



ISO/IEC JTC 1/SC 25/WG 4 **N 601**

**"Interconnection of computer systems
and attached equipment"**

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Title: Draft Report of 2nd meeting of ISO/IEC JTC 1/SC 25/WG 4
held in Bremen, Germany,
on September 30 to October 2, 1991

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Project: -

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Action requested:

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Draft Report
of the 2nd meeting of ISO/IEC JTC 1/SC 25/WG 4
held in Bremen, Germany, on September 30 to October 2, 1991

1 Opening of the meeting

Prof. Popovic, Convener of SC 25/WG 4, opened the meeting.

2 Roll call of experts

The experts introduced themselves. There were 10 Delegates from:

Denmark	J. Kolind
Germany,	F. Caprasse, J. Haas, J. Märgner, J. Schwandt
Japan	Y. Kawamura
USA	R. Cummings, J. Kubinec, G. Milligan, D. Shoemaker,

and as officers from DIN and DKE: N. Kovacs (Secretary WG 4) and Th. H. Wegmann (Secretary of 715.4, the German National Committee corresponding to WG 4).

3 a. Adoption of agenda

With a few amendments the agenda doc. SC 25/WG 4 N 598 was adopted.

b. Approval of the minutes of the previous meeting

No amendments were required to doc. SC 25/WG 4 N 595.

4 Appointment of the drafting committee

Y. Kawamura	Japan
R. Cummings	USA
J. Schwandt	Germany

5 Report of the secretariat

The secretary, Dr. Kovacs, reported on the progress of each project as it was called.

6 Project 1 - Channel interface specifications

Gene Milligan presented the FDDI survey of progress (see Bremen-7) prepared by Floyd Ross, Timeplex (a subsidiary of Unisys acquired by Ascom, Switzerland, as of Oct. 1, 1991).

Characteristics of Basic FDDI

Token Ring architecture

100 Megabits per second

- . Group encoding - 125 megabaud
- . Sustained data rate of 10 megabytes per second

Accommodated packed traffic with frames up to 4500 bytes in length

Optical fibre medium

- . LED based technology
- . 2nd. window transmission
- . 4 fibre sizes permitted
- . individual links may be up to 2 kilometers in length
- . Duplex cables and connectors

Optical bypass switch (optional)

Dual Ring connection

- . Redundancy (Dual PHYs)
- . Dual access (Dual MACs)

Timed Token Rotation (TTR) protocol provides **fair and deterministic access** for

- . Synchronous frames
 - Guaranteed bandwidth and response time
- . Asynchronous frames
 - Multiple priority levels
- . Restricted token mode
 - Dedicates asynchronous bandwidth to single dialogue
 - Minimizes response time

Default timer values accommodate up to

- . 500 stations
- . 100 kilometers of cabled fibre

Extensions

FDDI-II HRC Hybrid Ring Control for
isochronous data streams
digital voice and video
control and sensor data streams
backbone network for PABXs

3 alternative PMD replacements

SMF-PMD	single-mode fibre, up to 60 km
LCF-PMD	low cost fibre
TP-PMD	(Low-cost) twisted pair PMD

All PMDs support the same data rate but different distance.

SPM	SONET Physical Layer Mapping alternative to PMD via public net. SPM supports the same data rate.
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Status: MAC-2 technical letter ballot closed
 PHY-2 technical letter ballot closed
 SMT technical letter ballot closed, many comments
 to resolve
 SMF-PMD almost ANSI standard
 HRC 1 Revision beyond ISO-DIS
 SPM draft of ANSI standard in process

MAC-2 will be fully interoperable with MAC; however, the current MAC standard will be retained in the U.S. as active standard.

The same applies to PHY-2 and PHY. PHY-2 Rev. 5 was forwarded to X3.

HRC Rev. 6.1 was sent out for ISO DIS Letter Ballot. Meanwhile Rev. 6.2 with minor changes and clarifications was approved for X3 in June. Expected approval as ANSI standard late 1991/early 1992. X3T9.5 will incorporate the editorial comments received from Germany on the DIS document.

SMT Rev 6.2 was authorized by April 1990; X3T9 letter ballot was issued in May 1990. 574 comments were received, 533 have been resolved or accepted. The open comments will be dealt with in December 1991; the earliest publication of the revised document Rev. 7 will be in March 1992.

Future work

No documents are available yet for SPM, TP-PMD, LCF-PMD. For Conformance Test PICS Proforma for FDDI Rev. 1 was published, Rev. 2.1 is due.

