X3J3/213

Meeting Distribution

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Accredited Standards Committee
X3, INFORMATION PROCESSING SYSTEMS*

Doc. No.: X3/87-06-090-X,I,S,M,T
Date: June 15, 1987
Project:
Ref. Doc.:
Reply to:

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TO: Members, X3, IAC, SPARC, SMC
Officers of X3/TC's, SC's and SPARC/SG's
(FOR RETRANSMITTAL TO YOUR PARTICIPANTS)

SUBJECT: Transmittal of Revision 1 to SD-2, Organization and Procedures

Attached is the ANSI approval of our first revision to the SD-2. This document was approved by X3, CBEMA and revieved by ANSI to determine the impact on our accreditation and whether we would need to reapply. As you can see, ANSI does not feel that these changes, which reflect the methods of operation ve have been using for the past two years, have in fact, impacted our procedures causing them to deviate from the ANSI model procedures.

Please insert these into your GREEN SD-2 as soon as possible. Remember, the key to keeping these on white paper is to serve as a flag to revisions. Please retransmit to your TC and TG mailing recipients vith your next mailing.

The first one is always the hardest. Revision 2 is in the works and should be forvarded to ANSI soon. SMC Chairman Shoemaker has determined that the committee will be much more strict about "freezing" the various revisions and thus transmitting them in a much quicker timeframe. Revision 3 items will be discussed at the next SMC meeting and ve will begin the processing steps.

Special thanks to those members of SMC who have assisted in the procedures process. It is a long, arduous task and those people who have contributed are to be admired.

Catherine A. Kachurik
Director, X3 Secretariat

Attachment: REV. 1, dated March 1987, to SD-2

*Operating under the procedures of The American National Standards Institute.
X3 Secretariat: Computer and Business Equipment Manufacturers Association
311 First Street, N.W., Suite 500, Washington, DC 20001-2178
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1430 Broadway, New York, N.Y. 10018
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June 12, 1987

Ms. C. A. Kachurik
CBEMA
311 First Street, N.W.
Suite 500
Washington, D.C. 20001-2178

Dear Cathi;

This will respond to your letter of May 17, 1987 to Anita Meola with regard to Revision 1 to the X3 Organization and Procedures.

We are in agreement with you that this particular set of changes reflects the internal structure of X3. Accordingly it appears to us that these changes are not substantive with respect to ANSI criteria for the accreditation of Standards Committee X3.

We look forward to the receipt of the additional changes you mentioned.

Very truly yours

M. A. Pisciotta

MAP/5024D

Copy: Exsc Subcommittee
on Accreditation
Frances Schrotter

2.1 X3 STANDARDS PLANNING AND REQUIREMENTS COMMITTEE (SPARC)

2.1.1 Scope

SPARC is an advisory committee to X3 on new domestic and international standards, standards requirements, and review of proposed standards. SPARC also manages the standardization process within the TCs. It considers the functional and economic, rather than the detailed technical, aspects of standardization. Its scope includes the requirements to:

a. Evaluate the needs for systems of standards within the scope of X3.

b. Initiate, analyze, and make recommendation on proposed newly proposed or revised standards projects.

c. Audit the progress of standards development from a functional and economic point of view, monitoring target dates, etc.

d. Review proposed standards, at the time of their submission to X3, for their conformance to the original objectives.

e. Provide the functions of the "TC" when no appropriate subgroup exists.

2.1.2 Program of Work

a. Formulate recommendations to X3 on new domestic and international standards requirements. Review proposed standards for those items which fall within the scope of X3.

b. Develop and maintain X3/SD-1, Master Plan, to include statements of X3 goals, objectives, methods, plans and policies.

c. Develop and maintain X3/SD-3, Project Proposal Guide, and X3/SD-5, Standards Criteria

d. Analyze and evaluate promptly all proposals to X3 for new or revised standard development projects against the requirements and criteria prescribed in X3/SD-3 and X3/SD-5. Provide evaluation reports and recommendations, as appropriate, for X3 action.

e. Organize and manage Study Groups (SGs) as needed to assist in the analysis and evaluation of project proposals, or request such study support from other subgroups as appropriate.

f. Organize and manage the processes needed to study one or more closely related computer and information processing technology topics and to prepare advisory reports for guidance to designated parts of the X3 community.

g. Examine and advise X3 on all draft proposed American National Standards (dpANS) being submitted to X3 to ensure that they meet the criteria of: 1) development originally approved for the subject project, and 2) the requirements and criteria of X3/SD-3 and X3/SD-5 at the current date, taking into account any technological or economic changes during the development cycle.

h. Advise X3 on proposed ISO/TC97 projects and draft standards on subjects where an X3 subgroup does not exist. This is done in accordance with the criteria of acceptability for similar domestic proposals.

i. Monitor, manage and validate the initiation and development of all projects in accordance with X3 direction.

j. Monitor "Future Trends" for X3 and coordinate "Future Trends" reports from X3 subgroups; make recommendations to X3 as needed.

k. Act on behalf of X3 when action is required by international organizations on all program items and a timely response is not otherwise possible. SPARC reports all such actions to X3.

2.2 X3 INTERNATIONAL ADVISORY COMMITTEE (IAC)

2.2.1 Scope

IAC is an advisory committee to X3 on matters of policy and overall participation in international standards activities whose work fall within the scope of X3 and ensures X3's responses are timely.

2.2.2 Program of Work

a. Formulate recommmendations to X3 regarding U.S. policy for participation in ISO/TC97, its subcommittees and working groups and other international standards activities whose work falls within the scope of X3.

b. Review and advise X3 on U.S. contributions and recommendations to ISO/TC97, and recommend to X3 the U.S. delegations to TC97 meetings.

c. Recommend to X3 steps to be taken to fulfill U.S. responsibilities and uphold U.S. interests in international activities, including those of ISO, International Electrotechnical Commission (IEC), International Telegraph and Telephone Consultative Committee (CCITT), European Computer Manufacturers Association (ECMA) and other international and regional bodies.

d. Assist the X3 Secretariat staff in orientations for International Representatives (IR) and U.S. delegations to international standards meetings.

e. Act on behalf of X3 when action is required by international organizations and a timely response is not otherwise possible. IAC reports all such actions to X3. All program items will be referred to SPARC for action.

f. Manage relationships as X3 designates for U.S. TAG's of international committees including IEC/TC83, ISO/TC184, etc.

2.3 SECRETARIAT MANAGEMENT COMMITTEE

X3 is responsible for carrying out those functions as prescribed by CBEMA in its capacity as Secretariat. X3 has assigned these functions to the Secretariat Management Committee

2.3.1 Scope

SMC is an advisory committee to X3 for carrying out those functions as prescribed by CBEMA in its capacity as Secretariat.

2.3.2 Program of Work

The responsibilities designated to SMC by X3 are the following:

a. Elects the Chair, Vice Chair and IR of all X3 subgroups except SMC and ad hocs via the SMC letter ballot process.

b. Reviews the appointment of Secretaries of all TCs.

c. Seeks candidates for officer vacancies on TCs.

d. Is responsible for drafting and recommending to CBEMA the procedures for operation of X3 and its subgroups (X3/SD-2), assuring they are in compliance with ANSI procedures and amending them as necessary.

e. Reviews the procedures developed by each X3 subgroup to supplement the procedures of X3/SD-2 prior to their use within the subgroup to assure compliance.

f. Reviews and assures X3 that all applications for membership on X3 are in accordance with the procedures contained within this document.

g. Reviews administrative matters of note for X3 and its subgroups, recommending or taking action to assist the process and assure good management practices are followed.

h. Reviews and approves the requests to host all international meetings in the U.S. If there are budget implications for the X3 secretariat, SMC submits its decision to CBEMA for final approval action.

i. Monitors the monthly budget reports and makes appropriate recommendations on cost monitoring, resources and revenue.

j. Makes recommendations to CBEMA on service fees and structures.

k. Makes recommendations to CBEMA on requests for waiver of service fees. Final decisions are made by the CBEMA President and appeals may be made to that office.

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d. Assist the X3 Secretariat staff in orientations for International Representatives (IR) and U.S. delegations to international standards meetings.

e. Act on behalf of X3 when action is required by international organizations and a timely response is not otherwise possible. IAC reports all such actions to X3. All program items will be referred to SPARC for action.

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2.8 SUBCOMMITTEES

2.8.1 Background

One of X3's responsibilities is to participate as the U.S. TAG for ISO TC97. This participation is complicated in certain areas of standardization by the structure of TC97 which includes an organizational level (the TC97 Subcommittee) which can be responsible for a subject matter area of a wider scope than that assigned to any one X3 TC. This can result in the establishment of a domestic group which deals with the international standardization of a broad spectrum of associated subjects, each of which may be addressed individually by a different TC in the X3 structure. In addition, there are entities serving as liaison to some elements of TC97/SCs which were the former monitor groups in what used to be X4. For the purposes of Section 2.8 they will be grouped together and classified as X3 Subcommittees. Thus, when no one X3 TC has the expertise or interest necessary to serve as the U.S. TAG to that ISO/TC97/SC such expertise and interest must be provided by the members of a number of X3 TCs working together. The X3 Subcommittee provides the forum for this working relationship.

Another of X3's responsibilities is to strive for appointment as U.S. TAG to other international TCs in ISO or IEC where the scope of that TC overlaps or parallels that of TC97. If such assignment is made to X3, a corresponding Subcommittee must be formed which combines existing expertise of one or more X3 TCs with other available interested parties. As with the TC97/SC TAG above, the X3 subcommittee provides the forum for this working relationship.

2.8.2. Establishment/Management

Subcommittees are under the direction of X3 for administrative and management matters. They may be assigned specific additional duties by X3, complementary to the main TAG objectives. Subcommittees are established by X3 to deal with special international issues which involve subjects of a wider scope than those assigned to individual TCs, TGs or SGs.

2.8.3 General Mission

Generally, the Subcommittee mission is to serve as the U.S. TAG to a specific ISO TC97/SC (or other ISO/TC or IEC/TC) whose range of activities are comprised of the activities of more than one X3 TC. (See also Paragraph 10 for additional discussion of U.S. TAG responsibilities).

2.8.4 Charter

X3 prepares a Scope and Program of Work as the charter for a Subcommittee. This charter contains guidance and constraints on carrying out the Subcommittee charter. After approval of the charter by X3, the Subcommittee may recommend modifications at any time to IAC. With this structure the TAG/Subcommittees will operate like X3TC's. SPARC will oversee the technical program activities and IAC will review international policy matters.

2.8.5 Membership

Because of the unique nature of the Subcommittee mission as a U.S. TAG, the Subcommittee will include in its membership, at least the IR from each of the X3 subgroups which work directly within the areas covered by the scope of the ISO TC97/SC (or other international TC) for which the X3 Subcommittee is the TAG, unless specifically stated otherwise in the charter. These IRs appointed to the Subcommittee will retain their membership as long as they hold that TC office and abide by X3 membership rules specified for the Subcommittee.

In some cases, it may be necessary for the TC to appoint a substitute member replacing its IR on the subcommittee. This individual may be any TC member so designated by the TC Chair, and will retain that subcommittee designation until replaced or withdrawn by the TC Chair.

The IRs or substitute replacements constitute the voting membership of the subcommittee. There are no service fees for voting members and the subcommittee Chair.

Other individual experts in the subject matter area assigned to the subcommittee who are willing and able to participate may also join a subcommittee as nonvoting members upon application to the subcommittee Chair and payment of a service fee. Special rules for maintaining nonvoting membership may be determined by the subcommittee.

In cases where the charter of a subcommittee calls for special membership other than that specified above, the charter will also contain the membership criteria.

apply except that voting rights are immediately granted to all present at the organizational meeting.

Voting membership in SMC, IAC and its subgroups, SPARC and its SPARC SGs is limited to employees of U.S. domiciled organizations who reside in the U.S.

Voting membership in the X3 TCs and their TGs is open to any individuals directly and materially affected by the scope of the subgroup and willingness to participate regularly. Members who are employees of non-U.S. domiciled organizations may not vote on questions establishing the U.S. position on an international matter.

6.2.2 Other Members (NonVoting)

The Chair of any subgroup is an Ex Officio member of the next higher group. SPARC and IAC members assigned to coordinate the work of a subgroup are Ex Officio members of that subgroup and as such must receive all committee documentation. The X3 Secretariat, ANSI Secretariat, officers of the subcommittees and Chairs of U. S. held secretariats of TC97 Subcommittees are ex officio members of IAC. The Director of the secretariat staff is an ex officio member of the SMC. The Chair and Vice Chair of X3 are ex officio members of all subgroups.

Liaison representatives may be designated to X3 TCs from other U.S. and non-U.S. standards bodies. Requests for liaison representation from non-U.S. standards bodies to X3, IAC, or SPARC must be approved by SMC.

6.2.3 Observers

Anyone may become an observer to SPARC or X3 TCs or TGs by paying the appropriate service fee.

6.3 **Membership Chart (see section 6)**

Organization	Type	Eligibility
X3	Voting Members	Organizations approved by SMC and reviewed by the ISSB. One principal and one or more alternate members.
	Ex Officio	Chairs of IAC, SMC, SPARC, SCs and TCs.
	Liaison	Representatives of other U.S. and non-U.S. standards bodies approved by SMC.
	Observers	Chairs of ISSB and SPMC, the ANSI Secretariat, members of IAC, SPARC, and TC officers (other than the Chair). Anyone else who applies and pays appropriate service fees.
IAC	Voting Members	Limited to employees of U.S. domiciled organizations who reside in the U.S.
	Ex Officio	X3 and SPARC Chairs, X3 Vice Chair, X3 Secretariat staff, ANSI secretariat staff, officers of the Subcommittees and Chairs of U.S.-held secretariats of TC97 subcommittees.
	Liaison	None
	Observers	None
SPARC	Voting Members	Limited to employees of U.S.-domiciled organizations who reside in the U.S. Limited to 20 with a majority from the X3 "nonproducer" category organizations. One principal and one or more alternate members.
	Ex Officio	X3 and IAC Chairs and Vice Chair of X3.
	Liaison	Representatives of other U.S. and non-U.S. standards bodies upon request (Non-U.S. standards bodies must be approved by SMC.)

	Observers	Anyone interested who pays appropriate service fees.
SMC	Voting Members	Elected by X3 from X3 voting member organizations.
	Ex Officio	Chairs of X3 and SPMC and the Director of the X3 Secretariat.
	Liaison	None.
	Observer	None.
Subcommittee	Voting Members	The International Representative from each of the X3 subgroups working directly within the areas covered by the scope of the ISO TC97/SC (or other appropriate international bodies) for which the Subcommittee is the TAG. Any other individual having substantial concern with and competence in the scope of the Subcommittee and a willingness to participate who is employed by a U.S.-domiciled organization. (Note: Other or different criteria for membership may be established in the Subcommittee charter.)
	Ex Officio	Chairs of X3 and IAC and X3 Vice Chair and the IAC member assigned to coordinate the work of the Subcommittee.
	Liaison	Representatives of other U.S. and non-U.S. standards bodies upon request. Non-U.S. standards bodies must be approved by SMC.
	Observer	None

Technical Committee	Voting Members	Any individuals having substantial concern with and competence in the scope of the Technical Committee and a willingness to participate. Members who are employees of non-U.S. domiciled organizations may not vote on questions establishing the U.S. position on an international matter. One principal and one or more alternate members.
	Ex Officio	Chairs of IAC, SPARC and X3 and Vice Chair of X3. SPARC and IAC members assigned to coordinate the work of the TC.
	Liaison	Representatives of other U.S. and non-U.S. standards bodies upon request.
	Observers	Anyone interested, who pays the fees.
Study Groups	Voting Members	Any individual having substantial concern with and competence in the scope of the study group and a willingness to participate who is employed by a U.S.-domiciled organization and lives within the U.S. One principal and one or more alternates.
	Ex Officio	Chair of SPARC and the SPARC member assigned to coordinate the work of the Study Group.
	Liaison	Representative of other U.S. standards bodies upon request.
	Observers	Anyone interested who pays the service fees and lives within the U.S.
Task Group	Voting Members	Any individual having substantial concern with and competence in the scope of the Technical Committee and a willingness to participate. Members who are employees of non-U.S. domiciled organizations may not vote on

9. PROCESSING PROJECTS TO DEVELOP AMERICAN NATIONAL STANDARDS

9.0 GENERAL

The standardization process within X3 is shown in Appendix 2. While this description is based on the assumption that a proposal progresses normally from beginning to successful completion, it must be remembered that at any point in the cycle up to just before publication of an approved standard, the process may be interrupted and the project referred back for further work beginning at any earlier step, or it may be aborted, if so warranted.

