

International Telecommunication Union

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**G.998.2**  
**Amendment 4**  
(08/2015)

SERIES G: TRANSMISSION SYSTEMS AND MEDIA,  
DIGITAL SYSTEMS AND NETWORKS

Digital sections and digital line system – Metallic access  
networks

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Ethernet-based multi-pair bonding  
**Amendment 4 – New Annex D**

Recommendation ITU-T G.998.2 (2005) –  
Amendment 4

ITU-T



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# Recommendation ITU-T G.998.2

## Ethernet-based multi-pair bonding

### Amendment 4

### New Annex D

#### Summary

Amendment 4 to Recommendation ITU-T G.998.2 (2005) includes:

- A new Annex D defining "Ethernet bonding with DTU encapsulation" (new functionality).

#### History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T G.998.2	2005-01-13	15	<a href="http://handle.itu.int/11.1002/1000/7090">11.1002/1000/7090</a>
1.1	ITU-T G.998.2 (2005) Amd. 1	2006-12-14	15	<a href="http://handle.itu.int/11.1002/1000/8996">11.1002/1000/8996</a>
1.2	ITU-T G.998.2 (2005) Amd. 2	2007-12-07	15	<a href="http://handle.itu.int/11.1002/1000/9169">11.1002/1000/9169</a>
1.3	ITU-T G.998.2 (2005) Amd. 3	2013-08-29	15	<a href="http://handle.itu.int/11.1002/1000/11998">11.1002/1000/11998</a>
1.4	ITU-T G.998.2 (2005) Amd. 4	2015-08-29	15	<a href="http://handle.itu.int/11.1002/1000/12554">11.1002/1000/12554</a>

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\* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

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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.

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As of the date of approval of this Recommendation, ITU had received notice of intellectual property, protected by patents, 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 TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

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## **Recommendation ITU-T G.998.2**

### **Ethernet-based multi-pair bonding**

#### **Amendment 4**

#### **New Annex D**

##### **1) Clause 2**

*Add the following abbreviation in clause 2, in alphabetical order:*

DTU Data Transfer Unit

##### **2) New Annex D**

*Add a new Annex D on "Ethernet bonding with DTU encapsulation" as follows:*

#### **Annex D**

##### **Ethernet bonding with DTU encapsulation**

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

The specific normative requirements for DTU (data transfer unit) encapsulation are contained in the applicable ITU-T Recommendation for the underlying transport technology such as [b-ITU-T G.9701] (G.fast). The exception to clause 61.2.2.5 of IEEE 802.3-2005 defined in clause 6.2.3 of this Recommendation is extended as follows (at the end of the paragraph before the Note): "The receiving PCS shall be able to handle a total differential delay of 1 623 000 bit times (approximately 1.6 ms at 1 Gbit/s) without the need to stop traffic flow on any of the bonded lines in order to achieve reliable bonding operation. The receiving PCS shall be able to apply flow control to the underlying transport technology when the PCS receive buffer is full."

NOTE – Some implementations may be able to handle a total differential delay higher than 1 623 000 bit times and achieve higher bonding efficiency.

##### **3) Bibliography**

*Add a bibliography after Annex D with the following entry:*

[b-ITU-T G.9701] Recommendation ITU-T G.9701 (2014), *Fast access to subscriber terminals (G.fast) – Physical layer specification.*





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