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Information technology – Fibre channel –
Part 122: Arbitrated loop-2 (FC-AL-2)
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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

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INFORMATION TECHNOLOGY – FIBRE CHANNEL –

Part 122: Arbitrated loop-2 (FC-AL-2)

FOREWORD

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International Standard ISO/IEC 14165-122 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This consolidated version of ISO/IEC 14165-122 consists of the first edition (2005) and its Amendment 1 (2008).

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 1.1.

A vertical line in the margin shows where the base publication has been modified by Amendment 1.

The list of all currently available parts of ISO/IEC 14165 series, under the general title *Information technology – Fibre channel*, can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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INTRODUCTION

International Standard ISO/IEC 14165-122 specifies an enhancement to the signaling protocol of the Fibre Channel Physical and Signaling Interface (FC-PH), ISO/IEC 14165-251, to support communication among two or more Ports without using the Fabric topology. The following diagram shows the relationship of this document to other parts of Fibre Channel. FC-PH-n refers to *n* versions of FC-PH. The roadmap is intended to show the general relationship of documents to one another, not a hierarchy, protocol stack or system architecture. It does not show the complete set of Fibre Channel documents.

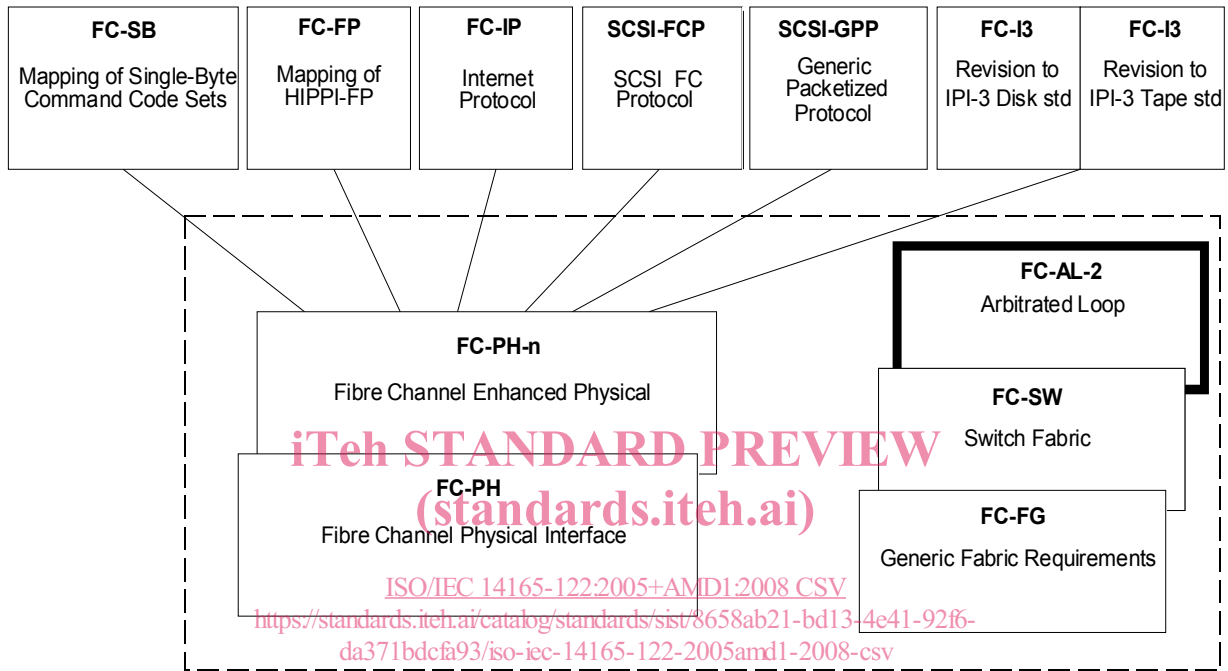


Figure 1 — Fibre channel roadmap

FC-AL features enhanced Ports, called L_Ports, which arbitrate to access an Arbitrated Loop. Once an L_Port wins arbitration, a second L_Port may be opened to complete a single point-to-point circuit (i.e., communication path between two L_Ports). When the two connected L_Ports release control of the Arbitrated Loop, another point-to-point circuit may be established. An L_Port may have the ability to discover its environment and works properly, without outside intervention, with an F_Port, an N_Port or with other L_Ports.