9.1 PLANNING PHASE

The first phase of the standardization process is the examination of a Project Proposal that X3 undertake development of a new standard or a revision of a published standard and terminates with the approval by X3 that such a project be established. Work in this phase is primarily the responsibility of SPARC. Referring to the milestones of Appendix 2, the successive steps are:

Milestone	Description
0	A Project Proposal may be developed by any individual or organization whether or not affiliated with X3. Project Proposals should be developed in accordance with the format of X3/SD-3 and the criteria in X3/SD-5. Project Proposals are submitted to the X3 Secretariat for distribution to SPARC. If not already in the format specified in the X3/SD-3, the originator may later be requested to modify the Project Proposal to conform with the X3/SD-3.
Milestone 1	If SPARC's preliminary review, possibly including communication with the author(s), indicates the subject is within X3's scope and that there is apparently substantial support, SPARC accepts the proposal for formal study.
Milestone 2	If the Project Proposal is found by SPARC to essentially satisfy the requirements of X3/SD-3 and SD-5, SPARC may directly approve, with or without modification, the Project Proposal as a recommendation to X3. The recommendation includes a suggested placement of the project in an X3 subgroup. In this case, steps 2, 3 and 4 are compressed and completed by SPARC itself. If an appropriate TC does not exist, SPARC may recommend creation of a new TC.

case, it is the responsibility of SPARC to ensure that an attempt is made to resolve the negative (on behalf of X3), and that the comments are responded to by the X3 subgroup which originated the project proposal. Pending the response to comments, further action on the project is held in abeyance.

When there are no negative comments or when reponses are issued to the negative comments above, the X3 Secretariat announces the ballot results, the assignment of the project, and the project number assigned by the X3 Secretariat is entered into the X3/SD-4 with the appropriate letter designation.

The X3 Secretariat will issue a Press Release announcing the establishment of the project and any resulting subgroups and soliciting technical contributions and membership.

When the subject proposed project closely relates to an already established X3 project for which there is already an SG or TC, SPARC may request that subgroup to prepare the recommendation. In other cases, if appropriate, based on the subject matter of the Project Proposal, SPARC develops and, by formal motion, approves the charter for an SG (See section 2.6.2) to review the proposal, collect additional information and draft a recommendation to SPARC based on its findings.

In all cases, SPARC documents the acceptance of the study project. The X3 community is advised by distribution of an X3 numbered document.

Milestone 3

If an SG is required, the SG is established by SPARC and appropriate Press Releases are prepared and distributed by the X3 Secretariat. The SG solicits contributions from any competent source. In the SG decision process, consensus of the SG members is sought. However, the SG task is that of fact-finding, rather than standards-writing, and, therefore, complete agreement on all points is not essential. An SG may produce one or more reports and/or Project Proposals.

Any dissenting or negative contributions must be included with a majority-approved document. If the SG finds it cannot reach consensus, it reports to SPARC, in writing, the information collected and the absence of agreement.

Milestone 4

If an SG prepares a Project Proposal, processing reverts to Milestone 1.

An SG report is forwarded to SPARC for appropriate action which may include a request for X3 approval of the report for publication by the Secretariat.

Milestone 5

Project Proposals forwarded to X3 by SPARC are the subject of a 30-day X3 letter ballot, with information copies of the Project Proposal concurrently sent to the entire X3 distribution list as well as the ISSB's Natinal Standards Coordinating Committee (NSCC). TC Chairs are responsible to advise X3 of any potential impact of the proposed new project on existing projects and to request liaison, if appropriate.

The SPARC recommmendation for assignment of the project, if approved, is included on the ballot. Voting is conducted in accordance with section 8.

If there are negative comments, these comments, Reconsideration Ballot, and the final results of the Letter Ballot, i.e., after conclusion of the Reconsideration Ballot, are referred to SPARC. If the project proposal originated in an X3 Subgroup other than SPARC, the comments are simultaneous forwarded to that subgroup. In either

9.2 DEVELOPMENT PHASE

The second phase of the standardization process is the development of the draft standard by an X3 TC.

Referring to Appendix 2, the successive steps are:

	Description
Milestone 6	The TC develops a detailed work plan for completing a draft proposed standard mapped to milestones in Appendix 2. The program of work in the project proposal approved by X3 will usually be stated in broad terms and time periods. The TC will prepare a timetable for completion of the project related to their meeting schedule. This will be more explicit for the near term, particularly in cases when several years of work is foreseen. At a minimum, the TC will review and/or revise the work plan as part of its Annual Report presented to X3 through SPARC. Note that no technical work may be done toward a standard without an approved Project for that standard. Each standard requires its own project proposal.
Milestone 7	A preliminary draft of a standard is developed in accordance with the ANSI Style Manual and a technical editor or document custodian is assigned from the TC. Contributions may include collections of basic data, suggested drafts of text, candidate standards, etc. Contributions from any source will be accepted and considered. A call for patents on the contribution to be considered should be made to the TC members and X3 simultaneously. Use of copyrighted or patented material will be in accordance with the X3 approved policy. The TC shall be cognizant of applicable international standards activities and requirements, and shall determine at what point in the development process contributions will be solicited from these activities.
Milestone 8	The TC decides by vote at a meeting when to issue a TC letter ballot on the draft proposed standard for further processing, i.e., public review, etc. When the TC ballot is issued, the draft, including the draft Expository Remarks, and the authorizing Project Proposal (X3/SD-3), is concurrently forwarded to Chairs of those TCs with which the originating TC has a liaison, the TC's SPARC liaison and the X3 Secretariat for distribution to SPARC. The Secretariat will inform the X3 community of the TCs having reached this milestone. This process is repeated for all subsequent revisions of the document resulting in public review periods.

Accredited Standards Committee
X3, INFORMATION PROCESSING SYSTEMS*

Doc. No.: X3/87-06-087-X,I,S

Date: June 17, 1987

Project:

Ref. Doc.:

Reply to:

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To: Members X3, SPARC, IAC, SMC
Officers, X3/TC's, SC's and SPARC/SG's

Subject: Transmittal of June 1987 Edition, SD-4, Projects Manual

Attached is the newly updated SD-4. We have added all new projects that have been approved since the last printing in February 1987.

If you have any questions or suggestions, please direct your inquiries to Caressa Williams who is now handling production of this document. Caressa can be reached at 202-737-8888 Ext. 52. We welcome all comments.

Sincerely,

Catherine A. Kachurik
Administrative Secretary, X3

Enclosure: JUNE 1987 SD-4

*Operating under the procedures of The American National Standards Institute.
X3 Secretariat: Computer and Business Equipment Manufacturers Association
311 First Street, N.W., Suite 500, Washington, DC 20001-2178

Tel: 202/737-8888
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X3/SD-4
JUNE 1987

ACCREDITED STANDARDS COMMITTEE*
X3-INFORMATION PROCESSING SYSTEMS

PROJECTS MANUAL

*Operating under the procedures of the American National Standards Institute

SECRETARIAT:
mputer & Business Equipment Manufacturers Association

CBEMA

X3 Standing Documents

This document is one of a series, developed by X3 and the X3 Secretariat, which provides a "data base" of information on Accredited Standards Committee X3 - Information Processing Systems. Each document is updated periodically on an individual basis.

The series is intended to serve several purposes:

- To describe X3 and its program to inquirers
- To inform committee members of the organization and operation of X3
- To provide a system of orderly administration incorporating the procedures required by ANSI together with supplements approved by the X3 Secretariat, for the guidance of X3 officers, members, subgroups and the Secretariat staff.

The series of Standing Documents consists of the following:

X3/SD-0	Information Brochure - 1986
X3/SD-1	Master Plan - May 1987
X3/SD-2	Organization & Procedures - October 1985
X3/SD-3	Project Proposal Guide - May 1987
X3/SD-4	Projects Manual - June 1987
X3/SD-5	Standards Criteria - September 1984
X3/SD-6	Membership and Officers - June 1987
X3/SD-7	Meeting Schedule and Calendar - February 1987
X3/SD-9	Policy & Guidelines - September 1984 (to be issued)
X3/SD-10	X3 Subgroup Annual Report - October 1985

X3/SD-4 - PROJECTS MANUAL

X3/SD-4 provides a listing of the current X3 projects, arranged by technical discipline and cross-referenced to the related ISO/TC97 projects, proposals and approved standards.

Corrections and suggestions for improvement will be welcomed, and should be addressed to:

X3 Secretariat/CBEMA
311 First Street, NW
Suite 500
Washington, DC 20001-2178

X3 PROJECTS MANUAL (SD-4)

FOREWORD

X3 administers its responsibilities for consideration and development of standards within its scope by means of a Project Management System.

- New X3 work is initiated by a Proposal, which, if sufficient interest is found, causes initiation of a STUDY project to determine the feasibility and need for standards on that subject.

- When the Study conclusions are affirmative, a project Recommendation is submitted to X3 letter ballot. If approved by at least 2/3 of the X3 membership, a DEVELOPMENT project is established to produce a standard.

- The project is converted to MAINTENANCE type when the proposed draft is approved by ANSI as an American National Standard.

- It is converted to REVISION type when a substantive change is proposed to and approved by X3, as a result of experience with and comments on the standard.

- The project is converted to REAFFIRMATION when, five years after publication the standard is reviewed and found to require no modification.

- LIAISON projects identify work of an industry, government, professional or international standards body, in which X3 has an interest but for which it has no directly related project.

- An INTERNATIONAL DEVELOPMENT project is one with an approved New Work Item which X3 has committed to support, and which is intended to result in an International Standard.

The Project Management System provides X3 the means used to identify, catalog, monitor and report its activities, and for filing its technical papers. A project may be terminated by X3 decision at any time prior to completion of a standard. However, once an American National Standard is published, the project remains, going through cyclic Maintenance, Revision and/or Reaffirmation stages as required until the standard is withdrawn.

X3/SD-4 provides a listing of the current X3 projects, arranged by technical discipline and cross-referenced to the related ISO/TC97 projects, proposals and approved standards.

HEADINGS & ENTRIES

EXPLANATION OF COLUMN HEADINGS AND ENTRIES

X3 PROJECT NUMBER

An arbitrary project identifier. Numbers 1 - 199 were assigned, upon initiation of the X3 Project Management System, to all then-active subcommittee Program of Work line items, under a "grandfather clause". Numbers above 200 were assigned to then-existing pre-standardization studies, and subsequently to all new proposal study projects and liaison projects as they are established. When more than one standard results from one project, separate project numbers are assigned as each new standard is identified.

X3 PROJECT TYPE

S = STUDY project to determine the feasibility and need for a development project which has been proposed to X3 (see X3/SD-3). Study projects are managed by X3/SPARC.

D = DEVELOPMENT project, formally recommended by X3/SPARC and approved by X3, to produce an American National Standard.

DT = DEVELOPMENT project to produce an X3 Technical Report.

R = REVISION project, to revise an existing approved American National Standard.

REAFFIRMATION project, as a result of the ANSI-required five year review when the X3 Technical Committee recommends that an existing American National Standard be reaffirmed without change.

M = MAINTENANCE project, the status into which a Development project is automatically placed upon approval of an American National Standard by ANSI. Activity for this type of project includes responses to inquiries for clarification and any comments received on experience with its use. As appropriate in individual cases, Maintenance activity usually includes also the support by X3 toward adoption of its technical content as an International Standard.

L = LIAISON project, formal recognition of relations with another standards body on a project for which X3 has no existing standard or work in process. A Liaison project is automatically established for each project established by ISO/TC97, and for others when requested by an X3 Technical Committee and approved by SPARC and X3. These projects as initially established are "passive"—for information receipt only. Upon request by the X3 Technical Committee and approval by SPARC and X3, they may become "active" liaison to permit technical contribution and participation. Upon approval by SPARC and X3, they may also become Development projects, to develop corresponding American National Standards.

I = INTERNATIONAL DEVELOPMENT project, with an approved New Work Item which X3 has committed to support, and which is intended to result in an International Standard.

DOCUMENT NUMBER

X3.n-19xx = ANSI catalog number of an approved American National Standard. (* = revision being developed)

BSR X3.nn = A Draft proposed American National Standard approved by the originating X3 Technical Committee, accepted by X3 for public comment and submitted to the ANSI Board of Standards Review for concurrent review. It is continued with this identifier until approved by ANSI, when the "BSR" is removed and the year of approval added. (* = revision of a published standard)

p-X3/TR = Proposed X3 Technical Report, being reviewed for approval by X3.

X3/TR-n = Published X3 Technical Report.

ESTIMATED COMPLETION

Anticipated year of approval by ANSI of a completed Standard, or publication of an X3 Technical Report.

ISO/TC97 PROJECT

Related project within ISO/TC97—however, respective boundaries of the two projects may not exactly coincide. Absence of an entry in this column indicates that no related TC 97 project has been established—two or more entries indicate that TC 97 has divided the work. Within the Project Number, the middle digit(s) identifies the responsible TC 97 Subcommittee, the last digit(s) identifies the project.

ISO/TC97 DOCUMENT

The ISO documents listed are related to the X3 poject in technical subject, but may agree or differ in technical content.

R = Published ISO/Recommendation. (*=revision being developed)

DP = Draft Proposal being developed within a subcommittee of ISO/TC97.

DIS = New Draft International Standard, approved by a subcommittee and being considered by ISO/TC97. (* = proposed revision of published Recommendation of the same number)

DRS = Draft revision of published International Standard of the same number.

