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Multiplexing structure

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New presentation - see History box

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Transmission and Multiplexing (TM) Technical Committee of the European Telecommunication Standards Institute (ETSI).

This ETS provides inter-vendor and inter-operator compatibility and is based on CCITT Recommendations G.707 [1], G.708 [2] and G.709 [3].

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1   Scope

This European Telecommunication Standard (ETS) specifies the hierarchical bit rates, the multiplexing structure and the mapping schemes to be used in the transmission networks based on Synchronous Digital Hierarchy (SDH).

2   Normative references

This ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to, or revisions of, any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1]   CCITT Recommendation G.707 (1990): "Synchronous Digital Hierarchy bit rates."

[2]   CCITT Recommendation G.708 (1990): "Network Node Interface for the Synchronous Digital Hierarchy."

[3]   CCITT Recommendation G.709 (1990): "Synchronous multiplexing structure."

3   Definitions and abbreviations

3.1   Definitions

For the purposes of this ETS the definitions given in CCITT Recommendation G.708 [2] apply.

3.2   Abbreviations

For the purposes of this ETS the following abbreviations apply.

ATM	Asynchronous Transfer Mode
AU	Administrative Unit
AUG	Administrative Unit Group
C	Container
CCITT	International Telegraph and Telephone Consultative Committee
ETS	European Telecommunication Standard
ETSI	European Telecommunications Standards Institute
POH	Path Overhead
SDH	Synchronous Digital Hierarchy
STM-N	Synchronous Transport Module-N
TU	Tributary Unit
TUG	Tributary Unit Group
VC	Virtual Container

4   Hierarchical bit rates

The hierarchical bit rates used in the SDH transmission network shall be in accordance with CCITT Recommendation G.707 [1].

5   Basic multiplexing structure

The basic SDH multiplexing structure shall be as described in figure 1.

> NOTE 1:   This SDH multiplexing structure is a subset of the SDH multiplexing structure defined in the CCITT Recommendation G.709 [3].

> NOTE 2:   The order of transmission of information in all diagrams in CCITT Recommendation G.709 [3] is first from left to right and then from top to bottom. Within each byte, the most significant bit is transmitted first. The most significant bit (bit 1) is illustrated at the left in all diagrams.

6   Multiplexing method and mapping

The multiplexing method and mapping are given in CCITT Recommendation G.709 [3] together with the following statements and modifications.

As CCITT Recommendation G.709 [3] was written as a Recommendation, table 1 below also gives an indication of the status of each requirement (i.e. normative or not relevant).

Definitions:

N - Normative: Requirements with which it is necessary to comply in order to be able to claim compliance with this ETS.
N/R - Not relevant: Section/subsection is not relevant to this Standard.

This ETS is not an equipment specification. The fact that a requirement is defined as normative does not imply that the associated function has to be implemented but means that, if implemented, the function shall be implemented in accordance with this requirement.

Table 1: Modifications and statements to CCITT Recommendation G.709 [3]

1.	Basic multiplexing structure (See Clause 5 of this ETS)	
		N/R
2.	Multiplexing Method	
2.1	Multiplexing of Administrative Units (AUs into STM-N)	
2.1.1	Multiplexing of Administrative Unit Groups (AUGs) into STM-N	
		N
2.1.2	Multiplexing of AU-4s via AUG	N
2.1.3	Multiplexing of AU-3s via AUG	N/R
2.2	Multiplexing of Tributary Units (TUs) into VC-4 and VC-3	
2.2.1	Multiplexing of Tributary Unit Group-3s (TUG-3s) into a VC-4	
		N
2.2.2	Multiplexing of TU-3s via TUG-3	N
2.2.3	Multiplexing of TUG-2s via TUG-3	N
2.2.4	Multiplexing of TUG-2s into a VC-3	N/R
2.2.5	Multiplexing of TU-2s via TUG-2s	N

Table 1: Modifications and statements to CCITT Recommendation G.709 [3](continued)