There is no change to the framing protocol of FC-PH-n, however, modification to the Port hardware is required to transmit, receive and interpret the new Arbitrated Loop Primitive Signals and Sequences.

INTRODUCTION to Amendment 1

Since the publication of ISO/IEC 14165-122:2005 (FC-AL) important technical corrections have been developed.

FC-AL-2 defines a method for the operation of a FC arbitrated loop. This amendment revises the base document, FC-AL-2, with respect to some inconsistencies found since approval of the base document.

This amendment contains the following changes:

- the transmission word delay through an L_Port is changed from 6 words to 12 words to accommodate higher fibre channel speeds; for example, 8 Gbit/s and 16 Gbit/s.
- the OPEN state is corrected to assure fairness for an L_Port that is using the TRANSFER state while another L_Port is using ARBf.

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INFORMATION TECHNOLOGY – FIBRE CHANNEL –

Part 122: Arbitrated loop-2 (FC-AL-2)

1 Scope

This part of ISO/IEC 14165 specifies signaling interface enhancements for FC-PH, to allow L_Ports to operate with an Arbitrated Loop topology. This standard defines L_Ports that retain the functionality of Ports as specified in FC-PH. The Arbitrated Loop topology attaches multiple communicating points in a loop without requiring switches.

The Arbitrated Loop topology is a distributed topology where each L_Port includes the minimum necessary function to establish a Loop circuit. A single FL_Port connected to an Arbitrated Loop allows multiple NL_Ports to attach to a Fabric.

When an L_Port is operating on a Loop with at least one other L_Port, the L_Port uses the protocol extensions to FC-PH that are specified in this standard.

When an L_Port is connected with an N_Port or an F_Port, the L_Port communicates using the protocol defined in FC-PH.

Each L_Port may use a self-discovering procedure to find the correct operating mode without the need for external controls.

2 Normative references

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The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 14165-131, *Information technology — Fibre Channel — Part 131: Switch Fabric Requirements (FC-SW)*

ISO/IEC 14165-141, *Information technology — Fibre Channel — Part 141: Fabric Generic Requirements (FC-FG)*

ISO/IEC 14165-251, *Information technology — Fibre Channel — Part 251: Framing and Signaling (FC-FS)*¹

INCITS 230:1994 [R2004], *Fibre Channel — Physical and Signaling Interface (FC-PH) [T11]*

Amendment 1 (1996)

Amendment 2 (1999)

¹ Under consideration.

3 Definitions and conventions

3.1 Definitions

For the purposes of this International Standard, the definitions in FC-FH and the following definitions apply. Definitions in this clause take precedence over any definitions in FC-FH.

3.1.1

Arbitrated Loop

Fibre Channel topology where Ports use arbitration to gain access to the Loop

3.1.2

Arbitrated Loop Physical Address (AL_PA)

unique one-byte valid value as established in 5.1

3.1.3

Arbitrated Loop Destination Address (AL_PD)

Arbitrated Loop Physical Address of the L_Port on the Loop that should receive the Primitive Signal or Primitive Sequence

For example, the AL_PD is the y value of the OPNyx or OPNy Primitive Signal.

3.1.4

Arbitrated Loop Source Address (AL_PS)

Arbitrated Loop Physical Address of the L_Port on the Loop that transmitted the Primitive Signal or Primitive Sequence

For example, the AL_PS is the x value of the OPNyx Primitive Signal.

3.1.5

close

procedure used by an L_Port to terminate a Loop circuit

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3.1.6

current Fill Word

Fill Word currently selected by the LPSM to be transmitted when needed. The initial value is the Idle Primitive Signal (see 8.4)

3.1.7

Dynamic Half-Duplex

procedure initiated by the L_Port in the OPEN state to change a full-duplex transfer to a half-duplex transfer

The resulting half-duplex transfer is from the L_Port in the OPENED state to the L_Port in the OPEN state (see 7.4 and annex C).

3.1.8

fairness window

period during which a fair L_Port can arbitrate and win access to the Loop only once (see 4.3)

3.1.9

Fill Word

Transmission Word which is an Idle or an ARByx Primitive Signal

These words are transmitted between frames, Primitive Signals and Primitive Sequences to keep a fibre active. For information about Primitive Signals and Primitive Sequences, see FC-FH.