ISO = Approved ISO International Standard. (* = revision being developed)

DTR = Draft ISO Technical Report

TR = Approved ISO Technical Report

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X3 PROJ. NO/TYPE	TITLE	STD. DESIG.	EST. CMPL. DATE	ISO PROJ. DESIG.	ISO DOC. NO.	SD-3 REF. NUM
	X3A1 - OCR & MICR					
0017-R	Print Specifications for Magnetic Ink Character Recognition Incorporates X3 Proj. 314	X3.2-1976	1986	97.03.07	ISO 1004 -77	SPARC/82-477
0018-L	Bank Check Specifications for Magnetic Ink Character Recognition	X9.13-1983				
0057-M	Character Set for Optical Character Recognition (OCR-A)	X3.17-1981	1986	97.03.01	ISO 1073/ I-76	
0061-M	Character Set for Optical Character Recognition (OCR-B)	X3.49-1982	1987	97.03.01	ISO 1073/ II-76	
0062-M	Character Set for Handprinting	X3.45-1982	1987			
0069-M	Optical Character Recognition (OCR) Character Positioning	X3.93M-1981	1986	97.03.02	ISO 1831 -80	
0227-M	Matrix Character Sets for Optical Character Recognition	X3.111-1986	1984			SPARC/854
0228-L	OCR Font for 7 and 9 Matrix Printers (Liaison with ECMA/TC4)	-				
0254-M	Paper Used In Optical Character Recognition (OCR) Systems	X3.62-1987	06/86			X3/85-31R
0274-M	Design of OCR Forms	X3/TR-5-1982	1987			
0284-RF	Optical Character Recognition (OCR) Inks	X3.86-198x	1985			
0285-M	Guideline for Optical Character Recognition (OCR) Print Quality	X3.99-1983	1988		ISO 1831 -80	
0312-DT	Basic Information on OCR	X3/TR-XX-	1984			SPARC/78-136
0313-S	Bar Code Standards	-				
0477-D	ANS for Guideline for Bar Code Print Quality	-	1986			SPARC/84-320
0611-D	Optical Character Recognition (OCR) Matrix Character Sets OCR-MB	-				X3/86-1477R
0350-M	Recorded Magnetic Tape Cartridge, 1/4 Inch 6400 BPI, 4-Track	X3.116-1986	3/86	97.11.10	DIS 8063/2	SPARC/80-564
0366-M	Unrecorded 1/4 Inch Recorded Mag. Tape Cartridge (6400-10000 BPI)	X3.127-1987	3/86	97.11.10	DIS 8063/1	SPARC/ -420
0391-D	Recorded Magnetic Tape for Info. Intchng, 0.5 Inch (12.7 mm) Tape, Nine Track, 3200 CPI (126 CPMM)	X3.157-198x	12/85			SPARC/83-517
	X3B5 - DIGITAL MAGNETIC TAPE					
0038-M	Magnetic Tape Labels and File Structure for Information Interchange	X3.27-1987	1986	97.15.1	ISO 1001 -79	X3/85-1204
0070-M	Unrecorded Magnetic Tape for Info. Interchange (9-Track 200 and 800 CPI, NRZI, and 1600 CPI, PE)	X3.40-1983	1988	97.11.04	ISO 1864 -85	
0071-M	Recorded Magnetic Tape for Info. Interchange (200 CPI, NRZI) (With X3L2, see Proj. 237-M)	X3.14-1983	1988	97.11.02	ISO 1862 -75	
0072-M	Recorded Magnetic Tape for Info. Interchange (800 CPI, NRZI)	X3.22-1983	1988	97.11.03	ISO 1863 -76	
0073-M	Recorded Magnetic Tape for Info. Interchange (1600 CPI, PE)	X3.39-1986	6/86	97.11.05	ISO 3788 -76	
0213-M	Magnetic Tape Cassettes for Info. Interchange (3.81 mm, 0.150 inch) Tape at 32 bpmm (800 BPI), PE	X3.48-1986	3/86	97.11.06	ISO 3407 -76	SPARC/82-1053
0217-M	Magnetic Tape Cassette Label	ISO 4341-1984	1989	97.15.3	ISO 4341 -78	
0221-R	Unrecorded Magnetic Tape Cartridge for Information Interchange (0.250 Inch, 1600 BPI, Phase Encoded)	X3.55-1982	12/85	97.11.10	ISO 4057 -79	X3/85-1219
0233-M	Recorded Magnetic Tape for Info. Interchange (6250 CPI, Group Encoded Recording)	X3.54-1986	6/86	97.11.11	ISO 5652 -83	SPARC/573
0236-L	Recorded Magnetic Tape (7-Track, 200 CPI NRZI)	-		97.11.01	ISO 1861 -75	
0250-M	One-Half Inch Magnetic Tape Interchange Using a Self-Loading Cartridge	X3.85-1987	1986	97.11.12	ISO 6098 -82	SPARC/591

PROJ. TYPE	TITLE	STD. DESIG.	REF. CMPL. DATE	ISO PROJ. DESIG.	ISO DOC. NO.	SD-3 REF. NUMBER
	X3S5 - DIGITAL MAGNETIC TAPE (CONTINUED)					
0255-M	Recorded Magnetic Tape Cartridge for Info. Interchange, 4-Track, 0.250 Inch 630mm, 1600 BPI, 63 BPMM Phase Encoded	X3.56-1986	1985	97.11.10	ISO 4057 -79	SPARC/82-4..
0256-W	Magnetic Tape Cassette for Info. Interchange, Dual Track Complimentary Return-To-Bias, Four-States Recording	X3.59-1981	1986	97.11.08		
0271-M	Parallel Rec. Mag. Tape Cartridge for Info. Intchng, 4-Track, 0.250 Inch, 6.30 mm, 1600 BPI, 63BPMM, Phase Encoded	X3.72-1987	1986			SPARC/831
0282-M	Unrecorded Magnetic Tape Minicassette For Info. Interchange, Coplanar 3.81 mm (0.150 Inch)	X3.103-1983	1988			SPARC/754
0403-D	Unrecorded MagTape Cartridge for Information Interchange 0.250 Inch (6.30 mm), 10000 ftpi, (394 ftpmm)	-	6/86	97.11.10	ISO 4057	SPARC/83-671
0404-M	Serial Recorded Magnetic Tape Cartridge for Info. Interchange, Four and Nine Track	X3.136-1986	3/86	97.11.10	DP 8462/2	SPARC/83-698
0405-D	Unrecorded Magnetic Tape Cassette for Info. Interchange 3.81 mm (0.150 In), 252 to 394 ftpmm (6400 to 10000 ftpi)	X3.164-198x	12/85			SPARC/83-690
0406-D	Serial Recorded Mag. Tape Cassette for Info. Intchng, 0.150 in (3.81mm) 3000 bpi (315 bpmm) Group Code Recording	X3.158-198x	3/86			SPARC/83-689
0472-M	Recorded Magnetic Tape Minicassette for Info. Interchange, Coplanar 3.81 mm (0.150 Inch) Phase Encoded	X3.104-1983	1988			SPARC/754
0485-D	Unrecorded Magnetic Tape Cartridge for Info. Interchange 0.500 In (12.65 mm) 6000-15000 ftpi (236-590 ftpmm)	-	1986			X3/84-718
0486-D	Recorded Magnetic Tape Cartridge for Info. Interchange, 0.500 In (12.65 mm), 6000-15000 bpi (236-590 bpmm)	-	1986			X3/84-719
7-D	Unrecorded Mag. Tape and Crtrdg for Info Intchng., 18-Track, Parallel, 12.65mm (1/2 in), 1491 cpmm (37 871 cpi)	-	03/87			X3/84-720
0488-D	Rec. Mag. Tape & Cartr. for Info. Intchg 18-Track, Parallel, 12.65mm (1/2 in), 1491 cpmm (37 871 cpi) Grp-Coded Recrdng	-	03/87			X3/84-721
0553-D	ANS for Unrecorded Magnetic Tape Mini Cartridge for Info. Interchange, 0.25 In (6.30 mm), 12500 ftpi (492 ftpmm)	-	12/87			X3/85-1420
0561-D	Unrecorded Magnetic Tape and Cartridge System for Mechanical and Magnetic Interchangeability between Info. Systems	-	07/87			X3/85-1547
0562-D	Recorded Magnetic Tape Cartridge for Information Interchange 0.500 in (12.65 mm), 22-Track, Serial, 6667 bpi	-	07/87			X3/85-1548
0563-D	Unrecorded Magnetic Tape Cartridge for Information Interchange 0.500 inch (12.65 mm), 6667 ftpi (262 ftpmm)	-	07/87			X3/85-1549
0565-D	Recorded Magnetic Tape Mini-Cartridge for Info. Interchange, 0.250 IN (630 mm) 12 and 24 Track, 10000 bpi (394 bpmm)GCR	-	12/87			X3/85-1419
0566-D	Recorded Magnetic Tape Cartridge for Info. Interchange, 0.500 IN (12.65 mm) 24-Track, Serial 8000 bpi (315 bpmm) GCR	-	06/87			X3/85-1544
0567-D	Unrecorded Magnetic Tape Cartridge for Info. Interchange, 0.500 IN (12.65 mm) 10000 ftpi (393 ftpmm)	-	06/87			X3/85-1545
0568-D	Recorded Magnetic Tape Cartridge for Information Interchange, 20-Track Serial 1/2 in (12.65mm) 12 000 ftpi (472 ftpmm)	-	06/87			X3/85-1546
0595-I	NWI TC97 N1631, Unrec. & Recorded 12,65 mm (1/2 in) Wide Mag. Tape Cartrdg for Info. Intchng 18 Track, Parallel, 1491 cpmm (37 871 cpi), Group-code Recording	-	"		TC97 N1631	

X3 PROJ. NO/TYPE	TITLE	STD. DESIG.	EST. COMPL. DATE	ISO PROJ. DESIG.	ISO DOC. NO.	SD-3 [illegible] NUMBER
	X3B6 - INSTRUMENTATION TAPE					
0291-D	High-Density Digital Magnetic Recording (HDDR)	-	1988	97.12.9	DP 8441	SPARC/77-30
0371-D	Recording Characteristics of Instrumentation Magnetic Tape	-	1987	97.12.7	IS 6068	SPARC/82-637
0383-D	Characteristics of Unrecorded Instrumentation, Mag. Tape - Interchange Practices and Recommended Test Methods	-	1986	97.12.8	DIS 6371	SPARC/83-45, 83-361
0390-D	Precision Reels for Magnetic Tape Used in Interchange Instrumentation Applications	-	1986	97.12.1	DIS 1860	SPARC/83-488
0592-D	Digital Recording Based on the SMPTE D-1 Format	-				X3/86-1696
	X3B7 - MAGNETIC DISKS					
0064-M	Unrecorded Magnetic Six-Disk Pack (General, Physical, and Magnetic Characteristics)	X3.46-1983	1988	97.10.1.1	ISO 2864-74	
0065-M	Unrecorded Magnetic Eleven-Disk Pack, General Physical and Magnetic Characteristics	X3.58-1984	1989	97.10.3.1	ISO 3564-76	
0123-L	Track Format for Six Disk Pack	-		97.10.1.2	ISO 3561-76	
0124-L	Track Format for Single Disk Cartridge (Top Loaded)	-		97.10.2.3	ISO 3563-76	
0224-RF	Unrecorded Single Disk Cartridge (Front Loading, 2200 BPI)	X3.52-198x	1989			
0225-M	Interchangeable Magnetic Twelve-Disk Pack (100 Megabytes)	X3.63-1981	1986	97.10.4	IOS 4337-77	
0251-M	Interchangeable Magnetic Twelve-Disk Pack (200 Megabytes)	X3.84-1981	1986	97.10.6	DIS 5653	SPARC/598
0275-RF	Unrecorded Single-Disk, Double-Density Cartridge (Front Loading 2200 BPI, 200 TPI)	X3.89-198x	1986			SPARC/750-A
0277-RF	Unformatted Single-Disk Cartridge (Top Loading, 200 TPI, 4400 BPI)	X3.76-198x	1986			SPAR[illegible]C
0321-M	Physical, Mechanical & Magnetic Characteristics of an Unformatted 80 Megabyte Trident Pack for Use at 370 TPI, 6000BPI	X3.115-1984	1989			SPARC/[illegible]-137
0328-M	14-Inch (356 mm) Diameter Low Surface Friction Magnetic Storage Disk	X3.112-1984	1989	97.10.7	IS 6901	SPARC/79-55R
0343-M	Contact Start/Stop Storage Disk, 158361 Flux Transitions Per Track, 8.268 Inch Outer and 3.937 Inch Inner Diameters	X3.119-1984	1989		DIS 7298	SPARC/80-234 REV.
0344-M	Contact Start/Stop Storage Disk, 95840 Flux Transitions Per Track, 7.874 Inch Outer & 2.50 Inch Inner Diameters	X3.120-1984	1989		ISO 7297	SPARC/80-235 R 10/10/80
0353-M	Contact Start/Stop Storage Disk: 83000 Flux Transition Per Track 130 mm (5.118 In) Outer Diam. 40 mm (1.575 In) Inner	X3.128-1985	1991		DP 7929	SPARC/81-52 REV. 3/18/81
0356-D	A Contact Start/Stop Metallic Thin Film Storage Disk, 83,333 Flux Transition Per Track, 130MM Outer Dia. & 40MM Inner Dia	X3.163-198x	1986			X3/85-607
0360-D	5 1/4 Inch Rigid Disk Removable Cartridge	X3.155-198X	1986	97.10.11	DP 8679	SPARC/81-893R 1/6/82
0369-D	Nominal 8 inch Rigid Media Removable Cartridge	X3.156-198x	1986	97.10.12	DP 8680	SPARC/81-285R 5/14/81
0479-D	95 MM Rigid Digital Recording Disk	-	1987			SPARC/84-527
0489-L	Liaison with the Semiconductor Equipment Manufacturers Institute (SEMI) for the Development of Substrate Standards	-	N/A			X3/84-916
0492-D	100 mm Rigid Digital Recording Disc for Cartridge Applications	-	1987			SPARC/84-471
	X3B7.1 - TEST METHODS AND PROCEDURES					
0582-S	Study Project on Test Methods and Procedures	-				X3/86-1027
	X3B8 - FLEXIBLE DISK CARTRIDGES (FDC)					
0231-M	Single-Sided Unformatted Flexible Disk Cartridge for 6631 BPR Use	X3.73-1986	1986	97.11.9.1	ISO 5654/ 1-84	SPA[illegible]

