International Telecommunication Union

# ITU-T
TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

# G.994.1
## Amendment 3
(01/2014)

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

Digital sections and digital line system – Metallic access networks

Handshake procedures for digital subscriber line transceivers

**Amendment 3: Codepoints for ITU-T G.998.4 extensions and exchange of transfer ID**

Recommendation ITU-T G.994.1 (2012) – Amendment 3

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# Recommendation ITU-T G.994.1

## Handshake procedures for digital subscriber line transceivers

## Amendment 3

## Codepoints for ITU-T G.998.4 extensions and exchange of transfer ID

**Summary**

Amendment 3 to Recommendation ITU-T G.994.1 (2012) covers the following functionalities:

1.  Additional codepoints for the support of ITU-T G.998.4 Annex D in conjunction with ITU-T G.993.2.

2.  Additional codepoints for the exchange of transceiver ID.

**History**

| Edition | Recommendation | Approval | Study Group | Unique ID[*] |
|---|---|---|---|---|
| 1.0 | ITU-T G.994.1 | 1999-07-02 | 15 | 11.1002/1000/4720 |
| 1.1 | ITU-T G.994.1 (1999) Cor. 1 | 2000-04-04 | 15 | 11.1002/1000/5139 |
| 2.0 | ITU-T G.994.1 | 2001-02-09 | 15 | 11.1002/1000/5364 |
| 3.0 | ITU-T G.994.1 | 2002-07-29 | 15 | 11.1002/1000/6119 |
| 4.0 | ITU-T G.994.1 | 2003-05-22 | 15 | 11.1002/1000/6281 |
| 4.1 | ITU-T G.994.1 (2003) Amd. 1 | 2004-02-22 | 15 | 11.1002/1000/7080 |
| 4.2 | ITU-T G.994.1 (2003) Amd. 2 | 2004-06-13 | 15 | 11.1002/1000/7351 |
| 4.3 | ITU-T G.994.1 (2003) Amd. 3 | 2005-01-13 | 15 | 11.1002/1000/7495 |
| 4.4 | ITU-T G.994.1 (2003) Amd. 4 | 2006-01-13 | 15 | 11.1002/1000/8549 |
| 5.0 | ITU-T G.994.1 | 2007-02-13 | 15 | 11.1002/1000/8993 |
| 5.1 | ITU-T G.994.1 (2007) Amd. 1 | 2007-11-22 | 15 | 11.1002/1000/9167 |
| 5.2 | ITU-T G.994.1 (2007) Amd. 2 | 2008-04-13 | 15 | 11.1002/1000/9388 |
| 5.3 | ITU-T G.994.1 (2007) Amd. 3 | 2009-03-22 | 15 | 11.1002/1000/9675 |
| 5.4 | ITU-T G.994.1 (2007) Amd. 4 | 2009-06-29 | 15 | 11.1002/1000/9891 |
| 5.5 | ITU-T G.994.1 (2007) Amd. 5 | 2010-04-22 | 15 | 11.1002/1000/10415 |
| 5.6 | ITU-T G.994.1 (2007) Amd. 6 | 2010-11-29 | 15 | 11.1002/1000/11018 |
| 5.7 | ITU-T G.994.1 (2007) Amd. 7 | 2011-04-13 | 15 | 11.1002/1000/11129 |
| 5.8 | ITU-T G.994.1 (2007) Cor. 1 | 2011-10-29 | 15 | 11.1002/1000/11417 |
| 5.9 | ITU-T G.994.1 (2007) Amd. 8 | 2011-12-16 | 15 | 11.1002/1000/11416 |
| 6.0 | ITU-T G.994.1 | 2012-06-13 | 15 | 11.1002/1000/11644 |
| 6.1 | ITU-T G.994.1 (2012) Amd. 1 | 2012-10-29 | 15 | 11.1002/1000/11797 |
| 6.2 | ITU-T G.994.1 (2012) Amd. 2 | 2013-08-29 | 15 | 11.1002/1000/11994 |
| 6.3 | ITU-T G.994.1 (2012) Amd. 3 | 2014-01-13 | 15 | 11.1002/1000/12093 |

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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.

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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/.

