondence of quantization tables to colour components are specified within the Frame Header, as detailed in Recommendation T.81.

G.6 Data format

G.6.1 Overview

The JPEG-encoded image data consist of a series of markers, parameters, and scan data that specify the image coding parameters, image size, bit-resolution, and entropy-encoded block-interleaved data.

The data stream is encoded for facsimile transfer using the error correction mode (ECM) specified in Annex A/T.30. Pad characters (X'00', the null character, or X'20', the 'space' character) are added after EOI within the last ECM frame of the page to complete the last frame, in alignment with Annex A.

G.6.2 JPEG data structure

The JPEG data structure for this application has the following elements, as specified by Annex B/T.81: parameters, markers, and entropy-encoded data segments. Parameters and markers are often organized into marker segments. Parameters are integers of length 1/2, 1, or 2 octets. Markers are assigned two-octet codes, an X'FF' octet followed by an octet not equal to X'00' or X'FF'.

The markers used in this application are characterized as follows:

(1) The encoder shall insert these markers, and the decoder shall be able to carry out a corresponding process upon these marker segments:

SOI, APPI, DQT, DHT, SOFO, SOS, EOI

(2) The encoder may insert these markers without negotiation, and the decoder shall be able to carry out a corresponding process upon these marker segments:

DRI, RSTn, DNL

(3) The encoder may insert this marker without negotiation, and the decoder shall skip these marker segments and continue the decoding process:

COM APPn (n not 1)

(4) The encoder may insert this marker when the decoder has the ability to carry out a process corresponding to this marker segment (negotiation is necessary). If used, it replaces SOFO in the data stream:

SOF1

The definitions of the markers are precise, and given in detail in Annex B/T.81, except for the APPn markers. For example, SOI is a two-octet word X'FFD8', in hexadecimal notation. APPn markers are undefined markers provided within Recommendation T.81 to facilitate the adaptation of the Recommendation to particular applications. Group 3 colour facsimile is one such application. The APPn markers are defined in G.6.5 to G.6.8.

The DNL marker is a JPEG option that is critical to the function of this coding method in machines that do not pre-scan the image. When the number of lines, Y, in the frame header is set to value 0, the number of lines in the frame remains open until defined by the DNL marker at the end of the scan. if the scanning terminates early, the DNL marker can also be used to reset the Y value to a smaller value.

G.6.2.1 Example of JPEG data structure for a 4:1:1 subsampled colour image

SOI	(start of image marker)
APP1, Lp	(application marker one, marker segment length)
Api	[application data octets: “G3FAX” – X'00', X'07CA' (version), X'00C8' (200 dpi)]
(APP1, Lp)	(application marker one, marker segment length)
Api	(application data octets: “G3FAX” – X'01' [(gamut range option), X'0000', X'0064', X'0080', X'00AA', X'0060', X'00C8', (gamut range values)]
(COM Lc, Cmi)	(comment marker, marker segment length, comment octets)
DHT, Lh	(define Huffman table marker, Huffman table length definition)
Tc, Th	(table class Tc = 0 for DC, destination identifier Th = 0 for L*)
Li, Vij	(number of codes for each of the 16 allowed code lengths, code values)
Tc, Th	(table class Tc = 1 for AC, destination identifier Th = 0 for L*)
Li, Vij	(number of codes for each of the 16 allowed code lengths, code values)
Tc, Th	(table class Tc = 0 for DC, destination identifier Th = 1 for a*, b*)
Li, Vij	(number of codes for each of the 16 allowed code lengths, code values)
Tc, Th	(table class Tc = 1 for AC, destination identifier Th = 1 for a*, b*)
Li, Vij	(number of codes for each of the 16 allowed code lengths, code values)
DQT, Lq	(define quantization table marker, quantization table length definition)
Pq, Tq	(element precision Pq = 0 for 8-bit, destination identifier Tq = 0 for lightness)
Qk	[64 quantization table elements for quantization table 0 (lightness)]
Pq, Tq	(element precision Pq = 0 for 8-bit destination identifier Tq = 1 for chrominance)
Qk	[64 quantization table elements for quantization table 0 (chrominance)]
(DRI, Lr, Ri)	(define restart interval marker, marker segment length, restart interval in MCUs)
SOFO, U	(start of frame marker for default 8-bit Huffman coded DCT, frame header length)
P, Y, X	(sample precision P = 8, number of lines Y, number of samples per line X)
Nf	(number of image components Nf = 3 for colour)
C1	(component identifier C1 = 0 for L* component)