X3 PROJ. TYPE	TITLE	STD. DESIG.	EST. CMPL. DATE	ISO PROJ. DESIG.	ISO DOC. NO.	SD-3 REF. NUMBER
	X3B8 - FLEXIBLE DISK CARTRIDGES (FDC) (CONTINUED)					
0286-R	Two-Sided Unformatted 8-Inch (200 MM) Double Density Flexible Disk Cartridge (For 13262 FTPR Two-headed Application)	X3.121-1984	1989	97.11.9.3.1	ISO 7065/ 1-2	SPARC/77-2.
0287-M	Two Sided Unformatted (200 mm) Double Density Flexible Disk Cartridge, General Physical and Magnetic Requirements	X3.121-1984	1989			SPARC/77-20
0306-R	One-Sided Single-Density Unformatted 5.25 Inch Flexible Disk Cartridge	X3.82-1980	1986	97.11.9.4.1	ISO 6596/ 1-2	SPARC/77-27
0322-M	Two-Sided, Double-Density, Unformatted 5.25 Inch (130 mm) 48-tpi (1.9 tpmm) Flexible Disk Cartridge for 7958 BPR Use	X3.125-1984	1989	97.11.9.5.1	ISO 7487/1	SPARC/79-73-A
0354-M	One or Two-Sided Double Density Unformatted 5.25 Inch (130 mm) 96 Tracks Per Inch Flexible Disk Cartridge	X3.126-1986	1990	97.11.15		SPARC/81-313R 8/3/81
0373-D	3.5 Inch Flexible Disk Cartridge	X3.137-198x	1986			SPARC/83-423
0453-D	Unformatted 72 mm (3 Inch Nominal) Two-Sided Double Density Flexible Disk Cartridge for Information Interchange	X3.142-198X	1985			SPARC/83-731
0475-I	NWI TC97 N1368, Std. of Flexible Disk Cartridges for Data Interchange Having a Diameter Smaller than 100 MM	-		97.11.15	TC97 N1368	SPARC/84-429
0494-D	5.25 Inch High Density (130 mm) Flexible Disk Cartridge	X3.162-198x	1986		DP 8630/ 1,2	X3/84-1065R
0589-D	90 mm (3.5 in) Flexible Disk Cartridge at 15916 ftprad	-				X3/86-1601
	X3B6.1 - TRACK FORMATS FOR FLEXIBLE DISK CARTRIDGES					
0232-D	Flexible Disks - Recorded Characteristics	-	1986	97.11.9	ISO 5654/ 2-82	SPARC/818
0272-D	Flexible Disk Labels and File Structures	ISO 7665-	1987	97.15.8	ISO 7665	SPARC/80-818
0386-L	Liaison with all TC97 Development Projects for Recorded Characteristics of Flexible Disk Cartridges	-	N/A			SPARC/83-310
89-D	ANS for Flexible Disk Track Form for Information Interchange	-	1986	DP 8630/2		SPARC/83-"
0588-D	Data Intchng on 90mm (3.5 in) Flex Disk Cartdg Using Modified Freq Modulation Recording at 15916 ftprad, on 80 Tracks	-				X3/86-960
	X3B9 - PAPER FORMS/LAYOUTS					
0101-R	Specification for General Purpose Paper Cards for Information Interchange	X3.11-1969	1985			
0102-M	Rectangular Holes in Twelve-Row Punched Cards	X3.21-1980	1985	97.0.2	ISO 1682-73	
0437-M	Basic Sheet Sizes and Standard Stock Sizes for Bond Paper and Index Bristols (FORMERLY X4.4-1972)	X3.151-1987	1985			N/A— Grandfather Clause
0438-M	Specifications for Single-Ply, Non-carbonized Adding Machine Paper Rolls (FORMERLY X4.8-1973)	X3.152-1987	1985			
0439-D	Standard for Business Letterhead Sizes	-	1987			
0440-M	Conversion of paper Substance Weights from Ream Weights to g/m2	X3/TR-2-1982	1986			
0441-M	Paper Sizes for Single Part Continuous Business Forms	X3.96-1983	1988			
0442-D	Paper Roll Sizes	-	1988			
0443-M	Printable/Image Areas for Text and Facsimile Communication Equipment	X3.117-1984	1989			
0444-D	Quality Requirements for Paper for Continuous Forms	-	1987		DP 7552	
0445-DT	Forms Tutorial	-	1985			
0446-DT	Publications on the Advantages of North American Sizes vs. ISO A Sizes	-	1985			
0447-M	Office Machines and Business Forms Character and Line Spacing (FORMERLY X4.17-1976)	X3.150-1"	19"			N/A— Grandfather Clause
	X3B10 - CREDIT/ID CARDS					
430-M	Credit Card Specifications	X4.13-1983	1988		ISO 7810	

X3 PROJ. NO/TYPE	TITLE	STD. DESIG.	EST. CMPL. DATE	ISO PROJ. DESIG.	ISO DOC. NO.	SD-3 NUMB
	X3B10 - CREDIT/ID CARDS (CONTINUED)					
0431-M	Magnetic Stripe Encoding on Credit Cards	X4.16-1983	1988		ISO 7811/ 1-5	
0432-M	Addendum to X4.16-1976, Encoding for Track 3; Liaison with X9	X4.16A-1977	1984		ISO 7812, 7813	
0433-L	Liaison with X9 - Magnetic Encoding Track 3	-				
0434-M	Interindustry Message Specifications for Credit Cards	X4.21-1981	1986		DIS 7580	
0436-M	PIN Pad Specifications	X3.118-1984	1989			
0471-L	DIS 7501, Machine Readable Passports	-		97.17.9	DIS 7501	N/A
0586-D	Identification Cards - Physical Characteristics (REF. ISO 7810)	-			ISO 7810	X3/86-1778
0590-D	Identification Cards - Recording Techniques - Part 1: Embossing	-			ISO 7811 /1	X3/86-1778
0595-D	Identification Cards - Numbering System and Registration Procedure for Issuer Identifiers	-			ISO 7812	X3/86-1778
0609-D	Magnetic Stripe Encoding on Credit Cards	-			ISO 7813	X3/86-1779
0633-D	Identification Cards - Recording Techniques - Part 2: Magnetic Stripe	-			ISO 7811/2	X3/86-1778
0634-D	Identification Cards - Recording Techniques - Part 3: Location of Embossed Characters on ID Cards	-			ISO 7811/3	X3/86-1778
0635-D	Identification Cards - Recording Techniques - Part 4: Location of Read-Only Magnetic Tracks - Tracks 1 & 2	-			ISO 7811/4	X3/86-1778
0636-D	Identification Cards - Recording Techniques - Part 5: Location of Read-Write Magnetic Track - Track 3	-			ISO 7811/5	X3/86-1778
	X3B10.1 - INTEGRATED CIRCUIT CARDS					
0372-D	Integrated Circuit Cards	-	1986	97.17.8	DIS 7816/ 1-3	X3/85-
	X3B10.2 - REVISION OF X3.149-1986					
0402-M	Location of Imprinted Information on a Credit Card Charge Form (FORMERLY X4.18-1977 PRIOR TO REVISION)	X3.149-1986	1991			SPARC/83-639
	X3B10.3 - MINIMUM PHYSICAL REQUIREMENTS OF SAVINGSBOOKS					
0459-D	Minimum Physical Requirements of Savingsbooks	-	1985		ISO 8484	SPARC/83-696 Rev. 1/19/84
	X3B10.4 - OPTICALLY ENCODED CARD MEDIA					
0511-D	ANS for Optically Encoded Card Media	-	1986			X3/84-1403
	X3B11 - OPTICAL DIGITAL DATA DISKS					
0407-D	Unrecorded Optical Media Unit for Digital Information Interchange, Nominal 200 mm (8.00 Inch) Diameter	-	01/86	97.23.3	NWI N1421	SPARC/83-536R
0408-D	Unrecorded Optical Media Unit for Digital Information Interchange, Nominal 300 mm (12.00 Inch) Diameter	-	01/86	97.23.2	NWI N1420	SPARC/83-537R
0409-D	Unrecorded Optical Media Unit for Digital Information Interchange, Nominal 120 mm (4.72 Inch) Diameter	-	01/86			SPARC/83-540R
0456-D	Unrecorded Optical Media Unit for Digital Information Interchange, Nominal 356 mm (14.00 Inch) Diameter	-	01/86	97.23.1	NWI N1419	SPARC/83-538R
0457-D	Unrecorded Optical Media Unit for Digital Information Interchange, Nominal 130 mm (5.25 Inch) Diameter	-	01/86	97.23.4	NWI N1422	SPARC/83-539R
0480-D	Recorded Characteristics of Optical Media Units for Digital Info. Interchange, Nominal 120 mm (4.72 Inch)	-	19			SPARC/84-600
0481-D	Recorded Characteristics of Optical Media Units for Digital Info. Interchange, Nominal 130 mm (5.25 Inch)	-	1986	97.23.4	NWI N1422	SPARC 1

X3 PROJ. TYPE	TITLE	STD. DESIG.	REF. CNFL. DATE	ISO PROJ. DESIG.	ISO DOC. NO.	SD-3 REF. NUMBER
	X3B11 - OPTICAL DIGITAL DATA DISKS (CONTINUED)					
0482-D	Recorded Characteristics of Optical Media Units for Digital Info. Interchange, Nominal 200 mm (8 Inch)	-	1986	97.23.3	NWI N1421	SPARC/84-4
0483-D	Recorded Characteristics of Optical Media Units for Digital Info. Interchange, Nominal 300 mm (12 Inch)	-	1986	97.23.2	NWI N1420	SPARC/84-603
0484-D	Recorded Characteristics of Optical Media Units for Digital Info. Interchange, Nominal 356 mm (14 Inch)	-	1986	97.23.1	NWI N1419	SPARC/84-604
0524-D	File Structure and Labelling of Optical Digital Data Disks for Information Interchange	-	1988			X3/85-356
0581-D	Unrecorded Optical Media Unit for Digital Information Interchange - Nominal 90 mm (3.5 inch) Diameter	-	1988			X3/86-1588
0607-I	Unrecorded Reversible Optical Media Unit for Digital Information Interchange Nominal 130 mm (5.25 in) Diameter	-				X3/86-1588
	X3H2 - DATA BASE					
0355-M	Database Language NDL	X3.133-1986	1986	97.21.3.1	SC21 N174	SPARC/81-191
0363-M	Database Language SQL	X3.135-1986	1986	97.21.3.2	SC21 N173	SPARC/81-689 3/4/82
0525-D	ANS for Extended Database Language SQL	-	02/86			X3/85-657R
0571-D	Embedding of SQL Statements into Programming Languages	-	02/86			X3/85-658R
0583-D	Remote Data Access (RDA) Service and Protocol	-				X3/86-1760
0594-D	Database Language SQL/Addendum 1 (Integrity Enhancement Feature)	-				X3/86-1761
0630-D	Embedding of NDL Statements into Programming Language	-				X3/86-1560
	X3H3 - COMPUTER GRAPHICS					
612-D	Pascal Language Binding of the Programmer's Hierarchical Interactive Graphics System (PHIGS)	-				X3/87-02-
	X3H3.1 - PROGRAMMER'S HIERARCHICAL INTERACTIVE GRAPHICS SYSTEM (PHIGS)					
0460-D	Programmer's Hierarchical Interactive Graphics System (PHIGS)	X3.144-198x	1987	97.21.24	SC21 N819	SPARC/83-832 Rev. 1/18/84
	X3H3.3 - VIRTUAL DEVICE INTERFACE					
0346-D	Computer Graphics Interface (CGI)	X3.161-198x	1987	97.21.26	SC21/2 N1179	SPARC/80-420
0347-M	Computer Graphics Metafile (CGM) (Formerly VDM)	X3.122-1986	1986	97.21.5	DIS 8632	SPARC/80-557
0620-I	TC97 NWI N1793, Information Processing Sytems - Computer Graphics - Reference Model of Computer Graphics	-		97.21.42	TC97 N1793	
	X3H3.4 - LANGUAGE BINDING					
0529-D	ANS for Ada Language Binding of the Graphical Kernel System (GKS)	X3.124.3-198X	1987	97.21.7.3	DP 8651/3	X3/85-1166R
0530-D	ANS for the *Ada Language Binding of the Programmers Hierarchical Interactive Graphics Standard (PHIGS)	-	1987	97.21.27.3	SC21 N668	X3/85-1168R
0531-D	ANS for the Pascal Language Binding of the Graphical Kernel System (GKS)	X3.124.2-198x	1987	97.21.7.2	DIS 8651/2	X3/85-1169R
0532-D	ANS for the Fortran Language Binding of the Programmers Hierarchical Interactive Graphics Standard (PHIGS)	X3.144.1-198x	1987	97.21.27.1	SC21 N667	X3/85-1172R
0533-D	C Language Binding of the Graphical Kernel System (GKS)	X3.124.4-198x	198x	97.21.7.7	SC21 N669	X3/85-1173R
0534-D	C Language Binding of the Programmers Hierarchical Interactive Graphics System (PHIGS)	-	198x	97.21.27.4		X3/85-1175R
0535-M	Graphical Kernel System (GKS) FORTRAN Binding	X3.124.1-1985	1990	97.21.7.1	DP 8651/1	

X3 PROJ. NO/TYPE	TITLE	STD. DESIG.	EST. CMPL. DATE	ISO PROJ. DESIG.	ISO DOC. NO.	SD-3 NUMBER
	X3H3.4 - LANGUAGE BINDING (CONTINUED)					
0543-D	ANS for the Ada* Language Binding of the 3-D Extensions to GKS (*Ada is a Registered trademark of the U.S. Government)	-	1988	97.21.7.6		X3/85-1167R
0544-I	Fortran Language Binding of the 3-D Extensions to GKS	-	1987	97.21.7.4	DP 8806/1	X3/85-1171R
0545-I	Pascal Language Binding of the 3-D Extensions to GKS	-	1988	97.21.7.5		X3/85-1170R
0546-I	C Language Binding of the 3-D Extensions to GKS	-	1988	97.21.7.8		X3/85-1174R
0559-D	C Language Binding of the Computer Graphics Interface	-	1988	97.21.26.2		X3/85-1559
0560-D	Fortran Language Binding of the Computer Graphics Interface	-	1988	97.21.26.1		X3/85-1560
0596-I	TC97 NWI N 1620, Technical Report for Info. Processing Sys - Computer Graphics - Conformity Testing of Graphics Stds.	-			ISO 1620	
0597-I	TC97 NWI N 1619, Computer Graphics - Feasibility of Formally Specifying Graphic Standards	-			ISO 1619	
	X3H3.5 - GRAPHICAL KERNEL SYSTEM (GKS)					
0268-M	Information Processing Systems - Computer Graphics - Graphical Kernel System	X3.124-1985	1990	97.21.2	DIS 7942	SPARC/79-52R, 81-930
0547-I	Three-Dimensional Extensions to GKS (Graphical Kernel System)	-		97.21.5.2	DIS 8805	X3/85-963R
	X3H3.6 - DISPLAY MANAGEMENT FOR GRAPHICAL DEVICES					
0552-D	Display Management for Graphical Devices	-	1989			X3/85-1531
	X3H4 - INFORMATION RESOURCE & DICTIONARY					
0336-D	Information Resource Dictionary System (IRDS)	X3.138-198x	1986	97.21.06	NWI 1243	SPARC [illegible]7
0557-DT	Technical Report on Integration of External Software Environments with the IRDS	-	1987			X3/85-[illegible]R
0569-D	Information Resource Dictionary System (IRDS) Software Interface	-	1988			X3/85-1115R
0570-DT	Technical Report, Reference Model for Information Resource Dictionary System (IRDS)	-	1987			X3/85-1110R
	X3J1 - PL/I					
0212-M	Programming Language PL/I	X3.53-1987	1986	97.22.5	ISO 6160	SPARC/841
0297-MT	Technical Report for Real Time Subset of Full PL/I, X3.53-1976	X3/TR-7-1985	1990			X3/84-961
	X3J1.3 - GENERAL PURPOSE SUBSET					
0296-R	PL/I General Purpose Subset	X3.74-198x	1986	97.22.6	ISO 6522	SPARC/82-810
	X3J2 - BASIC					
0215-RF	Programming Language Minimal BASIC	X3.60-1978			DP 6373	SPARC/509
0352-D	Programming Language Full BASIC	X3.113-198X	1985			SPARC/81-51 REV. 4/15/81
0534-D	Addendum to Programming Language Full BASIC, Modules and Individual Character Input	-				X3/86-1546
	X3J3 - FORTRAN					
0067-R	Programming Language FORTRAN	X3.9-1978	1987	97.05.02	ISO 1539-80	SPARC/78-33
	X3J4 - COBOL					
0021-D	COBOL Information Bulletins (CIB NO. 23)	-				
0022-M	Programming Language COBOL	X3.23-198[illegible]	199[illegible]	97.05.01	ISO 1989-78	SPARC/81-257
0585-D	Addendum to ANSI X3.23-1985, Programming Language COBOL	X3.23A-198x				X3/86-413
	X3J7 - APT					
0055-M	Programming Language APT	X3.37-1987	1986	97.09.01-09	ISO 3592-78	SPARC/84-481