# Recommendation ITU-T G.994.1

## Handshake procedures for digital subscriber line transceivers

## Amendment 3

## Codepoints for ITU-T G.998.4 extensions and exchange of transfer ID

**1)      Codepoints for the support of ITU-T G.998.4 Annex D in conjunction with ITU-T G.993.2**

*Modify Table 11.68.0.1 as follows:*

**Table 11.68.0.1 – Standard information field – ITU-T G.993.2 SPar(2) coding – Octet 2**

| Bits | | | | | | | | ITU-T G.993.2 SPar(2)s – Octet 2 |
|---|---|---|---|---|---|---|---|---|
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
| x | x | x | x | x | x | x | 1 | Annex A US0 |
| x | x | x | x | x | x | 1 | x | Annex B US0 |
| x | x | x | x | x | 1 | x | x | Annex C US0 |
| x | x | x | x | 1 | x | x | x | ITU-T G.993.5 |
| x | x | x | 1 | x | x | x | x | <u>ITU-T G.998.4 extensions</u>~~Reserved for allocation by ITU-T~~ |
| x | x | 1 | x | x | x | x | x | Reserved for allocation by ITU-T |
| x | x | 0 | 0 | 0 | 0 | 0 | 0 | No parameters in this octet |

*Add new Table 11.68.11 after Table 11.68.10:*

**Table 11.68.11 – Standard information field – ITU-T G.993.2 ITU-T G.998.4 extensions NPar(3) coding Octet 1**

| Bits | | | | | | | | ITU-T G.993.2 ITU-T G.998.4 extensions NPar(3)s – Octet 1 |
|---|---|---|---|---|---|---|---|---|
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
| x | x | x | x | x | x | x | 1 | ITU-T G.998.4 Annex D support |
| x | x | x | x | x | x | 1 | x | Reserved for allocation by ITU-T |
| x | x | x | x | x | 1 | x | x | Reserved for allocation by ITU-T |
| x | x | x | x | 1 | x | x | x | Reserved for allocation by ITU-T |
| x | x | x | 1 | x | x | x | x | Reserved for allocation by ITU-T |
| x | x | 1 | x | x | x | x | x | Reserved for allocation by ITU-T |
| x | x | 0 | 0 | 0 | 0 | 0 | 0 | No parameters in this octet |

## 2) Codepoints for the exchange of transceiver ID

*Modify Table 9 as follows:*

**Table 9 – Identification field – SPar(1) coding – Octet 1**

| Bits | | | | | | | | SPar(1)s – Octet 1 |
|---|---|---|---|---|---|---|---|---|
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
| x | x | x | x | x | x | x | 1 | Net data rate upstream (Note 1) |
| x | x | x | x | x | x | 1 | x | Net data rate downstream (Note 1) |
| x | x | x | x | x | 1 | x | x | Data flow characteristics upstream (Note 2) |
| x | x | x | x | 1 | x | x | x | Data flow characteristics downstream (Note 2) |
| x | x | x | 1 | x | x | x | x | xTU-R splitter information (Note 3) |
| x | x | 1 | x | x | x | x | x | xTU-C splitter information (Note 3) |
| x | 1 | x | x | x | x | x | x | <u>Transceiver ID</u>~~Reserved for allocation by ITU-T~~ |
| x | 0 | 0 | 0 | 0 | 0 | 0 | 0 | No parameters set in this octet |

NOTE 1 – In a CLR, CL or MP message, the data rates indicated in this Recommendation are of informative nature and do not imply any requirements on the net data rate during data mode. The data rate values are set and used by layers higher than the xTU-x although an xTU-x may monitor the information. The data rate values are useful to help the higher layers to select between the various ITU-T G.99x.x transceivers based upon information indicated by an application layer.

In an MS message:

- If the xTU-x is capable of supporting the information, it shall respond with an ACK.
- If the xTU-x is either not capable of supporting the information or the negotiation of this information, it shall respond with a NAK-NS.

NOTE 2 – In a CLR, CL or MP message, the latencies indicated in this Recommendation are of informative nature and do not imply any requirements on the latency during data mode. The latency values are set and used by layers higher than the xTU-x although an xTU-x may monitor the information. The latency values are useful to help the higher layers to select between the various ITU-T G.99x.x transceivers and coding parameters based upon information indicated by an application layer.

In an MS message:

- If the xTU-x is capable of supporting the information, it shall respond with an ACK.
- If the xTU-x is either not capable of supporting the information or the negotiation of this information, it shall respond with a NAK-NS.

NOTE 3 – Splitter information is only conveyed by an xTU-x if it has the capability of determining the local splitter information. Splitter information is only a capabilities indication and shall not be included in an MP or MS message.

