

ANSI/CEA Standard

Free-Topology Twisted Pair Channel Specification

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(Formulated under the cognizance of the CEA's **R7.1 HCS1 Subcommittee.**)

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Foreword

This standard was developed under the auspices of the CEMA Technology & Standards R-7.1 HCS1 Subcommittee.

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Free-Topology Twisted-Pair Channel Specification

1 Introduction

This document specifies the EIA-709.3 free-topology twisted-pair channel and serves as a companion document to EIA-709.1. The channel supports communication at 78.125 kbps between multiple nodes, each of which consists of a transceiver, a protocol processor, an application processor, a power supply, and application electronics.

This document covers the complete physical layer (OSI Layer 1), including the interface to the Media Access Control (MAC) layer and the interface to the medium. Parameters that are controlled by other layers but control the operation of the physical layer are also specified.

2 Normative References

The following standards contain provisions that, through reference in this text, constitute normative provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed in Section 2.1.

2.1 Normative Reference List

- EIA -709.1 Control Network Protocol Specification
- ANSI/TIA/EIA-568-A-1995, Commercial Building Telecommunications Cabling Standard, October 1995

2.2 Normative Reference Acquisition

EIA and ANSI/TIA/EIA Standards:

- Global Engineering Documents, World Headquarters, 15 Inverness Way East, Englewood, CO USA 80112-5776; Phone 800-854-7179; Fax 303-397-2740; Internet <http://global.ihs.com>; Email global@ihs.com

3 Network Overview

The EIA-709.3 free-topology twisted-pair channel supports up to 128 nodes on a single network segment with an optional link power source that supplies DC power to the nodes on the network. The channel is specified to support free-topology wiring, and will accommodate bus, star, loop, or any combination of these topologies. The total network length and number of nodes may be extended by use of EIA-709.3 channel physical layer repeaters, or EIA-709.1 compliant routers. The channel data rate is 78.125 kbps. Nodes can be either locally powered or link powered. A link-powered node derives its power from the network. The power is delivered on the same two conductors that carry data. Nodes are polarity-insensitive with respect to data as well as DC power. A locally powered node derives its power from a local source. The data is transmitted using Differential Manchester encoding, which is polarity-insensitive.

4 System Specifications

This section specifies the cable type used, terminations required with bus or free topology, maximum node counts and distances for link and locally powered schemes, and the maximum steady state power that can be drawn from the link power supply.

4.1 Cable

The cable shall conform to ANSI EIA/TIA 568A Category 5 requirements for 24 AWG unshielded twisted-pair cable. For a complete specification, see ANSI/TIA/EIA-568-A-1995.