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Information technology — Galvanic isolation of balanced interchange circuits

*Systèmes de traitement de l'information — Isolation galvanique des
circuits d'échange équilibrés*



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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 9549 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

Annex A of this International Standard is for information only.

Introduction

This International Standard specifies a method of galvanically isolating signal exchanges on balanced interchange circuits using optocoupler integrated circuit technology. It may be applied for data transmission in a two-condition code (e.g. NRZ).

Galvanic isolation of interchange circuits is required whenever the intercommunicating devices are connected to different mains supplies. In this case, the ground potential difference between the earthing systems frequently is higher than the common mode voltage specified for the interchange circuit receiver. Transmission errors and even damage to the receiver may be the result.

The optocoupler type of galvanic isolation may also be used when high external signal interferences have to be minimized. This situation may exist with long interchange circuits and operation at higher data signalling rates.

The specifications of this International Standard are compatible with both ISO 8482 (multipoint connection) and CCITT Recommendation V.11 (point-to-point connection) because of application flexibility and the fact that there is not much difference in the parameters for the component design.

Bidirectional data transmission is provided and requires the implementation of an isolated generator and an isolated receiver. Their unbalanced interfaces are not specified in order to provide flexibility for implementations and device manufacturers.

Information technology — Galvanic isolation of balanced interchange circuits

1 Scope

1.1 This International Standard specifies galvanic isolation of balanced interchange circuits using optocoupler integrated circuit technology and is provided for data transmission in the two-condition code (e.g. NRZ).

The electrical characteristics are compatible with both ISO 8482 and CCITT Recommendation V.11.

NOTE — Compatible means to allow interoperation with devices having interchange circuits conforming to the electrical characteristics specified in the referenced standards.

Annex A shows interoperation with CCITT Recommendation V.11 interchange circuits in a point-to-point environment.

1.2 The specifications are given in terms of parameters and measurements for an isolated generator and an isolated receiver. These components may be used in twisted pair 2-wire or 4-wire point-to-point connections up to 1 000 m or multipoint connections up to 500 m for speeds up to 2 Mbit/s for point-to-point connections and 1 Mbit/s for multipoint connections. For data signalling rates up to 20 kbit/s, device manufacturers may optimize their component design.

1.3 Options are provided to meet special application requirements, such as

- isolated generator high impedance control;
- isolated receiver circuit failure detection capability;
- line termination in point-to-point configuration.

1.4 This International Standard does not describe a complete equipment interface in terms of mechanical, electrical and functional /procedural specifications.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8482 : 1987, *Information processing systems - Data communication - Twisted pair multipoint interconnections*.

CCITT Recommendation V.11 : 1988, *Electrical characteristics for balanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications*.