INTERNATIONAL TELECOMMUNICATION UNION

ITU-T G.707/Y.1322

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Amendment 3
(04/2003)

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Digital terminal equipments – General

SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE AND INTERNET PROTOCOL ASPECTS

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Network node interface for the synchronous digital hierarchy (SDH)

Amendment 3

ITU-T Recommendation G.707/Y.1322 (2000) – Amendment 3

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Network node interface for the synchronous digital hierarchy (SDH)

Amendment 3

Summary

This amendment mainly includes modifications to Tables 9-11 and 9-13 containing the specification of signal label codes and new text (Annex F and Appendix XIII) dealing with the transport of a 10 Gbit/s Ethernet WAN PHY signal in VC-4-64c.

Source

Amendment 3 to ITU-T Recommendation G.707/Y.1322 (2000) was prepared by ITU-T Study Group 15 (2001-2004) and approved under the WTSA Resolution 1 procedure on 13 April 2003.

FOREWORD

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Network node interface for the synchronous digital hierarchy (SDH)

Amendment 3

1) Clause 2 – References

Add the following references for proprietary signal label to clause 2:

– ITU-T Recommendation G.806 (2000), *Characteristics of transport equipment – Description methodology and generic functionality*.

– IEEE Standard 802.3ae (2002), *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Carrier sense multiple access with collision detection (CSMA/CD) Access Method and Physical Layer Specifications-Media Access Control (MAC) Parameters, Physical Layer and Management Parameters for 10 Gb/s Operation*.

2) Abbreviations

Add the following abbreviation to clause 4:

WAN Wide Area Network

3) Table 9-11

Add Note on proprietary signal labels to Table 9-11:

Table 9-11/G.707/Y.1322 – C2 byte coding

MSB 1 2 3 4	LSB 5 6 7 8	**Hex code (Note 1)**	**Interpretation**
0 0 0 0	0 0 0 0	00	Unequipped or supervisory-unequipped (Note 2)
0 0 0 0	0 0 0 1	01	Reserved (Note 3)
0 0 0 0	0 0 1 0	02	TUG structure, see 7.2
0 0 0 0	0 0 1 1	03	Locked TU-n (Note 4)
0 0 0 0	0 1 0 0	04	Asynchronous mapping of 34 368 kbit/s or 44 736 kbit/s into the Container-3, see 10.1.2
0 0 0 0	0 1 0 1	05	~~Mapping under development~~Experimental mapping (Note 9)
0 0 0 1	0 0 1 0	12	Asynchronous mapping of 139 264 kbit/s into the Container-4, see 10.1.1.1
0 0 0 1	0 0 1 1	13	ATM mapping, see 10.2.1 and 10.2.2
0 0 0 1	0 1 0 0	14	MAN DQDB [1] mapping, see 10.4
0 0 0 1	0 1 0 1	15	FDDI [3]-[11] mapping, see 10.5
0 0 0 1	0 1 1 0	16	Mapping of HDLC/PPP [12], [13] framed signal, ~~according to~~see 10.3
0 0 0 1	0 1 1 1	17	Reserved for proprietary use (Note 10)~~Mapping of Simple Data Link (SDL) with SDH self synchronizing scrambler (Note 8)~~

Table 9-11/G.707/Y.1322 – C2 byte coding

MSB 1 2 3 4	LSB 5 6 7 8	**Hex code (Note 1)**	**Interpretation**
0 0 0 1	1 0 0 0	18	Mapping of HDLC/LAPS [15] framed signals, ~~according to~~see 10.3
0 0 0 1	1 0 0 1	19	Reserved for proprietary use (Note 10)~~Mapping of Simple Data Link (SDL) with set-reset scrambler (Note 8)~~
0 0 0 1	1 0 1 0	1A	Mapping of 10 Gbit/s Ethernet frames [14]~~ (Note 8)~~, see Annex F
0 0 0 1	1 0 1 1	1B	GFP mapping, ~~(Note 8)~~see 10.6
0 0 0 1	1 1 0 0	1C	Mapping of 10 Gbit/s Fibre Channel frames ~~[x]~~(Note 8)
0 0 1 0	0 0 0 0	20	Asynchronous mapping of ODUk (k = 1, 2) into VC-4-Xv (X = 17, 68), see 10.7
1 1 0 0	1 1 1 1	CF	Reserved (Note 7)
1 1 0 1 … 1 1 0 1	0 0 0 0 … 1 1 1 1	D0 … DF	Reserved for proprietary use (Note 10)
1 1 1 0 … 1 1 1 1	0 0 0 1 … 1 1 0 0	E1 … FC	Reserved for national use
1 1 1 1	1 1 1 0	FE	Test signal, O.181 specific mapping (Note 5)
1 1 1 1	1 1 1 1	FF	VC-AIS (Note 6)

NOTE 1 – There are 191~~209~~ spare codes left for future use. Refer to Annex A/G.806 for the procedure to obtain one of these codes for a new payload type.

