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STANDARDIZATION SECTOR
OF ITU

G.991.2

Amendment 1

(07/2004)

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

Digital sections and digital line system – Access networks

Single-pair high-speed digital subscriber line
(SHDSL) transceivers

Amendment 1

ITU-T Recommendation G.991.2 (2003) – Amendment 1

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For further details, please refer to the list of ITU-T Recommendations.

ITU-T Recommendation G.991.2

Single-pair high-speed digital subscriber line (SHDSL) transceivers

Amendment 1

Summary

This amendment resolves the passing of a target margin in an SHDSL access link with repeaters and introduces the addition of the TU-12/VC-12 framing. The revisions relative to G.991.2 (2003) are indicated with revision marks.

Source

Amendment 1 to ITU-T Recommendation G.991.2 (2003) was approved on 22 July 2004 by ITU-T Study Group 15 (2001-2004) under the ITU-T Recommendation A.8 procedure.

FOREWORD

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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.

NOTE

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

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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, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Single-pair high-speed digital subscriber line (SHDSL) transceivers

Amendment 1

1) Resolution to passing of a target margin in an SHDSL access link with repeaters

Modify Annex D and Appendix III as follows:

Annex D

Signal regenerator operation

In order to achieve data transmission over greater distances than are achievable over a single SHDSL segment, one or more signal regenerators (SRUs) may be employed. In the optional M -pair mode, M -pair regenerators may be used when this reach extension is required. This annex specifies operational characteristics of signal regenerators and the start-up sequence for SHDSL spans containing signal regenerators. Additional explanatory text is included in Appendix III.

D.1 Reference diagram

Figure D.1 is a reference diagram of a SHDSL span containing two regenerators. Up to eight (8) regenerators per span are supported within the EOC addressing scheme (9.5.5.5), and no further limitation is intended herein. Each SRU shall consist of two parts: an SRU-R for interfacing with the STU-C (or a separate SRU-C), and an SRU-C for interfacing with the STU-R (or a separate SRU-R). An internal connection between the SRU-R and SRU-C shall provide the communication between the two parts during start-up and normal operation. An SHDSL span containing X regenerators shall contain $X + 1$ separated SHDSL segments, designated TR1 (STU-C to SRU₁), TR2 (SRU_X-C to STU-R), and RR _{n} (SRU _{n} -C to SRU _{$n+1$} - R, where $1 \leq n \leq X - 1$). Each segment shall follow the general principles described in 6.2, 6.3 and 7.2 for the preactivation and activation procedures. Additional requirements specific to spans containing regenerators are described in this annex.

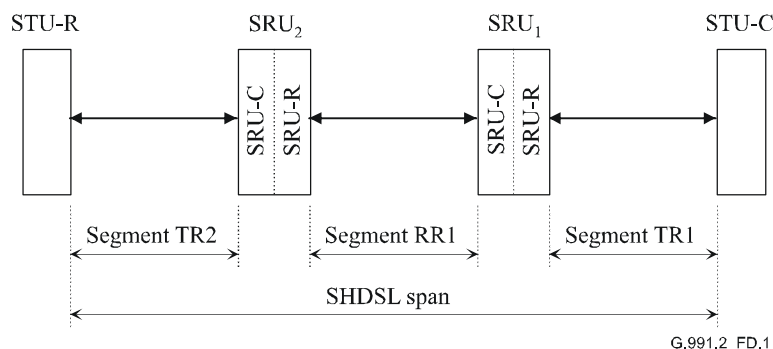


Figure D.1/G.991.2 – Block diagram of a SHDSL span with two signal regenerators

D.2 Startup procedures

D.2.1 SRU-C

Figure D.2 shows the state transition diagram for SRU-C start-up and operation. The SRU-C begins in the "Idle0" state and, in the case of an STU-R initiated start-up, transitions first to the ~~"Wait for STU-C"~~ "Idle0a" state. If line probe is disabled, the STU-C shall transition from the "Idle0a" state to the "Wait for STU-C" state; otherwise the STU-C will return to "Idle0" and wait for target margins to be passed across the internal regenerator interface with the indication that they originated at the STU-C. In this annex, the term "target margin" refers to both the current condition target margin and the worst-case target margin as described in 6.3.6 and 6.4.1. For an STU-C initiated start-up, the SRU-C moves from "Idle0" to the ~~"G.994.1 Session 1"~~ "Idle0b" state. If target margins have been received across the internal regenerator interface with the indication that they originated at the STU-C, the SRU-C will transition from "Idle0b" to Check "G.994.1" and the SRU-C will use these target margins in subsequent capabilities exchanges with its "CO target margin" capability bit set to a one. An SRU initiated start-up shall function identically to an STU-C initiated start-up from the perspective of the SRU-C.

The SRU-C shall communicate "Capabilities Available" status and transfer a list of its capabilities to the SRU-R across the regenerator's internal interface upon entering the ~~"Wait for STU-C"~~ or "Idle0a" state. The SRU-C's capabilities list, as transferred to the SRU-R, shall be the intersection of its own capabilities, the capabilities list it received from the STU-R (or SRU-R) in its G.994.1 session, and the segment capabilities determined by the line probe, if used.