6.1 Project 1.4 - Fibre Distributed Data Interfaces (FDDI) - Part 2: Token Ring Media Access Control (MAC) Registration of MAC Addresses

The requested inclusion of FDDI-MAC/LLC interface into ISO/IEC 10039 (see N 590) was investigated in the U.S. X3T9.5 Committee with Paul Cowell, the presenter of this issue, present. Result: Requirements shall be worked out before the proposed inclusion. Meanwhile, ISO 10039 was published without the inclusion of FDDI MAC. This may be included in a later revision of ISO/IEC 10039 (see also Bremen-8).

Registration of MAC addresses (see N 593 and Bremen-6): X3T9 requested IEEE to act as registration office and reserve a block of 16 contiguous addresses assigned for FDDI MAC addresses. Up to now 2 MAC addresses were requested (see Bremen-9). The purpose and usage of these addresses will be covered in the SMT document. They are used for internal ring management.

N 593 contains the request to IEEE and their reply which means that ISO may or may not request this registration. ANSI X3T9 requested the reservation of 16 addresses which were reserved by IEEE. For the implementations the individual company has to make the request for individual 48-bit addresses for each piece of equipment.

Proposed defect report on ISO 9314-2 from EWOS/EGLL (Expert Group on Lower Layers) (see Bremen-2) requests some clarifications in MAC which are up to now only provided in MAC-2. This will be considered by the U.S. experts.

Jens Kolind drafted a reply to N 593 on the registration of MAC addresses (see Bremen-6). IEEE is asked to specify where to send to any applications.

Jens Kolind addresses a problem with 9314-2 detected by EWOS/EGLL (see WG 4 Bremen-5). It seems to be unclear which bits of the addresses are the control bits.

ANSI X3T9 will investigate this issue and determine whether and which action needs to be taken (addendum, technical corrigendum, or none). Jens Kolind advises not to use a technical corrigendum because this changes the standard and makes existing implementations non-conforming to the standard.

**6.2 Project 1.6 - Fibre Distributed Data Interface (FDDI) -
Part 4: Single-Mode Fibre Physical Layer Medium Dependent
(SMF-PMD)**

The CD Letter Ballot approved 9314-4 (see 25 N 67 = Bremen-4). Editorial comments from Germany have been forwarded to the project editor Michael Muma of Boeing to be dealt with.

Juergen Schwandt mentions that a major part of the text is identical with 9314-3 (PMD). Starting from there an ISO style version should be easily achievable.

It is a general problem to keep track of any amendments that should be taken care of in future revisions of existing standards. Dr. Kovacs recommends to write defect reports.

**6.3 Project 1.7 - Fibre Distributed Data Interface (FDDI) -
Hybrid Ring Control (HRC) (ISO/IEC DIS 9314-5)**

DIS Letter Ballot voting ends on 1992-02-08. Votes and any comments have to be sent to ITTF. HRC Rev. 6.3 is under way. Advance copies of comments are welcome to the U.S. delegates. The SC 25 Secretary will have to provide "Results of voting", and the U.S. member body will have to resolve comments.

**6.4 Project 1.8 - Fibre Distributed Data Interface (FDDI) -
Station Management (SMT)**

NP voting ended on 1991-08-09 and approved the project. A project number has to be assigned by the SC 25 secretary. A WD document (Rev. 7) may be available in March 1992 at the earliest and should be circulated in WG 4. At the next meeting of WG 4 in Milan, it should be considered and accepted for CD Letter Ballot.

6.5 Proposal for a New Work Item: Fibre Distributed Data Interface (FDDI) - Physical Layer Protocol - 2 (PHY-2)

NP voting ended on 1991-08-09 and approved the project. A WD was circulated as N 584. A CD document will be available before the end of October 1991. In the USA, it was decided to maintain 2 standards for PHY and PHY-2. PHY-2 has the requirement to implement FDDI-II but has a basic mode that conforms to PHY.

The U.S. experts are asked to identify the differences between PHY and PHY-2 in more detail at the next meeting.

6.6 Proposal for a New Work Item: Fibre Distributed Data Interface (FDDI) - Media Access Control - 2 (MAC-2)

NP voting ended on 1991-08-09 and approved the project. A WD was circulated as N 585.

The U.S. National committee wants to have two international standards since there are two equivalent national standards. PHY-2 and MAC-2 shall become parts of 9314.

6.7 Proposal for a New Work Item: Fibre Distributed Data Interface (FDDI) to Synchronous Optical Network (SONET) Physical Layer Mapping Function (SPM)

NP voting ended on 1991-08-09 and approved the project. A WD will not be available before the 2nd half of 1992.