2.2.6	Multiplexing of TU-1s via TUG-2s In this subsection, reference to TU-11 is not relevant.	N
2.3	Maintenance signals	
2.3.1	Section maintenance signals	N
2.3.2	Path maintenance signals In this section 2.3.2, reference to AU-3 is not relevant.	N
2.4	Timing recovery	N
3.	Pointers	
3.1	AU pointer In this section 3.1, all the references to AU-3 are not relevant.	N
3.1.1	AU pointer location	N
3.1.2	AU pointer value	N
3.1.3	Frequency justification	N
3.1.4	New Data Flag	N
3.1.5	Pointer generation	N
3.1.6	Pointer interpretation	N
3.1.7	AU-4 concatenation	N
3.1.7.1	Pointer generation	N
3.1.7.2	Pointer interpretation	N
3.2	TU-3 pointer	N
3.2.1	TU-3 pointer location	N
3.2.2	TU-3 pointer value	N
3.2.3	Frequency justification	N
3.2.4	New Data Flag	N
3.2.5	Pointer generation	N
3.2.6	Pointer interpretation	N
3.3	TU-1/TU-2 pointer In this section 3.3, all the references to TU-11 are not relevant.	N
3.3.1	TU-1/TU-2 pointer location	N
3.3.2	TU-1/TU-2 pointer value	N
3.3.3	TU-1/TU-2 multiframe indication byte In this section, references to VC-3 are not relevant.	N
3.3.4	TU-1/TU-2 frequency justification	N
3.3.5	TU-1/TU-2 sizes	N
3.3.6	New Data Flag	N
3.3.7	TU Concatenation	N
3.3.7.1	Concatenation of Contiguous TU-2s in the Higher Order VC-3	N/R
3.3.7.2	Sequential Concatenation of TU-2s in the Higher Order VC-4	N/R
3.3.7.3	Virtual Concatenation of TU-2s in the Higher Order VC-4	N
3.3.8	TU pointer generation and interpretation In this subsection, item 4 dealing with Concatenation Indication is not relevant.	N
4.	Path Overhead description	
4.1	VC-3/VC-4 POH	N
4.2	VC-1/VC-2 POH	N
5.	Mapping of tributaries into VCs In Fig 5.1/G.709, the reference to TU-11 is not relevant.	N

Table 1: Modifications and statements to CCITT Recommendation G.709 [3](concluded)

