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TELECOMMUNICATION
STANDARDIZATION SECTOR
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G.8272/Y.1367

Amendment 1

(04/2016)

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

Packet over Transport aspects – Synchronization, quality and availability targets

SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS AND NEXT-GENERATION NETWORKS, INTERNET OF THINGS AND SMART CITIES

Internet protocol aspects – Transport

Timing characteristics of primary reference time clocks

Amendment 1

Recommendation ITU-T G.8272/Y.1367 (2015) – Amendment 1

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ITU-T G-SERIES RECOMMENDATIONS

TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS

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INDIVIDUAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON METALLIC LINES	G.300–G.399
GENERAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON RADIO-RELAY OR SATELLITE LINKS AND INTERCONNECTION WITH METALLIC LINES	G.400–G.449
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For further details, please refer to the list of ITU-T Recommendations.

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Recommendation ITU-T G.8272/Y.1367

Timing characteristics of primary reference time clocks

Amendment 1

Summary

Recommendation ITU-T G.8272/Y.1367 specifies the requirements for primary reference time clocks (PRTCs) suitable for time, phase and frequency synchronization in packet networks. It defines the error allowed at the time output of the PRTC.

These requirements apply under the normal environmental conditions specified for the equipment.

Amendment 1 adds:

- a 10 MHz interface and note in clause 9.2,
- a paragraph in Appendix I,
- 10 MHz jitter specification in clause 6.3.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T G.8272/Y.1367	2012-10-29	15	11.1002/1000/11817
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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 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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Recommendation ITU-T G.8272/Y.1367

Timing characteristics of primary reference time clocks

Amendment 1

Editorial note: This is a complete-text publication. Modifications introduced by this amendment are shown in revision marks relative to Recommendation ITU-T G.8272/Y.1367 (2015).

1 Scope

This Recommendation specifies the requirements for primary reference time clocks (PRTCs) suitable for time, phase and frequency synchronization in packet networks. These requirements apply under the normal environmental conditions specified for the equipment.

A typical PRTC provides the reference signal for time, phase and frequency synchronization for other clocks within a network or section of a network. In particular, the PRTC can also provide the reference signal to the telecom grand master (T-GM) within the network nodes where the PRTC is located.

The PRTC provides a reference time signal traceable to a recognized time standard (e.g., coordinated universal time (UTC)). UTC can be obtained from a UTC time laboratory registered at Bureau International des Poids et Mesures (BIPM) (e.g., a national UTC time lab) or, most commonly, from a global navigation satellite system (GNSS).

This Recommendation defines the PRTC output requirements. The accuracy of the PRTC should be maintained as specified in this Recommendation.

This Recommendation also covers the case where a PRTC is integrated with a T-GM clock. In this case it defines the performance at the output of the combined PRTC and T-GM function, i.e., the precision time protocol (PTP) messages.

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; 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. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T G.703] Recommendation ITU-T G.703 (2001), *Physical/electrical characteristics of hierarchical digital interfaces*.

[ITU-T G.810] Recommendation ITU-T G.810 (1996), *Definitions and terminology for synchronization networks*.

[ITU-T G.811] Recommendation ITU-T G.811 (1997), *Timing characteristics of primary reference clocks*.

[ITU-T G.8260] Recommendation ITU-T G.8260 (2012), *Definitions and terminology for synchronization in packet networks*.

[ITU-T G.8271] Recommendation ITU-T G.8271/Y.1366 (2012), *Time and phase synchronization aspects of packet networks*.

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[ITU-T G.8273] Recommendation ITU-T G.8273/Y.1368 (2013), *Framework of phase and time clocks*.

[IEEE 1588-2008] IEEE Std 1588-2008, *Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

Definitions related to synchronization are contained in [ITU-T G.810] and [ITU-T G.8260].

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

1PPS 1 Pulse-Per-Second

GNSS Global Navigation Satellite System

GPS Global Positioning System

MTIE Maximum Time Interval Error

PRC Primary Reference Clock

PRTC Primary Reference Time Clock

PTP Precision Time Protocol

RF Radio Frequency

SSU Synchronization Supply Unit

T-GM Telecom Grand Master

TDEV Time Deviation

ToD Time of Day

UTC Coordinated Universal Time

5 Conventions

None.

6 Time error, wander and jitter in locked mode

The noise generation of a PRTC is characterized by two main aspects:

– the constant time error (time offset) at its output compared to the applicable primary time standard (e.g., UTC);

– the amount of phase error (wander and jitter) produced at its output.

For characterization of the second aspect described above (phase error) the calculation of the maximum time interval error (MTIE) and the time deviation (TDEV) is useful.

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