H1, V1	(horizontal and vertical sampling factors: H1 = 2, V1 = 2 for L* in colour 4:1:1)
Tq1	(quantization table selector: Tq1 = 0)
C2	(component identifier C2 = 1 for a* component)
H2, V2	(horizontal and vertical sampling factors: H2 = 1, V2 = 1 for a* in colour 4:1:1)
Tq2	(quantization table selector: Tq2 = 1)
C3	(component identifier C3 = 2 for b* component)
H3, V3	(horizontal and vertical sampling factors: H3 = 1, V3 = 1 for b* in colour 4:1:1)
Tq3	(quantization table selector: Tq3 = 1)
SOS, Ls, Ns	(start of scan marker, scan header length, number of components Ns = 3 for colour)
Cs1	(scan component selector Cs1 = 0 for L*)
Td1, Ta1	(DC entropy coding table selector Td1 = 0, AC table selector Ta1 = 0 for L*)
Cs2	(scan component selector Cs2 = 1 for a*)
Td2, Ta2	(DC entropy coding table selector Td2 = 1, AC table selector Ta2 = 1 for a*)
Cs3	(scan component selector Cs3 = 2 for b*)
Td3, Ta3	(DC entropy coding table selector Td3 = 1, AC table selector Ta3 = 1 for b*)
Ss, Se	(Ss = 0 for sequential DCT, Se = 63 for sequential DCT)
Ah, A1	(Ah = 0 for sequential DCT, A1 = 0 for sequential DCT)
Scan data	(compressed image data)
(with RSTn)	(restart marker between image data segments, with n = 0-7 repeating in sequence)
(DNL, Ld, Y)	(define number of lines marker, marker segment length, number of lines)
EOI	(end of image marker)

NOTE – Parentheses around a marker indicate the marker is classified to (2), (3), or (4). All indented lines are single or multiple parameters.

The Huffman tables can be identified as the preferred Hufffman tables during negotiation as described in Annex E/T.30. The preferred Huffman tables are Tables K.3 to K.6 in Annex K/T.81.

G.6.2.2 Scan data structure

The scan data consist of block interleaved L*, a*, and b* data. Blocks are entropy-encoded DCT-transformed 8 × 8 arrays of image data from a single image component. The L*, a* and b* components are assigned indices zero, one, and two respectively in the frame header. When a gray-scale image is transmitted, only the L* component is represented in the data structure. The number of image components is either one (for a gray-scale image) or three (for a colour image).

The data are block-interleaved when a colour image is transmitted, and only one scan is contained within the image data. The blocks are organized in minimum coding units (MCU) such that an MCU contains a minimwn integral number of all image components. The interleaving has the following form in the default (4:1:1) subsampling case, as defined in A.2.3/T.81. In this case an MCU consists of four blocks of L* data, one block of a* data, and one block of b* data. The data are ordered L*, L*, L*, L*, a*, b* in the MCU. The four L* blocks proceed in the same scan order as the page: left to right and top to bottom. Therefore the L* blocks are transmitted first upper left, then upper right, then lower left, then lower right.

G.6.3 Subsampling method

The default (4:1:1) subsampling is specified as a four coefficient (tap) filter with coefficients (1/4, 1/4, 1/4, 1/4). Thus a* and b* are computed from non-subsampled data by averaging the four values of chrominance at the lightness locations. The location of the subsampled chrominance pixels is shown in Figure G.1.

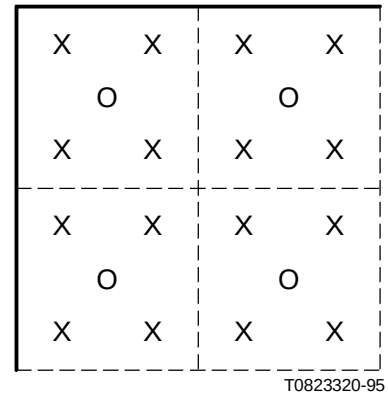

FIGURE G.1/T.4

Position of lightness and chrominance samples (4:1:1 subsampling) within the MCU's

G.6.4 Colour representation using the default gamut range

The following colour representation is in alignment with Recommendation T.42.

Colour data is represented using the CIELAB space. CIELAB colour data are acquired under a particular illuminant and computed from spectral or colorimetric data using a particular white point. The basic illuminant is CIE Standard Illuminant D50. The white point is the perfectly diffuse reflector associated with the D50 illuminant. In CIE XYZ colour space, this white point is specified as X_0 = 96.422, Y_0 = 100.000, Z_0 = 82.521. Optional illuminants are for further study. The default range of CIELAB data which may be coded in eight bits/pel/component is (to the nearest integer):

$$L^* = [0, 100]$$

$$a^* = [-85, 85]$$

$$b^* = [-75, 125]$$

The default representations for encoding real CIELAB data as eight bit integers are:

$$L = (L^*) * (2.55/100)$$

$$a = (a^*) * (255/170) + 128$$

$$b = (b^*) * (255/200) + 96$$

where L, a, and b represent eight bit integers, and L*, a*, and b* represent real numbers. Rounding to the nearest integer is performed. If L, a, or b fall outside the range [0, 255], they are truncated to 0 or 255 as appropriate.

The default representations for encoding real CIELAB data as twelve bit integers are:

$$L = (L^*) * (4095/100)$$

$$a = (a^*) * (4095/170) + 2048$$

$$b = (b^*) * (4095/200) + 1536$$

where L, a, and b represent the twelve bit integers, and L*, a*, and b* represent the continuous numbers. Rounding to the nearest integer is performed. If L, a, or b fall outside the range [0, 4095], they are truncated to 0 or 4095 as appropriate.

