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DIGITAL SYSTEMS AND NETWORKS

Digital networks – Quality and availability targets

**The control of jitter and wander within digital
networks which are based on the synchronous
digital hierarchy (SDH)**

ITU-T Recommendation G.825

(Formerly CCITT Recommendation)

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ITU-T Recommendation G.825

The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)

Summary

This ITU-T Recommendation specifies the maximum network limits of jitter and wander that shall not be exceeded and the minimum equipment tolerance to jitter and wander that shall be provided at any relevant transport or synchronization interfaces which are based on the Synchronous Digital Hierarchy (SDH).

The requirements for the jitter and wander characteristics that are specified in this ITU-T Recommendation must be adhered to in order to ensure interoperability of equipment produced by different manufacturers and a satisfactory network performance.

Source

ITU-T Recommendation G.825 was revised by ITU-T Study Group 13 (1997-2000) and approved under the WTSC Resolution 1 procedure on 10 March 2000.

Keywords

Clocks, Input Jitter Tolerance, Input Wander Tolerance, Network Limits, Output Jitter, Output Wander, Synchronization, Timing.

FOREWORD

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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.

NOTE

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Introduction and background

In a digital network, jitter and wander accumulate on transmission paths according to the jitter and wander generation and transfer characteristics of each equipment interconnected. This equipment may be different types of multiplexers/demultiplexers, cross-connects, clocks and line systems, for example.

An excessive amount of jitter and wander can adversely affect both digital (e.g. by generation of bit errors, slips and other abnormalities) and analogue signals (e.g. by unwanted phase modulation of the transmitted signal). The consequences of such impairment will, in general, depend on the particular service that is being carried and the terminating or adaptation equipment involved.

It is therefore necessary to set limits on the maximum magnitude of jitter and wander, and the corresponding minimum jitter and wander tolerance at network interfaces, in order to guarantee a proper quality of the transmitted signals and a proper design of the equipment.

These network limits are independent from the particular service that is being carried.

ITU-T Recommendation G.825

The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)

1 Scope

The scope of this ITU-T Recommendation is to define the parameters and the relevant values that are able to control satisfactorily the amount of jitter and wander present at the SDH network-network interfaces (NNI).

SDH network interfaces, to which this ITU-T Recommendation is applicable, are defined in terms of bit rates and frame structures in ITU-T Recommendation G.707; their electrical characteristics are described in ITU-T Recommendation G.703 and the optical characteristics in ITU-T Recommendations G.957 and G.691.

Additional information regarding the architecture of SDH networks is found in ITU-T Recommendation G.803.

Jitter and wander requirements for PDH and synchronization networks are specified in ITU-T Recommendation G.823, for networks based on the first level bit rate of 2048 kbit/s, and in ITU-T Recommendation G.824 for networks based on the first-level bit rate of 1544 kbit/s.

The jitter and wander control philosophy is based on the need:

- to recommend a maximum network limit that should not be exceeded at any relevant interface;
- to recommend a consistent framework for the specification of individual digital equipment (i.e. jitter and wander transfer, tolerance and generation requirements);
- to provide sufficient information and guidelines for organizations to measure and study jitter and wander accumulation in any network configuration.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- ITU-T Recommendation G.691 (draft), *Optical interfaces for single-channel STM-64, STM-256 and other SDH systems with optical amplifiers*.
- ITU-T Recommendation G.703 (1998), *Physical/electrical characteristics of hierarchical digital interfaces*.
- ITU-T Recommendation G.707 (1996), *Network Node interface for the Synchronous Digital Hierarchy (SDH)*.
- ITU-T Recommendation G.783 (1997), *Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks*.
- ITU-T Recommendation G.803 (2000), *Architecture of transport networks based on the synchronous digital hierarchy (SDH)*.