6.8 Future work

see item 8.

7 Project 10 - Device level interface - Interfaces between host computers and devices

7.1 Project 10.3 - Storage Module Interfaces (ISO/IEC 9324)

Gene Milligan, the project editor, prepared the preliminary final text which was proof-read by Keith Brannon. The final text as camera-ready copy shall be finished by the end of this year. Also a disposition of comments has to be prepared, referring to the comments circulated as SC 13 N 506.

7.1A Project 10.5 - Interface for streaming cartridge tape cassette drive (ISO/IEC 9317)

The responsible ANSI committee reaffirmed the national standard and will provide an editor for completing the ISO document.

**7.2 Project 10.6 - Intelligent Peripheral Interface (IPI) -
Part 1: Physical level (ISO/IEC 9318-1)**

The missing figures were sent to Keith Brannon to complete the IS. Dr. Kovacs will find out the status.

**7.3 Project 10.11 - Intelligent Peripheral Interface (IPI) -
Part 5: Device-specific tape commands (ISO/IEC DIS 9318-5)**

The results of voting together with the comments received were circulated as 25 N 41. The responsible ANSI committee will have to clarify the issue raised in the German technical comment on par. 3.2.2. After that a camera-ready copy will be prepared in the ISO style of the already published parts 9318-2 to 4 and sent to ITTF. Also a disposition of comments is required.

**7.4 Project 10.14 - Intelligent Peripheral Interfaces (IPI) -
Part 6: Enhanced PHY**

A WD was circulated as 13 N 567 in 1989. The ISO-style document passed public review in the U.S.A. An issue was raised that from experience ISO 8482 is not fully equivalent to EIA RS 485 as was intended. Some characteristics such as the common mode voltage range specified in ISO 8482 conflict with high-speed applications of conforming circuits (see Bremen-11).

A defect report shall be sent to SC 6 WG 3 to be resolved at its next meeting in January 1992.

The appropriate circuit specification shall be included into an annex of forthcoming ISO/IEC 9318-6 with a note that this annex be dropped after according revision of ISO 8482.

**7.5 Project 10.10 - Intelligent Peripheral Interface (IPI) -
Part 7: Generic command set for communications**

There is no editor for the ISO document. SC 25 N 41 asked for nomination of an editor, otherwise the project had to be discontinued (see recommendation 4.3 of Las Vegas meeting). Since no editor was nominated, the project is now discontinued.

**7.6 Project 10.12 - Enhanced Small Device Interface (ESDI) -
(ISO/IEC 10222)**

The ISO style final text has been completed and will be sent to ITTF by ANSI.

Dal Allan still has to provide the disposition of comments report as agreed upon in Las Vegas. This has to be sent to ITTF and to the WG 4 secretary for distribution with the final text.

Note: All final texts (camera-ready copies) and dispositions of comments have to be sent to ITTF for IS publication and to the WG 4 secretary for circulation.

7.7 Project 10.13 - Small Computer System Interface (SCSI-2) - (ISO/IEC CD 9316)

Current Rev. 10g will be voted upon in the U.S. and afterwards submitted to ISO as a replacement for the current standard ISO 9316. X3T9 has concluded that the current revision 10g be published as national and international standard although the technology will continue to develop.

SCSI-2 includes the common command set with mode select, mode sense commands paged. By changing set-up and hold times and fast rise and fall times SCSI-2 FAST supports up to 5 Mbytes/s in the data phases in synchronous mode.

For 16-bit operation a single cable shall be used instead of A and B cables as in SCSI-1. SCSI-2 offers a SCSI-1 mode. There is a field for implementation identification (ECMA, SCSI-1 or SCSI-2) (see Bremen-15). New device types not included in SCSI-1 were added. See Foreword for differences.

Further developments and additions will go into SCSI-3, a planned multi-part standard.

The SCSI-2 Rev. 10g document was circulated for information. The ANSI document may be used later to be circulated for CD Letter Ballot. However, if so this will be written to the WG 4 secretary who will forward the document to SC 25 secretariat for CD Letter Ballot.

7.8 Project 10.15 - High Performance Parallel Interface - Part 1: Mechanical, Electrical and Signalling Protocol Specification (HIPPI-PH)(ISO/IEC CD 11518-1)

Revision 8.1 dated 1991-06-24 was distributed during the meeting, for information, including the comments from U.S.A. (see Bremen-16). CD Letter Ballot approved the CD document Rev. 7.2 (see 25 N 45 /Bremen-3). These comments will be included (see Bremen-12). The following comments were addressed:

On "NOTE": a smaller font size is shown in ISO directives.