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	X3J7 - APT (CONTINUED)					
0315-MT	APT Language - Postprocessor Interface Modules	X3/TR-4-1982	1987			
0316-MT	APT Language - Expository Remarks Concerning X3.37-1980	X3/TR-3-1982	1987			
0361-DT	Tutorial for X3.37, Revision 3 of Programming Language APT	X3/TR-X-198X	1986			SPARC/84-480
	X3J7.1 - PROCESSOR LANGUAGES					
	X3J7.2 - POSTPROCESSOR LANGUAGES					
	X3J7.3 - LATHE LANGUAGE					
	X3J7.4 - ROBOTICS LANGUAGE					
	X3J9 - PASCAL					
0317-M	Programming Language PASCAL (Note: Complete Designation is ANSI/IEEE770X3.97-1983)	X3.97-1983	1988	97.05.10	DIS 7185	SPARC/79-111
	X3J9.1 - PASCAL EXTENSIONS					
0345-D	Extended Programming Language PASCAL	X3.160-198x	1986			X3/85-1900
	X3J10 - APL					
0331-D	Programming Language APL	X3.123-198x	1986	97.05.11	DP 8485	SPARC/79-349
0577-D	ANS for Advancements in the APL Language	-	1991			X3/86-527
	X3J11 - C LANGUAGE					
0381-D	Programming Language C	X3.159-198x	1985			SPARC/83-79R 3/2/83
	X3J12 - DIBOL					
0507-D	Programming Language DIBOL	X3.165-198x	1987			X3/84-094R
	X3J13 - COMMON LISP					
0574-D	COMMON LISP	-	1/88			86-344
	X3J14 - FORTH					
0610-D	Programming Language Forth	-				X3/87-04-L
	X3K1 - COMPUTER DOCUMENTATION					
0016-M	Guide for Technical Documentation of Computer Projects	X3/TR-6-1982	1987			
0264-L	Computer Configuration Charts	-		97.5.5		
0266-L	Specification of Single-Hit Decision Tables	-		97.7.7	DIS 5806	
0299-L	Symbols & Conventions for Program Flow, Program Networking, Data Flow & Computer Configuration	-		97.7.8	DIS 5807	
0506-L	Guidelines for the Documentation of Computer-Based Systems	-		97.7.3	DP 6592	N/A
0516-D	Documentation Standard for Small Computer Applications	-	1987	97.07.03	SC7 N337	X3/85-112
0517-D	Logical Flow of Activities in the Life of an Automated System	-	1986			X3/85-111
	X3K5 - VOCABULARY FOR INFORMATION PROCESSING SYSTEMS					
0026-D	American National Dictionary for Information Processing Systems (ANDIPS)	X3/TR-1-1982	Dec. 1987			SPARC/84-581
0027-L	ISO Vocabulary of Data Processing	-		97.1.1-.20	ISO 2382/I-XVI	
	Section 01: Fundamental Terms			97.1.1	ISO 2382/1-84	
	Section 02: Mathematics & Logic. Arith. & Logic Oper.			97.1.2	ISO 2382/2-76	
	Section 03: Equipment Technology			97.1.3	ISO 2382/3-76	
	Section 04: Organization of Data			97.1.4	ISO 2382/4-74	
	Section 05: Representation of Data			97.1.5	ISO 2382/5-74	
	Section 06: Preparation of Handling Data			97.1.6	ISO 2382/6-74	
	Section 07: Digital Computer Programs			97.1.7	ISO 2382/7-	
	Section 08: Control, Integrity, and Security			97.1.8	ISO 2382/8-	
	Section 09: Data Communication			97.1.9	ISO 2382/9-79	
	Section 10: Operating Techniques & Facilities			97.1.10	ISO 2382/10-76	
	Section 11: Control, Input-Output & Arithmetic Equipment			97.1.11	ISO 2382/11-76	

	Section 12: Storage Techniques & Data Media			97.1.12	ISO 2382/12-78	
	Section 13: Computer Graphics and Micrographics			97.1.13	ISO 2382/13-84	
	Section 14: Reliability, Maintainability & Availability			97.1.14	DIS 2382/14-	
	Section 15: Programming Languages			97.1.15	DIS 2382/15-	
	Section 16: Information Theory			97.1.16	ISO 2382/16-78	
	Section 17: Data Bases			97.1.17		
	Section 18: Open Systems & Distributed Data Networks			97.1.18	DP 2382/18	
	Section 19: Analogue Computing			97.1.19	ISO 2382/19-80	
	Section 20: Systems Development			97.1.20	DP 2382/20	
	Section 21: Interface Terminology			97.1.21	DP 2382/21	
0398-L	Liaison with ISO TC97 SC1, DIS 5138, ISO Office Machines Vocabulary	-			ISO 5138	
	Section 01: Dictation Equipment				ISO 5138/1	
	Section 02: Duplicators				ISO 5138/2	
	Section 03: Addressing Machines				DIS 5138/3	
	Section 04: Letter Opening Machines				ISO 5138/4	
	Section 05: Letter Folding Machines				ISO 5138/5	
	Section 06: Calculators				DIS 5138/6	
	Section 07: Postal Franking Machines				DIS 5138/7	
	Section 08: Document Copying Machines				DIS 5138/8	
	Section 09: Typewriters				ISO 5138/9-84	
	Section 10: Word Processing Equipment				DP 5138/10	
	Section 11: Document Inserting Machines				DIS 5138/11	
0448-D	Glossary of Word Processing, Definition of Terms and Functions	-				
	X3L2 - CODES AND CHARACTER SETS					
0006-M	Graphic Representation of the Control Characters of the American National Code for Information Interchange	X3.32-1973	1986	97.02.01	ISO 2047-81	
0007-L	Rules for the Definition of 4-Bit Subsets (TC97/SC2 and ECMA 21)	-		97.02.10	ISO 963-73	
0012-M	Information Processing--Coded Character Sets--7-Bit American National Standard Code for Info. Interchange (7-bit ASCII)	X3.4-1986	1986	97.02.01	ISO 646-83	SPARC/83-542
0013-RF	USA Sponsorship Procedures for ISO Registration According to ISO 2375	X3.83-198x	1985	97.02.04	ISO 2375-80	
0103-RF	Hollerith Punched Card Code	X3.26-198x	1985	97.02.15	ISO 6586-80	
0105-R	Code Extension Techniques for Use with the 7-Bit Coded Character Set for the ANS Code for Information Interchange	X3.41-1974	1986	97.02.02	ISO 2022-82	SPARC/83-393
0106-D	USA Candidates for Registry	-	N/A			
0107-M	Perforated Tape Code for Information Interchange	X3.6-1973	1985	97.02.12	ISO 1113-79	
0216-R	Magnetic Tape Cassette Code (For X3B5; REF. X3.48-1977, PROJ. 213-R)	-	3/86	97.02.04	ISO 3275-74	SPARC/82-1053
0237-M	Recorded Magnetic Tape for Information Interchange (200 CPI, NRZI) (Liaison with X3B5 for Coding; Ref. Proj. 71)	X3.14-1983	1988	97.02.05	ISO 962-74	
0239-L	Transformation of Data Between Telex Code and 7-Bit Code	-	N/A	97.02.07	ISO 6936-83	
0240-L	Coding of Character Sets for OCR & MICR	-	N/A	97.02.09	ISO 2033-83	
0257-M	Codes for Magnetic Tape Cartridge (0.250 Inch) (For X3B5; Ref. Proj. 255)	X3.56-1986	1985	97.11.10	ISO 4057-79	SPARC/82-421
0294-L	Codes for Flexible Disks (For X3B8/X3L5)	-	N/A	97.11.09	DIS 6863	
0304-M	Hexadecimal Input/Output to Microprocessors Using 5-Bit and 7-Bit Teleprinters	X3.95-1982	1987		ISO 6936-82	SPARC/77-93
0349-M	Coded Character Set for Use with X3.98-1983 Text Information Interchange In Page Image Format (Ref. Proj. 450)	-	1988	97.02.14	ISO 6937/ 1-2-1983	SPARC/80-663
0351-M	Coded Character Sets for Use with X4.23 and X4.22 Keyboard Arrangements for Alphanumeric Machines	X3.114-1984	1989			SPARC/80-662
0387-D	Control Function Coding for X3V1 Basic Processable Text Interchange Format and Text Processing Functions	-	N/A	97.02.13		SPARC/83-548
0388-D	Additional Graphic Character Sets for Use with ASCII	-	198[illegible]	97.02.14	ISO 6937	SPARC/83-546
0392-D	7-Bit and 8-Bit ASCII Supplemental Multilingual Graphic Character Set (ASCII Multilingual Set)	X3.134.2-198X	1985	97.02.20	NWI TC97 N1415	SPARC 83-5[illegible]

X3 PROJ. NO./TYPE	TITLE	STD. DESIG.	EST. CMPL. DATE	ISO PROJ. DESIG.	ISO DOC. NO.	SD-3 REF. NUMBER
	X3L2 - CODES & CHARACTER SETS (CONTINUED)					
0397-D	X3L2 Project for X3H3 Computer Graphics Metafile (CGM) and Computer Graphics Interface (CGI) Functions	-	1986	97.02.17	TC97 N1418	SPARC/ 83-549
0466-I	TC97 NWI N1285, 7-Bit Coded Character Set for the Arabic Language	-	1986	97.02.19	TC97 N1285	SPARC/ 84-385
0495-D	8-Bit ASCII - Structure and Rules	X3.134.1-198X	1986		TC97 N1498	X3/84-1080
0509-I	NWI TC97 N1416, Coding of Audio Information, Particularly Synthesized Sound, as Part of Interchangeable Documents	-		97.02.21	TC97 N1416	X3/84-926
0514-D	ANS for Alternate Controls for Character Imaging Devices	-	1985			X3/84-1691
0536-S	Identifying Videotex Requirements to be Met by Message Handling Systems Under Dev. in TC97/SC18 & X3V1 (MOTIS) & CCITT	-	12/86			X3/85-1207
0537-S	Draft Joint X3L2/X3V1 Project for Identifying Data Link Protocol Requirements for Videotex	-	12/86			X3/85-1208
0538-S	Joint X3L2/X3V1 Project for Identifying Session Layer Protocol Requiremetns for Videotex	-	12/86			X3/85-1209
0539-S	Joint X3L2/X3V1 Project for Identifying Presentation Layer Protocol Requirements for Videotex	-	4/86			X3/85-1210
0540-S	Joint X3L2/X3V1 Project for Identifying Common Application Layer Protocol Requirements for Videotex	-	12/86			X3/85-1211
0554-D	Extending ANS X3.110-1983, NAPLPS, to Accommodate Office Systems Requirements For Videotex; see also X3 Proj. 359	-	7/86			X3/85-1206
0555-DT	Technical Report for Specifying Guidelines for Implementors of X3.110-1983	-	5/86			X3/85-1214
0564-D	Extending ANS X3.110-1983, Videotex/ Teletext Presen. Level Protocol Syntax, to Include Photographic Image Coding	-	06/86			X3/85-121[illegible]
	X3L2.1 - VIDEOTEX/TELETEXT					
0359-M	Videotex/Teletext Presentation Layer Protocol Syntax (North American PLPS)	X3.110-1983	1988	97.02.14	ISO 6937/ 1-2	SPARC/81-684
0572-DT	Technical Report for the NAPLPS Verification Test Package	-	1986			X3/85-1213
	X3L2.2 - ADDITIONAL CONTROL FUNCTIONS FOR X3.64					
0004-R	Control Codes for 8-Bit Sets	X3.64-1979	1986	97.02.08	ISO 6429-83	SPARC/83-543,544
	X3L2.3 - TWO-BYTE GRAPHIC CHARACTER SET					
0396-D	Two-Byte Graphic Character Set for Processing and Interchange	-	1985	97.02.18		SPARC/83-545
	X3L8 - DATA REPRESENTATION					
0043-W	Guide for Standardization of Representation of Data Elements	X3TR-X0198x	1986	97.14.4		
0045-M	Representation for U.S. Customary, SI and other Units to be used in Systems with Limited Character Sets	X3.50-1986	1986	97.14.2	ISO 2955-83	X3/84-1418
0083-M	Representation of Calendar Date and Ordinal Date for Information Interchange	X3.30-1985	1990			
0084-M	Representation of Local Time of Day for Information Interchange	X3.43-1986	1990	97.14.3.1	ISO 3307-75	X3/84-1414
0085-M	Representations of Universal Time, Local Time Differentials, and U.S. Time Zone References for Information Interchange	X3.51-1986	1986	97.14.3.2	ISO 4031-78	X3/84-1419
0087-D	Structure for Identification of Organizations	-		97.14.5	ISO 6523-84	
0088-W	Identifiers of Accounts	-	1986			
0090-R	Identification of the States, the District of Columbia, and the Outlying Areas of the U.S. for Info. Interchange	X3.38-198x	1986			X3/85-80[illegible]

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	X3L8 - DATA REPRESENTATION (CONTINUED)					
0091-R	Structure for the Identification of the Counties of the U.S. for Information Interchange	X3.31-198x	1986			X3/84-1413
0092-R	Structure for the Identification of Named Populated Places and Related Entities of the States of the U.S.	X3.47-198x	1986			X3/84-1417
0093-M	Representation of Geographic Point Locations for Information Interchange	X3.61-1986	1986	97.14.6	ISO 6709-83	X3/84-1420
0095-W	Representation of Mailing and Shipping	-	N/A		TC154/SC1	
0096-L	Identification of Countries (ANSC Z39/SC27)	Z39.27-1976			ISO 3166-81	
0097-L	Identification of Sub-Divisions of Countries	-		TC46/WG2	ISO 3166-81	
0098-W	Identification of Continents and	-	1986			
0241-W	Identification of Industry Classifications (Liaison with TC97/SC14)	-	N/A	97.14.9	DP 4827	
0242-L	Representation of Human Sexes (Liaison with TC97/SC14)	-		97.14.10	ISO 5218-77	
0243-L	Representation of Human Blood Type (Liaison with TC97/SC14)	-		97.14.11		
0244-W	Representation of Commodity Classifications (Liaison with TC97/SC14)	-	N/A	97.14.13		
0253-W	Representation of Classifications of Occupations (Liaison with TC97/SC14)	-	N/A	97.14.8	DP 4828	
0259-L	Check Characters (Liaison with TC97/SC14)	-		97.14.15	ISO 7064-83	
0608-D	Groupings of Geopolitical Entities of the World	-				X3/86-1949R
0510-M	ANS for Codes for Identification of Hydrologic Units in the U.S. and the Caribbean Outlying Areas	X3.145-1986				X3/84-1421
	X3L8.5 - ATTRIBUTES OF DATA ELEMENTS					
0400-DT	Technical Report for a Guideline for the Development of Attributes of Data Elements	-	1986			SPARC/83-585
	X3L8.6 - CLASSIFICATION OF DATA ELEMENTS					
0399-DT	Technical Report for a Guideline for the Classification of Data Elements	-				SPARC/83-583
	X3L8.7 - MNEMONIC CODES FOR DATA ELEMENTS					
0455-D	Generation of Mnemonic Codes for Data Elements and Data Items	-	1988			SPARC/83-584
	X3S3 - DATA COMMUNICATIONS					
0110-R	Synchronous Signaling Rates for Data Transmission	-1976	1986			
0113-L	Signal Quality at Interface Between DTE and Synchronous DCE for Serial Data Transmission (Liaison with EIA TR-30)	X3.24-1968	N/A	97.06.25		
0116-L	Interface Between DTE and DCE (Liaison with EIA TR-30 on DTE/DCE Interface Definition, EIA RS-232D)	-	N/A			
0117-L	Interface Between ACU and DTE (Liaison with EIA TR-30 on EIA RS-366)	-	N/A			
0120-L	Concentration and Multiplexing Systems (Liaison with CCITT re Concentration & Multiplex. in CCITT Access Arrangements)	-	N/A			
0121-L	Interface Between Connecting Arrangements and DTE (Liaison with EIA TR-30)	-	N/A			
0122-L	Connector Pin Allocations for Use with High Speed DTE (Liaison with EIA TR-30 on Connector Pin Assignment)	-	N/A	97.06.09	ISO 2593	