*Add the following new tables after Table 9.11:*

**Table 9.13 – Identification field – Transceiver ID NPar(2) – Octet 1**

| **Bits** | | | | | | | | **Transceiver ID NPar(2)s – Octet 1** |
|---|---|---|---|---|---|---|---|---|
| **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | |
| x | x | x | x | x | x | x | 1 | Reserved for allocation by ITU-T |
| x | x | x | x | x | x | 1 | x | Reserved for allocation by ITU-T |
| x | x | x | x | x | 1 | x | x | Reserved for allocation by ITU-T |
| x | x | x | x | 1 | x | x | x | Reserved for allocation by ITU-T |
| x | x | x | 1 | x | x | x | x | Reserved for allocation by ITU-T |
| x | x | 1 | x | x | x | x | x | Reserved for allocation by ITU-T |
| x | x | 0 | 0 | 0 | 0 | 0 | 0 | No parameters in this octet |

**Table 9.14 – Identification field – Transceiver ID SPar(2) – Octet 1**

| **Bits** | | | | | | | | **Transceiver ID SPar(2)s – Octet 1** |
|---|---|---|---|---|---|---|---|---|
| **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | |
| x | x | x | x | x | x | x | 1 | Network side transceiver ID |
| x | x | x | x | x | x | 1 | x | Remote side transceiver ID |
| x | x | x | x | x | 1 | x | x | Reserved for allocation by ITU-T |
| x | x | x | x | 1 | x | x | x | Reserved for allocation by ITU-T |
| x | x | x | 1 | x | x | x | x | Reserved for allocation by ITU-T |
| x | x | 1 | x | x | x | x | x | Reserved for allocation by ITU-T |
| x | x | 0 | 0 | 0 | 0 | 0 | 0 | No parameters in this octet |

**Table 9.14.1 – Identification field – Network side transceiver ID NPar(3) coding – Octet 1**

| **Bits** | | | | | | | | **Network side transceiver ID NPar(3)s – Octet 1** |
|---|---|---|---|---|---|---|---|---|
| **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | |
| x | x | x | x | x | x | x | x | Network side transceiver ID (bits 30 to 25) |

**Table 9.14.1.1 – Identification field – Network side transceiver ID NPar(3) coding – Octet 2**

| **Bits** | | | | | | | | **Network side transceiver ID NPar(3)s – Octet 2** |
|---|---|---|---|---|---|---|---|---|
| **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | |
| x | x | x | x | x | x | x | x | Network side transceiver ID (bits 24 to 19) |

**Table 9.14.1.2 – Identification field – Network side transceiver ID NPar(3) coding – Octet 3**

| **Bits** | | | | | | | | **Network side transceiver ID NPar(3)s – Octet 3** |
|---|---|---|---|---|---|---|---|---|
| **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | |
| x | x | x | x | x | x | x | x | Network side transceiver ID (bits 18 to 13) |

**Table 9.14.1.3 – Identification field – Network side transceiver ID NPar(3) coding – Octet 4**

| Bits | | Network side transceiver ID NPar(3)s – Octet 4 |
|---|---|---|
| **8 7** | **6 5 4 3 2 1** | |
| x x | x x x x x x | Network side transceiver ID (bits 12 to 7) |

**Table 9.14.1.4 – Identification field – Network side transceiver ID NPar(3) coding – Octet 5**

| Bits | | Network side transceiver ID NPar(3)s – Octet 5 |
|---|---|---|
| **8 7** | **6 5 4 3 2 1** | |
| x x | x x x x x x | Network side transceiver ID (bits 6 to 1) |

**Table 9.14.2 – Identification field – Remote side transceiver ID NPar(3) coding – Octet 1**

| Bits | | Remote side transceiver ID NPar(3)s – Octet 1 |
|---|---|---|
| **8 7** | **6 5 4 3 2 1** | |
| x x | x x x x x x | Remote side transceiver ID (bits 30 to 25) |

**Table 9.14.2.1 – Identification field – Remote side transceiver ID NPar(3) coding – Octet 2**

| Bits | | Remote side transceiver ID NPar(3)s – Octet 2 |
|---|---|---|
| **8 7** | **6 5 4 3 2 1** | |
| x x | x x x x x x | Remote side transceiver ID (bits 24 to 19) |

**Table 9.14.2.2 – Identification field – Remote side transceiver ID NPar(3) coding – Octet 3**

| Bits | | Remote side transceiver ID NPar(3)s – Octet 3 |
|---|---|---|
| **8 7** | **6 5 4 3 2 1** | |
| x x | x x x x x x | Remote side transceiver ID (bits 18 to 13) |

**Table 9.14.2.3 – Identification field – Remote side transceiver ID NPar(3) coding – Octet 4**

| Bits | | Remote side transceiver ID NPar(3)s – Octet 4 |
|---|---|---|
| **8 7** | **6 5 4 3 2 1** | |
| x x | x x x x x x | Remote side transceiver ID (bits 12 to 7) |

**Table 9.14.2.4 – Identification field – Remote side transceiver ID NPar(3) coding – Octet 5**

| Bits | | Remote side transceiver ID NPar(3)s – Octet 5 |
|---|---|---|
| **8 7** | **6 5 4 3 2 1** | |
| x x | x x x x x x | Remote side transceiver ID (bits 6 to 1) |

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