On "Safety and fire standards": they are assumed to be national, not international.

In "Int.": it shall read "introduction" in the index because this uses section numbers rather than page numbers; the 4 entries refer to the introduction.

ISO/IEC 11518-1 may be used independently of other parts of HIPPI under development. They shall be submitted later to WG 4.

A DIS document will be prepared.

8 Standardization activities in WG 4

Project numbers shall be reconsidered at the Milan meeting.

The tabular overview N 596 was reviewed, and changes were recorded. These changes refer to technical characteristics as well as the status of some documents. Juergen Schwandt maintains this table and will provide a revised version after the meeting.

Future work

To keep WG 4 informed of the progress of work in the U.S. it was agreed that the X3T9 project status sheet shall be mailed regularly to the WG Secretary for circulation in WG 4.

NP applications were agreed upon at Las Vegas for alternative FDDI PMD parts (LCF, UTP, STP) and FDDI follow-up (FFOL).

Initial FFOL standards are anticipated for 1993 to 1995. They will apply existing FDDI cable plant and support 600+ Mbit/s, SDH (Synchronous Digital Hierarchy) and ATM (Asynchronous Transfer Mode).

Low-cost PMDs

TP-PMD STP, UTP, combined STP/UTP (shielded/unshielded twisted pair)

LCF-PMD low-cost copper
low-cost fibre implementations with broader tolerances, smaller connector

All PMDs shall support the same data rates.
There are several, not yet accepted, proposals.

For information of SC25/WG 4 the ANSI project application documents of FFOL and low-cost PMDs shall be sent to the secretary of WG 4 for circulation (see AP 10-12 of Las Vegas Meeting).

SCSI-3 (see Bremen-17) (foils)
evolve functionality, performance
downward compatibility
serial alternative
layered documentation

SCSI command set SCS

SCSI	SCSI
Interlocked	Packetized
Protocol	Protocol
SIP	SPP

SCSI	SCSI
Parallel	Serial
Interface	Interface
SPI	SSI

Fibre channel (see Bremen-18)

The Fibre Channel (FC) is a single interface design capable of handling various protocols, e.g. SCSI, IPI, HIPPI-FP. It uses pieces from a number of other systems.

Requirements:

- very small connector size, serial for ruggedness,
- 2 to 10 km operating distance,
- up to 100 Mbytes/s payload (= real data)
- new low-level protocol (not extender of existing syst.)

multiple cost/performance levels, preserve existing command sets, driver software

define a channel/network hybrid = fabric which shall be

- enough of a network for connectivity, distance, serial interface
- enough of a channel to be simple, repeatable, to be implemented in hardware

The fabric can be a large number of things that interconnect the boxes attached to the Fibre Channel system, e.g. daisy-chained cables, crossbar, PABX, etc.

3 classes of connection

- 1 like circuit switching, dedicated connections and ports
- 2 frame switched
 - buffer-to-buffer flow control
 - frames received in transmitted order (in first implementations)
 - or not (in later, more complex systems)
- 3 datagrams: no guarantee for delivery and order, no acknowledgement

Addressing: single-level, 24 bit address space. It is intended to support fabric consisting of heterogenous elements from multiple vendors.

Defined payload 12.5, 25, 100 Mbytes/s
resulting in 132, 266 1062.5 Mbaud

Encode/decode scheme 8B/10B IBM patented (with very good DC balancing).

Framing protocol supports variable-length frames.

At X3T9 level the first public review took place for the FC-PH physical interface (FC 0, 1, 2).

Lasers specified in FC comply with IEC 825 "Radiation safety on laser products, equipment classification, requirements and user's guide".

The laser interface has built-in safety precautions that switch off the transmitter if the receiver loses light.

Some delegates asked for the differences between Fibre Channel (FC) and ESCON, an IBM product. It was said that ESCON is similar to FC, but FC has more functions. ESCON has only one data rate and uses LED transmitters. IBM does not intend to offer ESCON for standardization.

HIPPI

HIPPI-PH	11518-1 CD Letter Ballot passed
HIPPI-FP	Framing Protocol, defines formats of packets sent across HIPPI
HIPPI-LE	Link Encapsulation, defines how to run 8802.2 LLC over HIPPI
HIPPI-MI	Memory Interface
HIPPI-IPI	IPI-3 Interface
HIPPI-SC	Switch Control (no document)

FB (Frame Buffer) was not accepted.

Separate NP applications will be prepared for these projects.