X3 PROJ. NO/TYPE	TITLE	STD. DESIG.	EST. COMPL. DATE	ISO PROJ. DESIG.	ISO DOC. NO.	SD-3 REF. NUMBER
	X3S3 - DATA COMMUNICATIONS (CONTINUED)					
0245-L	Fault Isolation Methods and Remote Test - Public Data Networks (Liaison with CCITT SGD on the Subject re PDNs)	-	N/A	97.06.05		
0246-L	Elec. & Mech. Charac. of Interfaces (IC Techn. (EIA RS 422 & 423) 25-Pin, 37 Pin 15-Pin DTE/DCE Connector and Pin Assign.	-	N/A	97.06.09	ISO 2110,4902-3	
0260-L	Data Transmission over Telephone Type Facilities - Liaison with CCITT, COMKVII (Active Liaison through CCITT SG D)	-	N/A	97.06.22		
0261-L	Other TC97/SC6 Liaison Activities	-	N/A	97.06.23		
0280-M	Determination of Performance of Data Communications Systems that Use Bit-Oriented Control Procedures	X3.79-1987	1986			
0288-D	Start/Stop Signal Quality Between DTE & Non-Synchronous DCE (Liaison with EIA TR 30 on EIA RS-303-79)	-	1986	97.06.25	DIS 7480	
0289-L	Electrical Characteristics of Balanced Voltage Digital Interface Circuits (EIA SP-1220, REV. OF RS-422)	-	N/A	97.06.25		
0290-L	Electrical Characteristics of Unbalanced Voltage Digital Interface Circuits (EIA-1221, REV. OF RS-423)	-	N/A	97.06.25		
0298-L	DTE's Functional and Electrical Specifications (Liaison with EIA TR-30)	-	N/A	97.06.25		
0324-S	OSI Reference Model, Physical Layer	-	1987	97.06.30		
0332-M	IPS - OSI - Connection Oriented Transfer Layer Protocol Specification (See also CCITT X.214 and X.224)	X3.140-1986	1986	97.06.35	ISO 8072 & 8072/1-3	SPARC/79-330 REV.
0368-L	X3S3 Liaison Project with IEEE Project 802 on Local Area Networks	-	N/A	97.06.16	DP 8802/2, /3,/4	SPARC/82-978
0462-D	Protocol Providing Connectionless Transport Service Using Connectionless or Connection-Oriented Network Service	-	1987	97.16.14	TC97 N1254	SPARC/84-367
0493-D	Transport Service Definition to Provide Connectionless-mode Data Transmission	-	1987			SPARC/84-REV.
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0326-S	OSI Reference Model, Network Layer	-	1986	97.06.32	DIS 8348	
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0550-D	Information Processing Systems - Data Communications - Network Layer Service Definition	-	1986	97.06.32. 01,.02		X3/85-377R
0551-DT	Information Processing Systems - Data Communications - Technical Report on Network Layer Architecture	-	1988	97.06.32.03		X3/85-376R
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JUNE 1987

ACCREDITED STANDARDS COMMITTEE*
X3-INFORMATION PROCESSING SYSTEMS

MEMBERSHIP & OFFICERS

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Secretariat:
Computer & Business Equipment Manufacturers Association

X3 Standing Documents

This document is one of a series, developed by X3 and the X3 Secretariat, which provides a "data base" of information on Accredited Standards Committee X3 - Information Processing Systems. Each document is updated periodically on an individual basis.

The series is intended to serve several purposes:

- To describe X3 and its program to inquirers
- To inform committee members of the organization and operation of X3
- To provide a system of orderly administration incorporating the procedures required by ANSI together with supplements approved by the X3 Secretariat, for the guidance of X3 officers, members, subgroups and the Secretariat staff.

The series of Standing Documents consists of the following:

X3/SD-0	Information Brochure - 1986
X3/SD-1	Master Plan - May 1987
X3/SD-2	Organization & Procedures - October 1985
X3/SD-3	Project Proposal Guide - May 1987
X3/SD-4	Projects Manual - June 1987
X3/SD-5	Standards Criteria - September 1984
X3/SD-6	Membership and Officers - June 1987
X3/SD-7	Meeting Schedule and Calendar - February 1987
X3/SD-9	Policy & Guidelines - September 1984 (to be issued)
X3/SD-10	X3 Subgroup Annual Report - October 1985

X3/SD-6 Membership and Officers

X3/SD-6 provides the current, approved organizational membership of Accredited Standards Committee X3, together with the name, mailing address and telephone number of Principal and Alternate Representatives. Also listed are representatives of other organizations which have requested liaison status, together with ex-officio and individual Observers. Finally, the membership of the X3 Standing Committees and the officers of the Technical Committees are listed.

Corrections and suggestions for improvement will be welcomed, and should be addressed to:

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301-763-3905

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BLOOMINTON MN 55420-1334
612/853-4380

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WOLLASTON, MA 02170
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JAMES RYLAND (P)
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6401 SECURITY BOULEVARD
BALTIMORE MD 21235-0001
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WASHINGTON DC 20330-5190
202/695-0499

FRED VIRTUE (P)
U.S. DEPT. OF DEFENSE
HQ USAF/SCTT
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WASHINGTON DC 20330-5190
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STUDY GROUP CHAIRMEN

DATA BASE SYSTEMS
EDWARD L. STULL (L)
GTE GOVERNMENT SYSTEMS
1700 RESEARCH BOULEVARD
ROOM 3095
ROCKVILLE, MD 20850

SOFTWARE SYSTEMS INTERFACE
ROBERT FOLLET (L)
IBM CORPORATION
643/RCTR/9E
6705 ROCKLEDGE DRIVE
BETHESDA, MD 20817
301-564-2108

Technical Committee Officers Chart

X3TC	**CHAIR	**VICE CHAIR	**INT'L REP.	VOCAB. REP.	SECRETARY	***INT'L
X3 - INFORMATION PROCESSING SYSTEMS						
	RICHARD GIBSON AT&T 201-234-3795	DON LOUGHRY HEWLETT-PACKARD 408-257-7000	N/A	N/A	CATHIE KACHURIK X3 SECRETARIAT 202-737-8888	TC97
SPARC- STANDARDS PLANNING AND REQUIREMENTS COMMITTEE						
	W.C. RINEHULS GEN. SER. ADMN. 202-566-1180	LEROY RODGERS DEC 617-493-3163	N/A	N/A	GWENDY PHILLIPS X3 SECRETARIAT 202-737-8888	
SPARC STUDY GROUPS						
DBSSG Database Sys. Study Group	EDWARD STULL GTE GVT. SYS. 301-294-8649	NANCY MCDONALD COMP. TECH. PLNG. 813-968-2660	ELIZABETH FONG NBS 301-975-3250	EDWARD STULL GTE GVT. SYS. 301-294-8649	ELIZABETH FONG NBS 301-975-3250	SC21
SSISG Softwr.Sys. Intfce. Study Group	*BOB FOLLETT IBM 301-564-2108	VACANT	VACANT	VACANT	VACANT	
IAC - INTERNATIONAL ADVISORY COMMITTEE						
	JOSEPH DEBLASI IBM CORP. 914-697-7280	GARY ROBINSON DEC 617-493-4094	N/A	N/A	CATHIE KACHURIK X3 SECRETARIAT 202-737-8888	
SMC - SECRETARIAT MANAGEMENT COMMITTEE						
	DEL SHOEMAKER DEC 202-383-5622	ED KELLY AMP 717-561-6153	N/A	N/A	STANLEY ALLEN X3 SECRETARIAT 202-737-8888	
X3 SUBCOMMITTEES						
SC7 TAG	*O. GOLUBJATNIKOV G.E. 315-456-4744	RICHARD WERLING 703-820-4034	N/A	N/A	VACANT	SC7
SC21 TAG	J. ASCHENBRENNER IBM CORP. 919-254-0299	*VACANT	N/A	N/A	VACANT	SC21
SC22 TAG	*BOB FOLLETT IBM 301-564-2108	*VACANT	N/A	N/A	VACANT	SC22
X3 TECHNICAL COMMITTEES						
A - RECOGNITION						
X3A1 OCR & MICR	ROGER MONELL MONARCH MARKING 714-893-0511	ROBERT BLOSS UNISYS 313-451-4298	JOHN MCDONNELL RECOG. EQUIP. 214-579-5800	CARL KNOEDEL STD. REG. CO. 513-443-1072	CARL KNOEDEL STD. REG. CO. 513-443-1072	
X3A1.1 FONT DESIGN	PATRICK TRAGLIA IBM CORP. 607-752-3357	VACANT	N/A	N/A	VACANT	
X3A1.2 OCR SUPPL. & FORMS	CARL KNOEDEL STD. REG. CO. 513-443-1072	VACANT	N/A	N/A	VACANT	
X3A1.3 IMAGE DEF. & MEASUREMENT	C.E. BISS PHO. SCI. CORP. 716-265-1600	VACANT	N/A	N/A	VACANT	

NOTE: Where the SMC appointment ballot is not complete or volunteers have not submitted the necessary documentation, the officer position has been listed as ACTING (*) or "VACANT"

** SMC elected officer

*** Corresponding International Standards Committee

STANDARDS PLANNING AND REQUIREMENTS COMMITTEE (SPARC)

CHAIRMAN
WILLIAM C. RINEHULS
GENERAL SERVICES ADMN.
ADTS
8457 RUSHING CREEK COURT
SPRINGFIELD VA 22153-2532
202/566-1180

VICE CHAIRMAN
LEROY RODGERS (P)
DIGITAL EQUIPMENT CORPORATION
146 MAIN STREET MLO5-5/T58
MAYNARD, MA 01754-2572
617/493-3163

SECRETARY
GWENDY J. PHILLIPS
X3 SECRETARIAT/CBEMA
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202-737-8888

MARVIN W. BASS (P)
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215/542-3319

MARGARET K. BUTLER (P)
ARGONNE NATIONAL LABORATORY
8700 SOUTH CASS AVENUE
BLDG. 221
ARGONNE, IL 60439-4801
312/972-7172

STANLEY FENNER (A)
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4F11
1 UNISYS PLACE
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ROBERT H. FOLLETT (P)
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MARY ANNE GRAY (A)
IBM CORPORATION
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PURCHASE NY 10577-2597
914/697-7224

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X3 - INFORMATION PROCESSING SYSTEMS						
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SSISG Softwr.Sys. Intfce. Study Group	*BOB FOLLETT IBM 301-564-2108	VACANT	VACANT	VACANT	VACANT	
IAC - INTERNATIONAL ADVISORY COMMITTEE						
	JOSEPH DEBLASI IBM CORP. 914-697-7280	GARY ROBINSON DEC 617-493-4094	N/A	N/A	CATHIE KACHURIK X3 SECRETARIAT 202-737-8888	
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X3 SUBCOMMITTEES						
SC7 TAG	*O. GOLUBJATNIKOV G.E. 315-456-4744	RICHARD WERLING 703-820-4034	N/A	N/A	VACANT	SC7
SC21 TAG	J. ASCHENBRENNER IBM CORP. 919-254-0299	*VACANT	N/A	N/A	VACANT	SC21
SC22 TAG	*BOB FOLLETT IBM 301-564-2108	*VACANT	N/A	N/A	VACANT	SC22
X3 TECHNICAL COMMITTEES						
A - RECOGNITION						
X3A1 OCR & MICR	ROGER MONELL MONARCH MARKING 714-893-0511	ROBERT BLOSS UNISYS 313-451-4298	JOHN MCDONNELL RECOG. EQUIP. 214-579-5800	CARL KNOEDEL STD. REG. CO. 513-443-1072	CARL KNOEDEL STD. REG. CO. 513-443-1072	
X3A1.1 FONT DESIGN	PATRICK TRAGLIA IBM CORP. 607-752-3357	VACANT	N/A	N/A	VACANT	
X3A1.2 OCR SUPPL. & FORMS	CARL KNOEDEL STD. REG. CO. 513-443-1072	VACANT	N/A	N/A	VACANT	
X3A1.3 IMAGE DEF. & MEASUREMENT	C.E. BISS PHO. SCI. CORP. 716-265-1600	VACANT	N/A	N/A	VACANT	

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** SMC elected officer

*** Corresponding International Standards Committee

(32)

X3TC	**CHAIR	**VICE CHAIR	**INT'L REP.	VOCAB. REP.	SECRETARY	***INT'L
B - MEDIA						
X3B5 DIGITAL MAG. TAPE	R. STEINBRENNER AT&T 201-386-7053	SAM CHEATHAM STOR. TECH. CORP. 303-673-3359	MICHAEL HOGAN NBS 301-975-2926	ARNOLD ROCCATI EG&G WASH. ANAL. 301-840-3277	VACANT	97/11
X3B6 INSTRUMENTA. TAPE	BILL POLAND NASA/GODDARD 301-286-8592	C. DON WRIGHT LOCKHEED	STAN REYNOLDS SAND. NATL LABS.	VACANT	VACANT	97/WG2
X3B7 MAG. DISKS	BILL CARLSON MAXTOR 408-942-1700	VACANT	BILL CARLSON MAXTOR 408-942-1700	PAUL JANNKE 3M COMPANY 612-736-0117	A. SARATORA BASF SYS., INC. 617-271-4255	97/10
X3B8 FLEX.DISK CARTRIDGES	JAMES BARNES BARNES ASSOC. 617-577-4526	WILLIAM PROCTOR MEMOREX CORP. 408-987-0634	MICHAEL HOGAN NBS 301-975-2926	RONALD YOUNG REY 408-947-8700	CLOYS TOLBERT COMPAQ COMP. 713-320-1673	97/11
X3B8.1 TRK. FORMATS FOR FDC'S	VACANT	VACANT	N/A	N/A	VACANT	
X3B9 PAPER FORMS/LAYOUTS	DELMER ODDY MRE. BUS. FORMS 716-773-0378	VACANT	VACANT	VACANT	DUNHAM SEELEY STD. REG. CO. 716-271-3400 X2407	
X3B10 CREDIT/ID CARDS	R. KITCHENER LOGICARD, SYS. 914-273-8734	ALICE DROOGAN MSTRCARD INT'L 212-649-5358	DAVID SEIGAL AMERICAN EXP. 602-995-7837	VACANT	JOHN STEARNS DATACARD 612-933-1223	97/17
X3B10.1 INTEGRATED CIRCUIT CARDS	VACANT	VACANT	N/A	N/A	JIM JOHNSON DATACARD 612-933-1223	
X3B10.2 REV. OF X3.149	VACANT	VACANT	N/A	N/A	VACANT	
X3B10.3 MIN. SYS. REQ./SAVINGS DOORS	VACANT	VACANT	N/A	N/A	VACANT	
X3B10.4 OPT. RECOG. CARD MEDIA	ROBERT CALLEN DREXLER TECH. 415-969-4428	VACANT	N/A	N/A	VACANT	
X3B11 OPT. DIG. DATA DISKS	J. ZAJACZKOWSKI CHEROKEE DATA 303-449-1239	ROBERT BENDER PENTAX TECHNOL.	MICHAEL DEESE CHEROKEE DATA 303-530-0618	J.A.WESTENBROEK DUPONT 302-999-4310	SHARON ORIEL DOW CHEMICAL 517-636-2173	97/23
H & J - PROGRAMMING LANGUAGES						
X3H2 DATABASE	DONALD DEUTSCH G.E. 615-371-6038	CAROL D. JOYCE RELA. TECH. INC. 415-769-1400	LEONARD GALLAGHER NBS 301-975-3251	BERNARD KOCIS NARDAC 202-433-4390	MICHAEL GORMAN WHITEMARSH INFO. 301-249-1142	SC21
X3H3 COMPUTER GRA.	PETER BONO P.R.BONO ASSOC. 203-464-9350	JOHN MCCONNELL DEC 603-884-2285	JANET CHIN CHIN ASSOC. 415-843-9384	MADELEINE SPARKS UNISYS 205-837-7610	JAMES MICHENER APOLLO COMP. 617-256-6600 X5275	SC21
X3H3.1 PHIGS	DAVID BAILEY CALCOMP/SANDERS 603-885-8141	DEBBIE CAHN BOEING	N/A	N/A	VACANT	
X3H3.2 FORMAL DESCR. VALID & TESTING.	*GEORGE CARSON GSC ASSOCIATES 213-978-9351	VACANT	N/A	N/A	VACANT	
X3H3.3 VIRTUAL DEVICE INTERFACE	KARLA VECCHIET MICROFIELD GRA. 503-626-9393	THOMAS POWERS DEC 617-493-2704	N/A	N/A	VACANT	
X3H3.4 LANGUAGE BINDING	MADELEINE SPARKS UNISYS 205-837-7610	G. CUTHBERT SOFTWARE TECH. 305-723-3999	N/A	N/A	DAVE LARSON HEWLETT-PACKARD 303-226-3800	