|		
5.1 5.1.1	Mapping of tributaries into VC-4 Asynchronous mapping of 139 264 kbit/s	N
5.2 5.2.1 5.2.2	Mapping of tributaries into VC-3 Asynchronous mapping of 44 736 kbit/s Asynchronous mapping of 34 368 kbit/s	N N
5.3 5.3.1 5.3.2 5.3.3 5.3.4	Mapping of tributaries into the VC-2 Byte synchronous mapping of 8 448 kbit/s Asynchronous mapping of 6 312 kbit/s Bit synchronous mapping of 6 312 kbit/s Byte synchronous mapping of 6 312 kbit/s	N/R N/R N/R N/R
5.4 5.4.1 5.4.2 5.4.3	Mapping of tributaries into VC-12 Asynchronous 2 048 kbit/s Bit synchronous mapping of 2 048 kbit/s Byte synchronous mapping of 2 048 kbit/s	N N N
5.5 5.5.1 5.5.2 5.5.3	Mapping of tributaries into VC-11 Asynchronous mapping of 1 544 kbit/s Bit synchronous mapping of 1 544 kbit/s Byte synchronous mapping of 1 544 kbit/s	N N N
5.6	VC-11 to VC-12 conversion for transport by a TU-12	N
5.7	Floating and locked mode conversion In this section, references to VC-3 POH and AU-3 are not relevant.	N
5.8 5.8.1 5.8.2	Mapping of ATM cells Mapping of ATM cells into VC-4 Mapping of ATM cells into other VCs	N N N
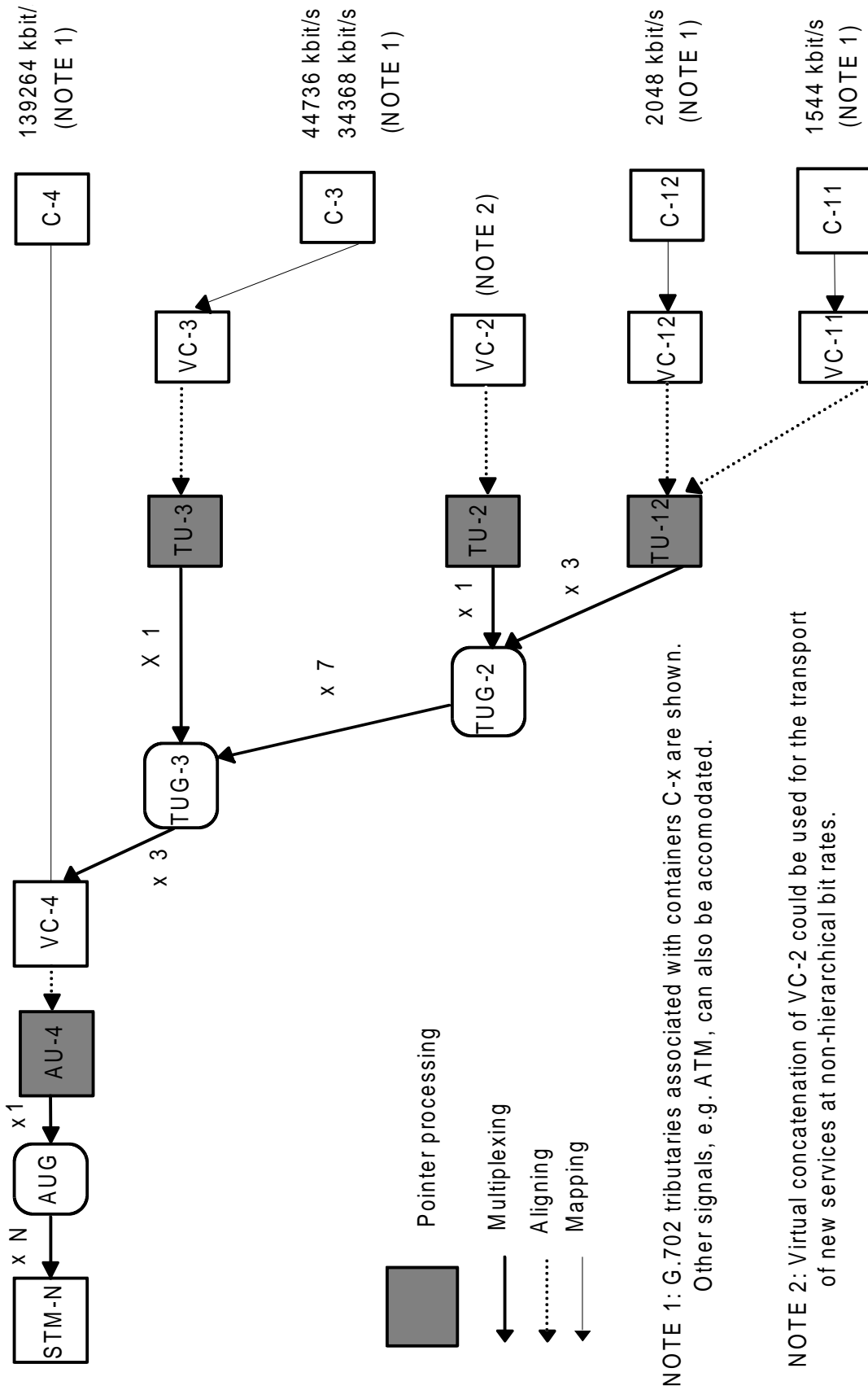
Figure 1: Multiplexing structure

History

Document history	
March 1992	First Edition
March 1996	Converted into Adobe Acrobat Portable Document Format (PDF)