CAM

Common Access Method for SCSI peripherals is essentially a software driver standard to facilitate having compatible host bus adapter facilities. X3T9 has to decide whether to submit this for an NP.

CAM contains operating-system dependent parts for UNIX, DOS, and NOVELL operating system. For any operating system, OS dependent operations will be needed.

WG 4 is interested in such a project. U.S.A. will provide an NP application .

ATA

AT attachment (emulation of a WD 1003 controller with 2 ST506 disk drives) to AT bus (the original PC XT configuration) limited to 2 disk drives, 8 cm of cable length. The high volume of disk drives shipped (about 80%) uses this interface.

DADI

Directly Addressed Device Interface for very small disk drives mounted to printed circuit boards.

PCM CIA

Interface for Memory Cards (of credit card size, to be plugged into laptops, notebook computers).

IPI-2 enhanced disk

A document is under preparation and is expected by the end of 1991.

IPI-3 disk and tape
will be revised.

9 **Liaison with other organizations**

9.1 **Report on the development of interface standards within
IEC/SC 65C/WG6**

Juergen Schwandt announced a written report to be included into the meeting report:

IEC SC 65C WG 6 develops - together with the U.S. national committee ISA SP 50 - the Fieldbus standards. The following is a citation from the Application Layer Specification Fieldbus document:

"The Fieldbus is intended to be used in factories and process plants to interconnect primary automation devices (sensors, actuators, field mounted controllers, etc.) and to connect these devices with the control and monitoring equipment located in control rooms. This use positions the fieldbus at the lowest levels of the CIM architecture.

Primary automation devices are associated with the lowest levels of the industrial automation hierarchy and perform a limited set of functions within a definite time window. These primary automation devices, also termed field devices, are located close to the process fluids, the fabricated part, the machine, the operator and the environment.

These primary automation devices are growing in capability, evolving toward configurations with several sets of functions, to carry out automatically not only their primary activity but also such functions as diagnostics, calibration, and reconfiguration. As simple and intelligent primary automation devices become available, there will be an evolution toward a distribution (in the field devices) of some activities traditionally carried out completely by a centralized system. Some of these activities include diagnostics, data validation, and handling of multiple inputs and outputs pertaining to a small portion of the system.

Examples of these primary automation devices are sensors, actuators, local display devices, annunciators, small logic controllers or small single loop controllers. Fieldbus is intended to connect a wide variety of primary automation devices, exchanging a few items of information within a definite time window, over a limited distance within a building or over a small area of a plant. Some of the expected benefits in using Fieldbus are reduction in wiring, increase in amount of data exchanged, wider distribution of control between the primary automation devices and the control room equipment, and the satisfaction of time critical constraints."

IEC SC 65C/WG 6 holds joint meetings with ISA SP 50. A joint meeting took place in Milan on 16-19 September 1991, the next meeting dealing with the data link layer is in Fribourg, Switzerland, on 18-22 November 1991.

A Working Draft 1.0 of the Fieldbus Application Layer Specification was completed in October 1991. It is to be developed further before letter balloting.

This document specifies a set of application layer standards for the communication and interworking of sensors, actuators and other automation devices. By using this standard together with other standards positioned within the OSI or Fieldbus Reference Models, otherwise incompatible systems may work together in any combination.

This set of standards describes the Fieldbus Application Layer Services and Protocol specifications, including the management operations and communications appropriate to the management of an open fieldbus communications environment.

A draft of the Data Link Service Definition - FieldBus part 3 version 8 - was sent out for comments in October.

Also a Network Management Specification was drafted and sent out for comments.

The Physical Layer Specification was balloted and commented mid 1990, and the comments received have been resolved to submit a draft for worldwide letter ballot in the 3rd quarter of 1991. The results of voting will be considered at the November meeting.

The Physical Layer offers alternative data rates of 31.25 Kbit/s and 1 Mbit/s in voltage mode and 1 Mbit/s in current mode. 2.5 Mbit/s in voltage mode have been requested.

Meanwhile a European ESPRIT research project FICIM (Fieldbus Integration into CIM) was started.

9.2 Report on the development of LAN-standards within IEEE

No reporter present.

9.3 Report on the development of IEC/TC 86 "Fibre Optics"

No reporter present.

9.4 Report on the activities of ISO/IEC JTC 1/SC6 regarding local area networks (LAN)

Prof. Haas is convenor of WG 3 and could not attend WG 1 dealing with LAN protocols and bridges.

WG 3 deals with physical aspects of datacommunication.

8802-4 Token-bus: no activities regarding fibre optics.