G.6.5 Definition of the APPn markers for continuous-tone G3FAX

The application marker APP1 initiates identification of the image as a G3FAX application and defines the spatial resolution and subsampling. This marker directly follows the SOI marker. The data format is as follows:

XFFE1' (APP1), length, FAX identifier, version, spatial resolution.

The above terms are defined as follows:

Length: (Two octets) Total APPl field octet count including the octet count itself, but excluding the APP1 marker.

FAX identifier: (Six octets) X'47', X'33', X'46', X'41', X'58', X'00'. This X'00'-terminated string “G3FAX” uniquely identifies this APP1 marker.

Version: (Two octets) X'07CA'. This string specifies the year of approval of the standard, for identification in the case of future revision (for example, 1994).

Spatial resolution: (Two octets) Lightness pixel density in pels/25.4 mm. The basic value is 200. Allowed values are 200, 300, and 400 pels/25.4 mm, with square (or equivalent) pels.

NOTE – The functional equivalence of inch-based and mm-based resolutions is maintained. For example, the 200 × 200 pels/25.4 mm and 8/7.7 line/mm resolutions are equivalent.

An example of the string including the SOI and APP1 codes for a baseline JPEG encoded 1994 G3FAX application at 200 pels/25.4 mm:

X'FFD8', X'FFE1', X'000C', X'47', X'33', X'46', X'41', X'58', X'00', X'07CA', X'00C8'.

G.6.6 FAX option identifier: G3FAX1 for gamut range

X'FFE1' (APP1), length, G3FAX option identifier, gamut range data.

The above terms are defined as follows:

Length: (Two octets) Total APP1 field octet count including the octet count itself, but excluding the APP1 marker.

FAX identifier: (Six octets) X'47', X'33', X'46', X'41', X'58', X'01'. This X'01'-terminated string “G3FAX” uniquely identifies this APP1 marker as containing FAX information about optional gamut range data. (The FAX option identifiers are referred to as G3FAX1-G3FAX255, meaning the octet-terminated string, “G3FAX”, X'nn'.)

Gamut range data: (Twelve octets) The data field contains six two-octet signed integers. For example: X'0064' represents 100. The calculation from a real value L* to an eight bit value, L, is made as follows:

$$L = (255/Q) \times L^* + P,$$

where the first integer of the first pair, P, contains the offset of the zero point in L* in the eight most significant bits. The second integer of the first pair, Q, contains the span of the gamut range in L*. Rounding to the nearest integer is performed. The second pair contains offset and range values for a*. The third pair contains offset and range values for b*. If the image is gray-scale (L* only), the field still contains six integers, but the last four are ignored.

NOTE – This representation is in accord with Recommendation T.42. When the twelve bits/pel/component option is used, the range and offset are represented as above in eight bits. These represent the eight most significant bits of the zero-padded twelve-bit number in the offset, and the eight-bit integer range data as above. Appropriately higher precision calculation should be used.

For example, the gamut range L* = [0, 100], a* = [–85, 85], and b* = [–75, 125] would be selected by the code:

X'FFE1', X'0014', X'47', X'33', X'46', X'41', X'58', X'01', X'0000', X'0064', X'0080', X'00AA', X'0060', X'00C8'.

G.6.7 FAX option identifier: G3FAX2 for illuminant data

X'FFE1' (APP1), length, G3FAX option identifier, illuminant data. This option is for further study with the exception of the default case; the specification of the default illuminant, CIE Illuminant D50, may be added for information.

Length: (Two octets) Total APP1 field octet count including the octet count itself, but excluding the APP1 marker.

FAX identifier: (Six octets) X'47', X'33', X'46', X'41', X'58', X'02'. This X'02'-terminated string "G3FAX" uniquely identifies this APP1 marker as containing optional illuminant data.

Illuminant data: (Four octets) The data consist of a four octet code identifying the illuminant. In the case of a standard illuminant, the four octets are one of the following:

CIE Illuminant D50:	X'00', X'44', X'35', X'30'
CIE Illuminant D65:	X'00', X'44', X'36', X'35'
CIE Illuminant D75:	X'00' , X'44', X'37', X'35'
CIE Illuminant SA:	X'00', X'00', X'53', X'41'
CIE Illuminant SC:	X'00', X'00', X53', X'43'
CIE Illuminant F2:	X'00', X'00', X'46', X'32'
CIE Illuminant F7:	X'00', X'00', X'46', X'37'
CIE Illuminant F11:	X'00', X'46', X'31', X'31'

In the case of a colour temperature alone, the four octets consist of the string "CT", followed by the temperature of the source in degrees Kelvin represented by an unsigned two-octet integer. For example, a 7500 K illuminant is indicated by the code:

X'FFE1', X'000C', X'47', X'33', X'46', X'41', X'58', X'02', X'43', X'54', X'1D4C'.

G.6.8 Future option identifiers: G3FAX3 to G3FAX255

In addition to the G3FAX1 and G3FAX2 identifiers used for specifying optional parameters, the identifiers from G3FAX3 to G3FAX255 are reserved for future use.

Printed in Switzerland

Geneva, 1995