X3TC	**CHAIR	**VICE CHAIR	**INT'L REP.	VOCAB. REP.	SECRETARY	***INT'L
H & J - PROGRAMMING LANGUAGES (CONTINUED)						
X3H3.5 GKS	MARY MILLER LANDMARK GRAPH. 713-531-4080	*JOHN MCCONNELL DEC 603-884-2285	N/A	N/A	VACANT	
X3H3.6 DISPLAY MGMT. FR GRAPH. DEV.	GEORGES GRINSTEIN UNIV. OF LOWELL 617-452-5000	VACANT	N/A	N/A	VACANT	
X3H4 INFO. RESOURCE & DICTIONARY	ANTHONY WINKLER 703-848-2750	DAVID CARPENTER PANSOPHIC 312-357-5950	DAVID THOMAS MSP, INC. 617-863-5800	DON MCCAFFREY 703-569-2390	DON MCCAFFREY 703-569-2390	97/22
X3H4.1 IRDS REF. MODEL	VACANT	VACANT	N/A	N/A	VACANT	
X3H4.2 IRDS EXTER. SOFTWARE INTFC.	VACANT	VACANT	N/A	N/A	VACANT	
X3J1 PL/I	JOHN KLENSIN MIT 617-253-1355	CHARLES NYLANDER DEC 603-881-2081	*K.R. LUND IBM CORP.	ARTHUR COSTON APPLD. INFO. SYS. 919-942-7801	VACANT	97/22
X3J1.3 GEN PURP. SUBSET	VACANT	VACANT	N/A	N/A	VACANT	
X3J2 BASIC	JAMES HARLE U.S.NAVAL ACAD.	ANDREW KLOSSNER TEKTRONIX, INC.	VACANT	JOHN CUGINI NBS 301-975-3248	VACANT	97/22
X3J3 FORTRAN	JEANNE ADAMS NCAR 303-497-1275	JERROLD WAGENER AMOCO PROD. CO. 918-664-3415	ANDREW JOHNSON PRIME 617-879-2960	JAMES MATHENY COMP. SCI. CORP. 213-615-0311	J.K. REID AERE HARWELL	97/22
X3J4 COBOL	DON SCHRICKER WANG LABS. 617-967-7628	LEMUEL SKIDMORE SKIDMORE RES. 203-669-7126	PEGGY BEARD NCR CORP. 619-693-5730	VICKI ECKELS TEXAS INST. 512-250-6512	PEGGY BEARD NCR CORP. 619-693-5730	97/22
X3J7 APT	WICKHAM LOH IBM CORP. 213-312-5926	C. W. WILSON MARTIN MARIETTA	RICHARD CAMPBELL APPL. SCHLUMBERGER 214-386-0157	ELLIOT BREBNER UNISYS	VACANT	184/SC3
X3J7.1 PROCESSOR LANGS	VACANT	VACANT	N/A	N/A	VACANT	
X3J7.2 POSTPROCESSOR LANGUAGES	VACANT	VACANT	N/A	N/A	VACANT	
X3J7.3 LASER LANG.	VACANT	VACANT	N/A	N/A	VACANT	
X3J7.4 ROBOTICS LANG.	VACANT	VACANT	N/A	N/A	VACANT	
X3J9 PASCAL	K. ZEMROWSKI TRW 703-876-8014	MICHAEL HAGERTY RADIONICS 408-757-8877	PAULA SCHWARTZ RES. LIBR. GRP. 415-329-3534	DAVID ROBBINS GTE CORP.	V. POLNARCZNY NCR CORP. 614-439-0516	97/22
X3J10 AFL	VACANT	G. H. FOSTER SYRACUSE UNIV. 315-423-4375	VACANT	PETER LUSTER 703-525-8001	VACANT	97/22
X3J11 C LANGUAGE	JIM BRODIE 602-961-0032	THOMAS PLUM PLUM HALL INC. 609-927-3770	STEVE HERSEE LATTICE, INC. 312-858-7950	ANDREW JOHNSON PRIME 617-879-2960 X4045	P.J. PLAUGHER WHITESMITHS, LTD. 617-692-7800	
X3J12 DIBOL	ELI SZKLANKA TEC COMPUTER SYS. 617-964-3890	KENNETH LIDSTER D.I.S.C. INC. 916-635-7300	VACANT	K. SCHILLING MCBA 818-242-9600	KENNETH BEERS DEC 603-884-5537	
X3J13 COMMON LISP	*ROBERT MATHIS 703-425-5923	VACANT	VACANT	VACANT	VACANT	97/21

X3TC	**CHAIR	**VICE CHAIR	**INT'L REP.	VOCAB. REP.	SECRETARY	***INT'L
K - DOCUMENTATION						
X3K1 COMPUTER DOCUMENTATION	*VACANT	JOHN HACKNEY INTSTATE. ELEC. 714-635-7210	VACANT	VACANT	VACANT	97/7
X3K5 VOCAB. FOR INFO PROC. SYS	JOHN WOOD IBM CORP. 919-254-0182	HELMUT THIESS 202-265-9439	RICHARD BATEY UNISYS 215-542-2709	N/A	ROY MULLINAX HOUS. & URBAN 703-755-5607	97/1
L - DATA REPRESENTATION						
X3L2 CODES & CHAR. SETS	DONALD THELEN AT&T TECH. 201-644-3728	VACANT	MACKLIN BISHOP IBM CORP. 512-823-2005	JOHN RUSSELL CONTROL DATA 612-853-5414	RICHARD MYERS UNISYS	97/2
X3L2.1 VIDEOTEX/ TELETEXT	DONALD THELEN AT&T 201-644-3728	VACANT	N/A	N/A	VACANT	
X3L2.2 ADD. CONTR. FUNCTS. FOR X3.64	VACANT	VACANT	N/A	N/A	GARY WATSON NCR CORP. 607-273-5301	
X3L2.3 TWO-BYTE GRA. CHAR. SET	RONALD PELLAR XEROX CORP. 213-333-7364	VACANT	N/A	N/A	VACANT	
X3L8 DATA REPR.	BILL KENWORTHEY DEPT. OF DEFENSE 202-694-3361	DUANE MARQUIS NTIA 301-224-4300	KAREN KIRKBRIDE 202-746-0797	BILL KENWORTHEY DEPT. OF DEFENSE 202-694-3361	VACANT	97/14
X3L8.4 GEO. UNITS	VACANT	HENRY TOM NBS 301-975-3271	N/A	N/A	VACANT	
X3L8.5 ATTRIBUTES OF DATA ELEMENTS	VACANT	VACANT	N/A	N/A	VACANT	
X3L8.6 CLASSIF. OF DATA ELEMENTS	KAREN KIRKBRIDE 202-746-0797	ROGER PAYNE U.S. GEO SURVEY 703-648-4544	N/A	N/A	VACANT	
X3L8.7 MNEMONIC CODES FOR DATA ELE.	DUANE MARQUIS NTIA 301-224-4300	MARY SUMMERS DEF. INTEL. AGY. 202-373-3007	N/A	N/A	VACANT	
S - DATA COMMUNICATION						
X3S3 DATA COMM.	W. F. EMMONS IBM CORP. 919-254-0294	GEORGE WHITE NATL COMM. SYS. 202-692-2124	JOHN WHEELER WINTERGREEN I.S. 716-671-4087	VACANT	VACANT	97/6
X3S3.1 DATA COMM. PLANNING	W. F. EMMONS IBM CORP. 919-254-0294	VACANT	N/A	N/A	VACANT	
X3S3.2 DATA COMM. VOCABULARY	VACANT	VACANT	N/A	N/A	VACANT	
X3S3.3 NETWORK LAYER	LYMAN CHAPIN DATA GENERAL 617-870-6056	DAVID PISCITELLO UNISYS 215-341-4642	N/A	N/A	GEORGE WHITE NAT'L COMM. SYS. 202-692-2124	
X3S3.4 COMTR. PROCED.	VACANT	VACANT	N/A	N/A	VACANT	
X3S3.5 COMM. SYS. PERFORMANCE	NEAL SEITZ DEPT.OF COMM. 303-497-3106	VACANT	N/A	N/A	VACANT	
X3S3.7 PUBLIC DATA NETWORK ACCESS	FRED BURG AT&T 201-949-0919	RANDY SPUSTA BELL COMM. RES.	N/A	N/A	JOSEPH PODVOJSKY MITRE CORP. 617-271-2155	

X3TC	**CHAIR	**VICE CHAIR	**INT'L REP.	VOCAB. REP.	SECRETARY	***INT'L
T & V - SYSTEMS TECHNOLOGY						
X3T1 DATA ENCRYPTION	STEPHEN LEVIN SOFTSEL INC. 609-683-1150	GEOFFREY TURNER BANK OF AMERICA	ROBERT ELANDER IBM CORP. 914-385-6692	STEPHEN LEVIN SOFTSEL INC. 609-683-1150	VACANT	97/20
X3T2 DATA INTER-CHANGE	L. J. GALLAGHER NBS 301-975-3251	MIKE BLACKLEDGE SANDIA NAT'L. LAB. 505-846-6014	MAURICE SMITH ALLIED-BENDIX 816-997-3590	VACANT	VACANT	
X3T5 OSI	JERROLD FOLEY EDS CORP. 313-524-8416	J. ASCHENBRENNER IBM CORP. 919-254-0299	J. ASCHENBRENNER IBM CORP. 919-254-0299	WILLIAM MATHEWS NCR CORP. 619-452-1020	VACANT	97/21
X3T5.1 OSI ARCH.	JOHN DAY CODEX CORP. 617-364-2000 X7111	JOHN GURZICK M/A-COM DCC, INC. 301-258-8940	N/A	N/A	VACANT	97/21/1
X3T5.4 OSI HIGHT. PROTOCOLS	WILL COLLINS CODEX CORP. 617-364-2000	MARK KLERER AT&T 201-949-8645	N/A	N/A	VACANT	
X3T5.5 APPLI. & PRES. LAYERS	L. L. HOLLIS IBM CORP. 919-254-0292	WAYNE DAVISON RES. LIBR. GRP. 415-328-0920	N/A	N/A	PAT MELZER NCR CORP. 619-693-5391	97/21
X3T9 I/O INTERFACE	DEL SHOEMAKER DEC 202-383-5622	BILL BURR NBS 301-975-2914	PATRICK LANNAN AMP INC. 904-686-4476	ARNOLD ROCCATI EG&G WASH. AN. 301-840-3277	BILL BURR NBS 301-975-2914	97/13
X3T9.2 LOWER LEVEL INTERFACE	JOHN LOHMEYER NCR CORP. 316-688-8000	I. DAL ALLAN ENDL 408-867-6630	N/A	N/A	VACANT	
X3T9.3 DEVICE LEVEL INTERFACE	GARY ROBINSON DEC 617-493-4094	VACANT	N/A	N/A	VACANT	
X3T9.5 LOCAL DIST. DATA INTERFACE	GENE MILLIGAN CONTROL DATA 405-324-3070	FLOYD ROSS UNISYS 215-341-1542	N/A	N/A	VACANT	
X3T9.6 CARTRIDGE TAPE DRIVES	LOUIS DOMSHY ARCHIVE CORP. 714-641-0279	VACANT	N/A	N/A	VACANT	
X3V1 TEXT: OFFICE & PUB. SYS.	L. M. COLLINS IBM CORP. 214-556-7690	*ROY PIERCE XEROX CORP. 214-420-4326	MACKLIN BISHOP IBM CORP. 512-823-2005	STEVEN SCHRIER BOOZ,ALLEN,HAMIL. 202-767-4975	CHARLES REEVES ASSOC. OF INFO. 615-574-2342	97/18
X3V1.1 USER REQ.: N.S.T.	W. S. HOBGOOD IBM CORP.	VACANT	N/A	N/A	JONATHAN GRUDIN MCC 512-338-3615	
X3V1.3 DOCUMENT ARCHITECTURE	ROY PIERCE XEROX CORP. 214-420-4326	HERMAN SILBIGER AT&T 201-898-2360	N/A	N/A	JAMES MASON OAK RIDGE LAB. 615-574-6973	
X3V1.4 TEXT INTERCHG	R. H. CHRISTIE CONTROL DATA 612-482-6689	CAROL MOLLEN NCR CORP. 612-638-7777	RONALD HARVEY HONEYWELL 602-861-4711	CAROL MOLLEN NCR CORP. 612-638-7777	ROBERT SAMUELL BELLSOUTH SER. 404-529-7246	
X3V1.5 CONTENT ARCHI.	VACANT	VACANT	N/A	N/A	LYNNE ROSENTHAL NBS 301-975-3353	
X3V1.8 TEXT DESCR. & PROC. LANGS.	BILL DAVIS INTERNAL REV. 202-566-6533	LAWRENCE BECK GRUMMAN DATA 516-682-8478	N/A	N/A	VACANT	
X3V1.9 USER SYS. INTF. & SYMBOLS	VACANT	HELEN WALKER IBM CORP. 512-838-7861	N/A	N/A	VACANT	