NOTE 2 – Value "0" indicates "VC-4-Xc/VC-4/VC-3 path unequipped or supervisory-unequipped". This value is originated in the case of an open connection and in the case of a supervisory unequipped signal that contains no payload.

NOTE 3 – Value "1" should not be used in any equipment designed after the date of approval (10/2000) of this Recommendation. In the past this code meant "Equipped – non-specific" and has been used in cases where a mapping code is not defined in this table, see code "05" for new designs. For interworking with (old) equipment designed to transmit only the values "0" and "1", the following conditions apply:

– For backward compatibility, old equipment shall interpret any value received other than value "0" as an equipped condition.

– For forward compatibility, when receiving value "1" from old equipment, new equipment shall not generate a PayLoad Mismatch alarm.

NOTE 4 – The code "03" shall, for backward compatibility purposes, continue to be interpreted as previously defined even if the locked mode byte synchronous mappings are not defined any more.

NOTE 5 – Any mapping defined in ITU-T Rec. O.181 which does not correspond to a mapping defined in this Recommendation falls in this category.

NOTE 6 – Value "FF" indicates VC-AIS. It is generated by a TCM source if no valid incoming signal is available and a replacement signal is generated.

NOTE 7 – Previous value assigned for an obsolete mapping of HDLC/PPP framed signal [12], [13].

NOTE 8 – Th~~ese~~ese mapping~~s~~ is~~are~~ under study and the signal label~~s~~ is provisionally allocated.

Table 9-11/G.707/Y.1322 – C2 byte coding

NOTE 9 – Value "05" is only to be used for experimental activities in cases where a mapping code is not defined in this table. Refer to Annex A/G.806 for more information on the use of this code~~. By using this code the development or experimental activities is isolated from the rest of the SDH network. There is no forward compatibility if a specific signal label is assigned later. If that is done the equipment that has used this code must either be reconfigured to use that new specific signal label or be recycled~~.

NOTE 10 – The~~se 16-~~ code value(s) will not be subject to further standardization. Refer to Annex A/G.806 for more information on the use of these codes.

4) Table 9-13

Add Note and signal labels for proprietary use to Table 9-13:

Table 9-13/G.707/Y.1322 – VC-1/2 Extended Signal label byte coding

MSB b12 b13 b14 b15	LSB b16 b17 b18 b19	**Hex code (Note 1)**	**Interpretation**
0 0 0 0 … 0 0 0 0	0 0 0 0 … 0 1 1 1	00 … 07	Reserved (Note 2)
0 0 0 0	1 0 0 0	08	~~Mapping under development~~Experimental mapping (Note 3)
0 0 0 0	1 0 0 1	09	ATM mapping, see 10.2.3 to 10.2.5
0 0 0 0	1 0 1 0	0A	Mapping of HDLC/PPP [12], [13] framed signal, ~~according to~~see 10.3
0 0 0 0	1 0 1 1	0B	Mapping of HDLC/LAPS [15] framed signals, ~~according to~~see 10.3
0 0 0 0	1 1 0 0	0C	Virtually concatenated test signal, O.181 specific mapping (Note 4)
0 0 0 0	1 1 0 1	0D	GFP mapping ~~(Note 5)~~, see 10.6
1 1 0 1 … 1 1 0 1	0 0 0 0 … 1 1 1 1	D0 … DF	Reserved for proprietary use (Note 5)
1 1 1 1	1 1 1 1	FF	Reserved

NOTE 1 – There are 2254~~2~~ spare codes left for future use. Refer to Annex A/G.806 for the procedure to obtain one of these codes for a new payload type.

NOTE 2 – Vales "00" to "07" are reserved to give a unique name to non-extended in Table 9-12 and extended signal labels.

NOTE 3 – Value "02" is only to be used for experimental activities in cases where a mapping code is not defined in this table. Refer to Annex A/G.806 for more information on the use of this code~~. By using this code the development or experimental activities is isolated from the rest of the SDH network. There is no forward compatibility if a specific signal label is assigned later. If that is done the equipment that has used this code must either be reconfigured to use that new specific signal label or be recycled~~.

NOTE 4 – Any virtually concatenated mapping defined in ITU-T Rec. O.181 or its successors which does not correspond to a mapping defined in this Recommendation falls in this category.

~~NOTE 5 – This mapping is under study and the signal label provisionally allocated.~~

NOTE 5 – These 16- code values will not be subject to further standardization. Refer to Annex A/G.806 for more information on the use of these codes.