8802-3 CSMA/CD projects (see Bremen-13), FOIRL was published.

SC 6 decided to take over the responsibility for fibre-optic implementations for all LAN standards from SC 25 WG 2.

A NP Letter Ballot to include twisted-pair cables with 120 ohms in addition to current twisted-pair cables with 100 ohms, to cover needs outside U.S.A. was started.

8802-5 Token-ring standard will be published in the same form for IEEE and ISO. Several amendments are under way to make the text more readable.

The fibre-optic part of 8802-5 is making progress, a draft will be available in the January 1992 meeting of WG 3 for consideration as CD.

Test purposes and test suite specifications for token-ring LANS are under development towards a document.

A TR 10738 on UTP (unshielded twisted pair) cables for token-ring LAN is under preparation.

A TR 9578 on LAN connectors has been published.

8802-6 DQ DB: A CD letter ballot is out, voting ending in December 1991.

8802-7 Slotted-ring is published as International Standard.

9.5 Cooperation with JTC 1/SC 1. List of terms with definitions for FOLANS

For Fibre Channel, terms different from FDDI will be defined.

Prof. Popovic suggests to prepare chapters for distributed fibre interfaces and for channel fibre interfaces to be included into ISO 2382, Information Technology Vocabulary. These terms may be included into part 25 (LAN) at its next revision or as an amendment. Fibre optics technology terms recently published by IEC TC 86 shall be taken into account (see CD IEC 86(Sec)33, voting ended 31.08.91).

10 Future meetings

The SC 25 plenary and WG meetings will be from 8 to 12 June 1992 in Milan. Prof. Popovic will fix the date for the WG 4 meeting.

11 Any other business

ISO 9314-3 was checked for editorial errors addressed by Japanese experts on the Las Vegas meeting. They do not justify a reprint, but will be covered in a future revision of the standard..

A liaison statement was received from SC 21 (see 25 N 62) on "managed objects in FDDI". Gene Milligan reports that the SMT document will cover this in the MIB section (management information base). ISO/IEC 10165 is a multipart standard on OSI management currently under development. CCITT SG VII and SC 21 WG 4 do the technical work.

SC 6 WG 3 proposed a project on physical layer management.

Jens Kolind comments that it is important to harmonize the SMT document with the developing OSI management standards.

TA 54 has to be commented until the end of October 1991 and shall be sent out for pDISP Letter Ballot (see Bremen-1,2). A liaison statement from SGFS was sent to SC 25 WG 4 (see 25 N 61). Jens Kolind asks to have this contribution checked. X3T9 requested that the PICS Proforma developed in the U.S.A. for FDDI Conformance Test be used instead of the provisional PICS Proforma developed by AOW.

Jens Kolind suggested that SC 25 establishes S-liaison to regional workshops. Denmark will propose action to be taken for the next meeting. Liaison with regional workshops shall become an agenda item of WG 4. Unfortunately, Jens Kolind will not be in the position to cover this subject any longer.

ISO 6951: A periodical review of International standards is required. ISO 6951 Eurobus A was confirmed with one negative vote from Germany.

Juergen Schwandt referred to new ISO and IEC procedures to speed up work (see Bremen-10). These procedures comprise essentially:

- Tighter schedules for document preparation and for voting:
 - 18 months between NP registration and first working draft,
 - 6 months between working draft and committee draft,
 - 36 months after start of project a DIS manuscript has to be supplied - in machine-readable form,
 - 4 months of DIS voting,
 - 9 to 14 months from DIS submission to IS printing.
- Restriction of technical changes to the CD level,
- DIS voting may approve or disapprove, but not change a DIS,
- Synchronous publication of all parts required for the application of a multi-part standard,
- Parallel DIS voting in ISO, CEN resp. IEC, CENELEC, i.e. on international and European level.

12 Approval of resolutions, action points

Resolutions approved during the meeting are contained in Attachment 1.

Action points as amended during the meeting are listed in Attachment 2.

Resolutions of the 2nd meeting of ISO/IEC JTC 1/SC 25/WG 4**Resolution 1**

WG 4 resolves to request the SC 25 secretariat to send a letter to the IEEE Registration Authority stating:

"Thank you for your letter dated 1990-12-11. ISO/IEC JTC 1/SC 25/WG 4 has discussed your letter during its meeting in Bremen, 1991-09-30/10-02.

WG 4 will request that SC 25 widely distribute your Request Form and instructions for IEEE Assignment of a 48-Bit LAN Globally Assigned Address Block and promote their use in FDDI implementations. This will facilitate interconnection through bridges and/or gateways of FDDI networks with each other and with 8802 type networks.