The SRU-C shall receive mode selection information from the SRU-R in association with the "SRU-R Active" indication. In the subsequent G.994.1 session, the SRU-C shall select the same mode and parameter settings for the SHDSL session.

The timer T_{SRUC} shall be set to 4 minutes. If T_{SRUC} expires before the SRU-C reaches the "Active" state, the SRU-C shall return to the "Idle" state and shall indicate link failure to the SRU-R across the internal interface. The SRU-C shall also indicate failure and return to the "Idle" state if a G.994.1 initiation is unsuccessful after 30 s.

The "Diagnostic Mode" bit, if set in the G.994.1 Capabilities Exchange, shall cause an SRU-C to function as an STU-C if the subsequent segment fails. This implies that an internal failure indication received while in the "Wait for STU-C" state shall cause the SRU-C to select an operational mode, initiate a G.994.1 session, and transition to state "G.994.1 Session 2".

Figure D.2

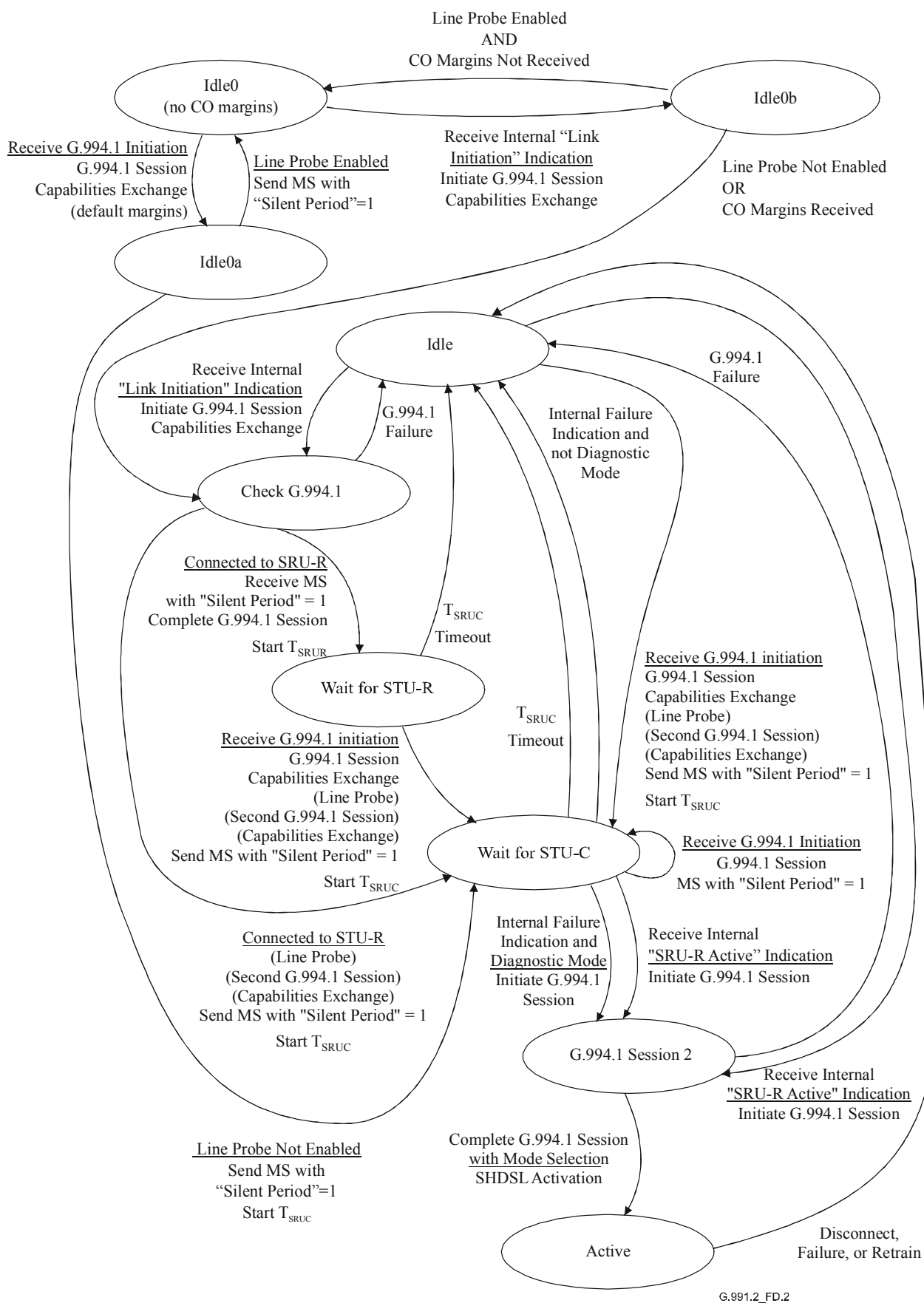


Figure D.2/G.991.2 – SRU-C state transition diagram