5) New Annex F

Add Annex F for 10 GbE WAN mapping:

Annex F

Transport of 10 Gbit/s Ethernet in a VC-4-64c

IEEE has defined in IEEE 802.3ae a 10 Gbit/s Ethernet WAN interface. This interface is basically a STM-64 with a VC-4-64c and the Ethernet MAC mapped into the VC-4-64c using a 64B/66B coding (see IEEE 802.3ae, sections 49 and 50). Some limitations on the use of overhead bytes apply (see IEEE 802.3ae, section 50). Furthermore the 10 Gbit/s Ethernet WAN signal has a different clock accuracy (see Appendix XIII).

F.1 Mapping of Ethernet MAC into VC-4-64c using 64B/66B coding

The Ethernet MAC data is 64B/66B coded as defined in IEEE 802.3ae, section 49.2.4. The 64B/66B coded continuous data stream is mapped into the VC-4-64c payload area as shown in Figure F.1. The mapping is independent of the Ethernet block and packet boundaries. A bit re-labelling process is used to accommodate the different bit numbering schemes used by IEEE 802.3 and SDH (see IEEE 802.3, sections 49.1.4.5 and 50.3.1).

The C2 path signal label shall be set to "1A" as defined in Table 9-11.

Note that this mapping is an alternative to the mapping of Ethernet MAC frames into a VC-4-64c using GFP (see 10.6 and G.7041/Y.1303).

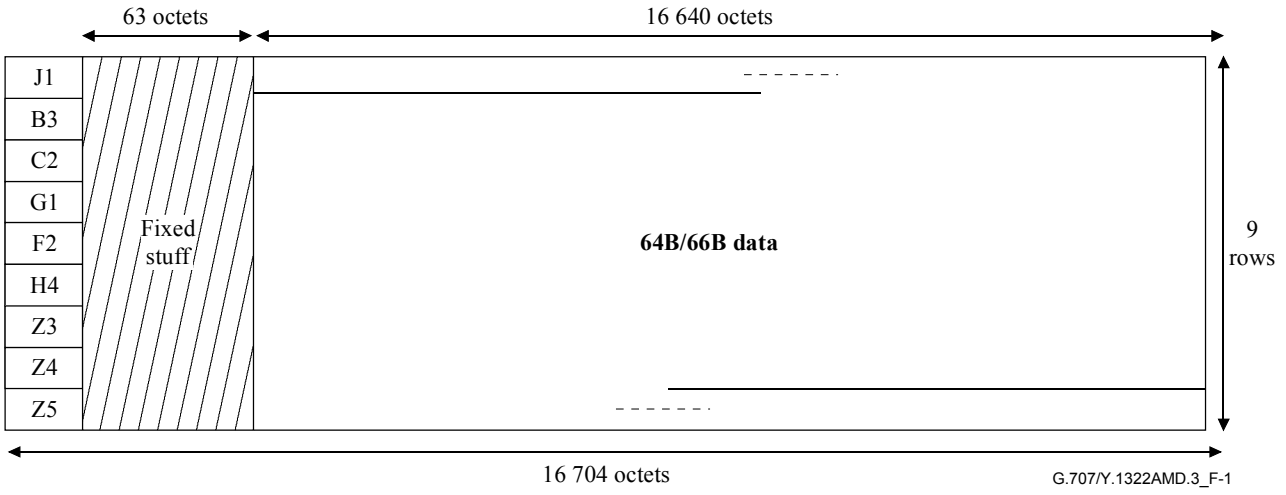

Figure F.1/G.707/Y.1322 – 64B/66B coded Ethernet MAC mapping into VC-4-64c

6) New Appendix XIII

Add new Appendix XIII for 10 GbE WAN clock accuracy:

Appendix XIII

Consideration on 10 Gbit/s Ethernet WAN clock accuracy

IEEE has defined in IEEE 802.3ae a 10 Gbit/s Ethernet WAN interface. This interface is basically a STM-64 with a VC-4-64c and the Ethernet MAC mapped into the VC-4-64c using a 64B/66B coding (see Annex F).

IEEE 802.3ae defines a clock accuracy of ±20 ppm for the 10 Gbit/s WAN signal, while a clock accuracy of ±4.6 ppm is required for SDH signals (except for the MS-AIS case). A VC-4-64c with ±20 ppm clock accuracy may result in excessive AU pointer justifications, which results in alarms if pointer adjustment monitoring is active.

The IEEE 802.3ae interface can be supported by an SDH network if the clock accuracy is improved to meet the SDH ±4.6 ppm requirement. No other changes are required. Alternately, a clock alignment can be performed at the entrance to a SDH network. The 10 Gbit/s WAN signal is terminated in this case. The 64B/66B data stream is extracted and re-inserted into a new VC-4-64c (see Annex F) generated by the SDH equipment clock. Clock adaptation is performed by insertion or deletion of idle characters as defined in IEEE 802.3ae, section 49.2.4.7.

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