WG 4 welcomes the offer from IEEE to continue to act as the registration authority for 48 bit FDDI MAC addresses. However it is not clear who within IEEE should receive requests for 48 bit MAC addresses required for inclusion within the FDDI standards. In this regard IEEE is requested to provide this information."

Resolution 2

WG 4 resolves to remind the SC secretariat to take the necessary steps to discontinue the IPI Part 7: Generic command set for communications project since during the call to member bodies to nominate candidate project editors no appropriate candidates were nominated.

Resolution 3

WG 4 resolves to request the SC 25 secretariat to take the necessary steps to reserve the following standards numbers to continue the subdivision of families of standards:

- 9314-7 FDDI PHY-2
- 9314-8 FDDI MAC-2
- 9314-9 FDDI Low Cost Fibre (LCF) PMD
- 9314-10 FDDI Shielded Twisted Pair (STP) PMD
- 9314-11 FDDI Unshielded Twisted Pair (UTP) PMD
- 9314-12 FDDI SONET Mapping (SPM)
- 9314-13 FDDI Conformance Testing PICS (CTPICS)
- 9314-20 FDDI Follow-on LAN (FFOL) PMD
- 9314-21 FDDI Follow-on LAN (FFOL) PHY
- 9314-22 FDDI Follow-on LAN (FFOL) Service Multiplexer (SMUX)
- 9314-23 FDDI Follow-on LAN (FFOL) Isochronous MAC (IMAC)
- 9314-24 FDDI Follow-on LAN (FFOL) Asynchronous MAC (AMAC)
- 9314-25 FDDI Follow-on LAN (FFOL) SMT
- 9316-1 SCSI-2
- 9316-2 SCSI Common Access Method (CAM)
- 9316-3 SCSI Command Set (SCS)
- 9316-4 SCSI Interlocked Protocol (SIP)
- 9316-5 SCSI Parallel Interfaces (SPI)
- 9316-6 SCSI Packetized Protocol (SPP)
- 9316-7 SCSI Serial Interface (SSI)

9318-8 IPI-2 Enhanced

- 11 518-2 HIPPI Framing Protocol (FP)
- 11 518-3 HIPPI IEEE Logical Link Control Interface (LE)
- 11 518-4 HIPPI IPI-3 Mapping
- 11 518-5 HIPPI Memory Interface (MI)
- 11 518-6 HIPPI Switch Control (SC)

- TBD -1 Fibre Channel (FC) Physical (PH)
- TBD -2 Fibre Channel (FC) SCSI Mapping
- TBD -3 Fibre Channel (FC) IPI-3 Mapping
- TBD -4 Fibre Channel (FC) HIPPI-FP mapping
- TBD -5 Fibre Channel (FC) Fabric
- TBD -6 Fibre Channel (FC) Low Cost Fabric (LCF)

Resolution 4

WG 4 resolves to request the SC 25 secretariat to take the necessary steps to issue DIS 11 518-1 HIPPI Physical (PH) when the revision is received incorporating the resolution of the CD comments.

Resolution 5

WG 4 resolves to thank Herrn Prof. Dr. Popovic and his associates for their very kind hospitality, assistance, and arrangements for the productive WG 4 meeting in Bremen.

Resolution 5 was unanimously accepted with applause.

Action points resulting from the 2nd meeting of ISO/IEC JTC 1/SC 25/WG 4 held in Bremen, Germany, on 30 September to 2 October 1991 including remainders from 1st meeting, Las Vegas, January 7 to 10, 1991

No.	actor	project	action required
1-01	USA	9314	Provide list of terms on FDDI to JTC 1/SC 1
1-07	Secr.	9314-6	Initiate CD letter ballot
1-08	USA	9314-6	Provide doc. SMT Rev. 7.0 for CD letter ballot
1-10	USA	9314-x	Provide NP applications for FDDI-LCF-PMD
1-11	USA	9314-x	Provide NP applications for FDDI-FFOL
1-12	USA	9314-x	Provide NP information for FDDI-twisted pair PMD
1-13	USA	9316.2	Provide DIS doc. covering DP 10288 LB comments
1-14	Secr.	9316.2	Initiate DIS letter ballot replacing DIS 10288
1-15	USA	9317	Complete final text for IS, dispos. of comments
1-16	USA	9318-1	Complete final text for IS, dispos. of comments
1-18	USA	9318-5	Resolve comments from DIS letter ballot
1-19	USA	9318-5	Complete final text for IS, dispos. of comments
1-21	Secr.	9318-7	Discontinue project if no project editor can be found
1-22	USA	9318-x	Provide NP application for IPI-2 Enhanced Disk
1-23	USA	9324	Complete final text for IS, dispos. of comments
1-24	USA	10222	Complete final text for IS, dispos. of comments
2-01	USA	9314-2	Respond to Bremen-5 on control bit specification
2-02	USA	9314-2	Clarify address registration
2-03	SecrWG4	9314-2	Respond to DSC 6, referring to Bremen-8
2-04	USA	MAC-2	Provide CD document, identify deltas to MAC
2-05	USA	PHY-2	Provide CD document, identify deltas to PHY
2-06	USA	9314-4	Resolve CD Letter Ballot comments, provide DIS doc.
2-07	USA	9314-5	Resolve DIS Letter Ballot comments, provide IS text
2-08	USA	9314-5	Provide disposition of DIS Letter Ballot comments
2-09	USA	9314-6	SMT: Provide WD document
2-10	USA	FFOL	Provide project specification (ANSI project application)
2-11	USA	LC-PMD	Provide project specification (ANSI project application)
2-12	USA	FDDI	Terms: Provide glossaries for IT vocabulary to SC 1
2-13	USA	9324	SMD: Provide IS final text
2-14	USA	9324	SMD: Provide disposition of comments
2-15	USA	9317	Streamer: Provide IS final text
2-16	USA	9317	Streamer: Provide disposition of comments
2-17	USA	9316	SCSI-2: Provide CD document
2-18	USA	9318-1	IPI-PHY: Provide IS final text
2-19	USA	9318-1	IPI-PHY: Provide disposition of comments
2-20	USA	9318-5	IPI-2 Tape: Provide IS final text
2-21	USA	9318-5	IPI-2 Tape: Provide disposition of comments
2-22	USA	9318-6	IPI Enh. PHY: Provide CD document
2-23	USA	10222	ESDI: Provide IS final text
2-24	USA	10222	ESDI: Provide disposition of comments
2-25	USA	11518-1	HIPPI-PH: Resolve CD Letter Ballot comments
2-26	USA	11518-1	HIPPI-PH: Provide DIS document
2-27	USA	8482	ISO version of EIA RS 485: send defect report to SC 6
2-28	SecrWG4	N595rev	Circulate updated WG 4 project table
2-29	SecrSC	9314-5	Provide results of voting on DIS Letter Ballot
2-30	SecrWG4	FDDI	Terms: Invite liaison person from SC 1
2-31	SecrWG4	9318-1	IPI-PHY: Clarify status of IS text with ITTF
2-32	USA	X3T9	Mail status sheet regularly to WG 4 secretary
2-33	USA	CAM	Provide project specification (ANSI project applic.)
2-34	SecrSC	various	Apply at ITTF for standard numbers as of resolution 3

Documents circulated during the 2nd meeting of SC 25/WG 4 in Bremen

Doc. no Bremen-	Source	Subject
1	Japan	Letter accompanying AOW Draft TA54 (FDDI) profile
2	NIST	Proposed comments on TA54 (FDDI) profile, 9th draft
3	SC25 Secr N 66	Results of voting on ISO/IEC 11518-1 HIPPI-PH
4	SC25 Secr N 67	Results of voting on ISO/IEC 9314-4 FDDI SMF-PMD
5	EWOS/EGLL	Proposed defect report on ISO IS 9314-2 FDDI MAC
6	Kolind	Registration of MAC addresses (draft letter to IEEE)
7	Ross	FDDI Overview and project status
8	X3T9	ISO/IEC 10039 Inclusion of FDDI MAC, letter to X3S3
9	X3T9	Standard Multicast address for FDDI SMT, letter to IEEE
10	Schwandt	New procedures for ISO/IEC work, short note
11	X3T9	International version of EIA RS-485, letter to TR30.2
12	X3T9	Reply to German comments to CD 11518-1 HIPPI-PH
13	SC 6	Status of 802.3 projects in ISO/IEC JTC 1/SC 6
14	WG 4	Action points resulting from the 2nd meeting of WG 4 (draft)
15	X3T9.2	SCSI-2 Revision 10g, September 1, 1991, for information only
16	X3T9.2	HIPPI-PH Revision 8.1, June 24, 1991, for information only
17	Milligan	SCSI-3 Overview
18	Cummings	New era dawns for peripheral channel (from Laser Focus World)
19	Cummings	Fiber Channel 101 (introduction)
20	WG 4	Draft resolutions of the 2nd meeting of WG 4