Officer Appointment & Term Expiration Dates

X3TC	OFF. POS.	NAME	DATE EFFECTV. MM/DD/YY	TICKLER NOTIF. MM/DD/YY	TERM EXPIRATN. MM/DD/YY
X3	CH	RICHARD GIBSON	03/01/87	N/A	N/A
X3	VC	DONALD LOUGHRY	03/10/87	N/A	N/A
SMC	CH	DELBERT SHOEMAKER	03/17/87	01/17/90	03/17/90
SMC	VC	EDWARD KELLY	03/17/87	01/17/90	03/17/90
IAC	CH	JOSEPH DEBLASI	12/10/84	06/10/87	12/10/87
IAC	VC	GARY ROBINSON	01/06/86	09/06/88	01/06/89
SPARC	CH	WILLIAM RINEHULS	04/12/85	01/01/88	04/12/88
SPARC	VC	LEROY RODGERS	08/10/82	04/08/85	08/10/85
DSSSG	CH	EDWARD STULL	00/00/00	00/00/00	00/00/00
DSSSG	VC	NANCY MCDONALD	06/25/85	03/25/88	06/25/88
DSSSG	IR	ELIZABETH FONG	09/18/85	04/18/88	09/18/88
SC7 TAG	VC	RICHARD WERLING	07/01/86	04/01/89	07/01/89
SC21 TAG	CH	J. ASCHENBRENNER	11/30/84	06/30/87	11/30/87
X3A1	CH	ROGER HOWELL	06/05/84	01/05/87	06/05/87
X3A1	VC	ROBERT ELOSS	09/06/84	04/05/87	09/06/87
X3A1	IR	JOHN MCDONNELL	09/01/84	04/01/87	09/01/87
X3A1.1	CH	PATRICK TRAGLIA	03/20/85	01/20/88	03/20/88
X3A1.2	CH	CARL KNOEDEL	09/10/84	04/10/87	09/10/87
X3A1.3	CH	C. BISS	04/17/87	01/17/90	04/17/90
X3B5	CH	RICHARD STEINBRENNER	04/24/87	01/24/90	04/24/90
X3B5	VC	SAM CHEATHAM	01/29/87	10/29/89	01/29/90
X3B5	IR	MICHAEL HOGAN	04/17/87	01/17/90	04/17/90
X3B6	CH	WILLIAM POLAND, JR.	04/17/87	01/17/90	04/17/90
X3B6	VC	C. DON WRIGHT	04/17/87	01/17/90	04/17/90
X3B6	IR	STAN REYNOLDS	05/20/87	02/20/90	05/20/90
X3B7	CH	BILL CARLSON	07/20/85	03/20/88	07/20/88
X3B7	IR	BILL CARLSON	06/20/85	03/20/88	06/20/88
X3B8	CH	JAMES BARNES	09/09/85	06/06/88	09/09/88
X3B8	VC	BILL PROCTOR	03/31/86	01/01/89	03/31/89
X3B8	IR	MICHAEL HOGAN	04/17/87	01/17/90	04/17/90
X3B9	CH	D. ODDY	06/07/85	01/01/88	06/07/88
X3B10	CH	ROBERT KITCHENER	01/06/86	09/06/88	01/06/89
X3B10	VC	ALICE DROOGAN	01/06/86	09/06/88	01/06/89
X3B10	IR	D. SEIGAL	01/06/86	09/06/88	01/06/89
X3B10.4	CH	ROBERT CALLEN	06/25/86	03/25/89	06/25/89
X3B11	CH	JOSEPH ZAJACZKOWSKI	11/30/84	08/30/87	11/30/87
X3B11	VC	ROBERT BENDER	12/10/84	09/10/87	12/10/87
X3B11	IR	MICHAEL DEESE	12/15/84	09/15/87	12/15/87
X3H2	CH	DONALD DEUTSCH	04/17/87	01/17/90	04/17/90
X3H2	VC	CAROL JOYCE	10/21/86	05/21/89	10/10/89
X3H2	IR	LEONARD GALLAGHER	04/17/87	01/17/90	04/17/90
X3H3	CH	PETER BONO	05/04/84	01/04/87	05/04/87
X3H3	VC	JOHN MCCONNELL	11/15/86	07/15/89	11/15/89
X3H3	IR	JANET CHIN	05/20/87	02/20/90	05/20/90
X3H3.1	CH	DAVID BAILEY	01/06/86	09/06/88	01/06/89
X3H3.1	VC	DEBBIE CAHN	05/26/87	02/26/90	05/26/90
X3H3.3	CH	KARLA VECCHIET	05/26/87	02/26/90	05/26/90
X3H3.3	VC	THOMAS POWERS	06/07/85	01/01/88	06/07/88

X3H3.4	CH	MADELEINE SPARKS	12/15/84	09/15/87	12/15/87
X3H3.4	VC	GERALDINE CUTHBERT	06/07/85	01/01/88	06/07/88
X3H3.5	CH	MARY MILLER	01/22/87	10/22/89	01/22/90
X3H3.6	CH	GEORGES GRINSTEIN	02/13/87	12/13/89	02/13/90
X3H4	CH	ANTHONY WINKLER	05/30/84	03/30/87	05/30/87
X3H4	VC	DAVID CARPENTER	04/17/87	01/17/90	04/17/90
X3H4	IR	DAVID THOMAS	04/17/87	01/17/90	04/17/90
X3J1	CH	JOHN KLENSIN	03/22/82	01/22/85	03/22/85
X3J1	VC	CHARLES NYLANDER	10/15/83	07/15/86	10/15/86
X3J2	CH	JAMES HARLE	04/24/87	01/24/90	04/24/90
X3J2	VC	ANDREW KLOSSNER	11/20/86	07/20/89	11/20/89
X3J3	CH	JEANNE ADAMS	04/17/87	01/17/90	04/17/90
X3J3	VC	JERROLD WAGENER	06/13/86	03/13/89	06/13/89
X3J3	IR	ANDREW JOHNSON	05/20/87	02/20/90	05/20/90
X3J4	CH	DON SCHRICKER	09/23/85	06/23/88	09/23/88
X3J4	VC	LEMUEL SKIDMORE	07/01/84	04/01/87	07/01/87
X3J4	IR	PEGGY BEARD	09/01/84	04/01/87	09/01/87
X3J7	CH	WICKHAM LOH	02/13/87	12/13/89	02/13/90
X3J7	VC	C. WILSON	02/13/87	12/13/89	02/13/90
X3J7	IR	RICHARD CAMPBELL	09/13/82	06/13/85	09/13/85
X3J9	CH	KENNETH ZEMROWSKI	11/02/83	08/12/86	11/02/86
X3J9	VC	MICHAEL HAGERTY	06/10/85	01/01/88	06/10/88
X3J9	IR	PAULA SCHWARTZ	01/06/86	09/06/88	01/06/89
X3J10	VC	G. FOSTER	00/00/00	00/00/00	00/00/00
X3J11	CH	JIM BRODIE	01/02/84	09/02/86	01/02/87
X3J11	VC	THOMAS PLUM	01/02/84	09/02/86	01/02/87
X3J11	IR	STEVE HERSEE	01/06/86	09/06/88	01/06/89
X3J12	CH	ELI SZKLANKA	06/10/85	01/01/88	06/10/88
X3J12	VC	KENNETH LIDSTER	06/10/85	01/01/88	06/10/88
X3J13					
X3K1	VC	JOHN HACKNEY	03/20/85	01/20/88	03/20/88
X3K5	CH	JOHN WOOD	01/02/87	09/02/89	01/02/90
X3K5	VC	HELMUT THIESS	01/02/87	09/02/89	01/02/90
X3K5	IR	RICHARD BATEY	11/20/86	07/20/89	11/20/89
X3L2	CH	DONALD THELEN	06/13/86	03/13/89	06/13/89
X3L2	IR	MACKLIN BISHOP	09/10/84	04/10/87	09/10/87
X3L2.1	CH	DONALD THELEN	06/10/85	03/10/88	06/10/88
X3L2.3	CH	RONALD PELLAR	05/30/84	01/30/87	05/30/87
X3L8	CH	WILLIAM KENWORTHEY	09/01/86	06/01/89	09/01/89
X3L8	VC	DUANE MARQUIS	06/28/86	03/28/89	06/28/89
X3L8	IR	KAREN KIRKBRIDE	05/25/84	01/25/87	05/25/87
X3L8.4	VC	HENRY TOH	07/20/85	04/20/88	07/20/88
X3L8.6	CH	KAREN KIRKBRIDE	03/22/85	12/22/87	03/22/88
X3L8.6	VC	ROGER PAYNE	05/26/87	02/26/90	05/26/90
X3L8.7	CH	DUANE MARQUIS	11/20/86	07/20/89	11/20/89
X3L8.7	VC	MARY SUMMERS	06/25/86	03/25/89	06/25/89
X3S3	CH	W. EMMONS	07/01/84	04/01/87	07/01/87
X3S3	VC	GEORGE WHITE	09/10/84	06/10/87	09/10/87
X3S3	IR	JOHN WHEELER	05/20/87	02/20/90	05/20/90
X3S3.1	CH	W. EMMONS	05/15/84	02/15/87	05/15/87
X3S3.3	CH	LYMAN CHAPIN	04/17/87	01/17/90	04/17/90
X3S3.3	VC	DAVID PISCITELLO	01/02/84	07/02/86	01/02/87
X3S3.5	CH	NEAL SEITZ	01/29/87	10/29/89	01/29/90
X3S3.7	CH	FRED BURG	03/13/87	12/13/89	03/13/90
X3S3.7	VC	RANDY SPUSTA	04/17/87	01/17/90	04/17/90

X3T1	CH	STEPHEN LEVIN	05/04/84	02/04/87	05/04/87
X3T1	VC	GEOFFREY TURNER	05/09/86	03/09/89	05/09/89
X3T1	IR	ROBERT ELANDER	00/00/00	00/00/00	00/00/00
X3T2	CH	LEONARD GALLAGHER	02/13/87	12/13/89	02/13/90
X3T2	VC	MIKE BLACKLEDGE	04/13/87	01/13/90	04/13/90
X3T2	IR	MAURICE L. SMITH	06/15/87	03/15/90	06/15/90
X3T5	CH	JERROLD FOLEY	01/06/86	09/06/88	01/06/89
X3T5	VC	J. ASCHENBRENNER	05/04/84	02/04/87	05/04/87
X3T5	IR	J. ASCHENBRENNER	05/04/84	02/04/87	05/04/87
X3T5.1	CH	JOHN DAY	07/05/84	04/05/87	07/05/87
X3T5.1	VC	JOHN GURZICK	07/05/84	04/05/87	07/05/87
X3T5.4	CH	WILL COLLINS	11/15/86	07/15/89	11/15/89
X3T5.4	VC	MARK KLERER	11/15/86	07/15/89	11/15/89
X3T5.5	CH	L. HOLLIS	05/20/87	02/20/90	05/20/90
X3T5.5	VC	W. (WAYNE) DAVISON	04/17/87	01/17/90	04/17/90
X3T9	CH	DELBERT SHOEMAKER	06/20/85	03/20/88	06/20/88
X3T9	VC	WILLIAM BURR	11/30/84	07/30/87	11/30/87
X3T9	IR	PATRICK LANNAN	05/25/84	02/25/87	05/25/87
X3T9.2	CH	JOHN LOHMEYER	02/20/87	12/20/89	02/20/90
X3T9.2	VC	I. DAL ALLAN	02/20/87	12/20/89	02/20/90
X3T9.3	CH	GARY ROBINSON	00/00/00	00/00/00	00/00/00
X3T9.5	CH	GENE MILLIGAN	03/21/85	01/01/88	03/21/88
X3T9.5	VC	FLOYD ROSS	06/10/85	01/01/88	06/10/88
X3T9.6	CH	LOUIS DOMSHY	02/04/85	10/04/87	02/04/88
X3V1	CH	L. COLLINS	06/07/85	01/01/88	06/07/88
X3V1	IR	MACKLIN BISHOP	04/17/87	01/17/90	04/17/90
X3V1.1	CH	W. HODGOOD	04/17/87	01/17/90	04/17/90
X3V1.3	CH	ROY PIERCE	10/02/85	07/02/88	10/02/88
X3V1.3	VC	HERMAN SILBIGER	10/02/85	07/02/88	10/02/88
X3V1.4	CH	R. CHRISTIE	04/24/87	01/24/90	04/24/90
X3V1.4	VC	CAROL MOLLEN	10/02/85	07/02/88	10/02/88
X3V1.8	CH	WILLIAM DAVIS, JR.	10/02/85	07/02/88	10/02/88
X3V1.8	VC	LAWRENCE BECK	10/02/85	07/02/88	10/02/88
X3V1.9	VC	HELEN WALKER	10/02/85	07/02/88	10/02/88

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WESTBORO, MA 01580
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KEY:
CH = CHAIR OR AC = ACTING
VC = VICE CHAIR OR AV = ACTING
IR = INTERNATIONAL REP.
VR = VOCABULARY REP.
SY = SECRETARY

SPARC NATIONAL AND INTERNATIONAL MONITORING

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X3A1	Mr. Bass	January
X3B5/SC11/SC15*	Mr. Fogle	July
X3B6/WG2	Mr. Bass	November
X3B7/SC10	Mr. Saltman	January
X3B8/SC11/SC15	Mr. Kurihara	January
X3B9	Mr. Bass	July
X3B10/SC17	Mr. Bass	July
X3B11/SC23	Mr. Follett	July
X3H2	Mr. LaPlant	March
X3H3	Mr. Fogle	November
X3H4	Mr. McNamara	March
X3J1	Mr. Ryland	September
X3J2	Mr. Kurihara	September
X3J3	Mr. LaPlant	May
X3J4	Mr. McNamara	September
X3J7	Mr. Ryland	January
X3J9	Mr. Kurihara	March
X3J10	Mr. Fogle	July
X3J11	Mr. Kurihara	May
X3J12	Mr. LaPlant	September
X3J13	Mr. LaPlant	September
X3K1	Ms. Butler	November
X3K5/SC1	Ms. Butler	November
X3L2/SC2	Mr. Haines	July
X3L8/SC14	Mr. McNamara	November
X3S3/SC6	Mr. Follett	March
X3T1/SC20	Mr. Saltman	July
X3T2	Mr. Follett	
X3T5	Mr. Virtue	March
X3T9/SC13	Mr. Ryland	March
X3V1/SC18	Mr. McNamara	September
SPARC/DBSSG	Ms. Butler	March
SPARC/SSISG	Mr. Follett	
PLIP	(Inactive)	
U.S. TAG to SC7	Ms. Butler	November
U.S. TAG to SC21	Mr. Follett	March
U.S. TAG to SC22	Ms. Butler	March

*SC11 and SC15 liaison is conducted through reporting to both TCs.

PROJECT LIAISON

Project	Member	Liaison With
Ada	Mr. Virtue	DOD HOLWG
MUMPS	Mr. LaPlant	MDC

SPARC LIAISON ACTIVITIES WITH EXTERNAL ORGANIZATIONS

Organization	Member
Information Systems Standards Board (ISSB)	Mr. Rinehuls
ANSI Planning Panel on Industrial Automation	Mr. Rodgers
IEEE Computer Society Standards Activities Board	Mr. LaPlant
X9 - Financial Services	Mr. Bass
X12 - Electronic Business Data Interchange	Mr. Virtue
IEC/TC83 Working Group on Planning and Requirements	Mr. McNamara

IAC INTERNATIONAL LIAISON ASSIGNMENTS

ISO/TC97 - CHAIR
WG2 - MARV BASS
SC1 -- GARY HAINES
2 - BOB ROUNTREE
6 - JOHN WHEELER
7 - BOB ROUNTREE*
11 - BOB ROUNTREE
13 - PATRICK LANNAN
14 - BOB ROUNTREE
15 - MARY ANNE GRAY
17 - MARV BASS
18 - MARY ANNE GRAY
20 - GARY ROBINSON
21 - GARY ROBINSON
22 - BOB ROUNTREE
23 - GARY HAINES

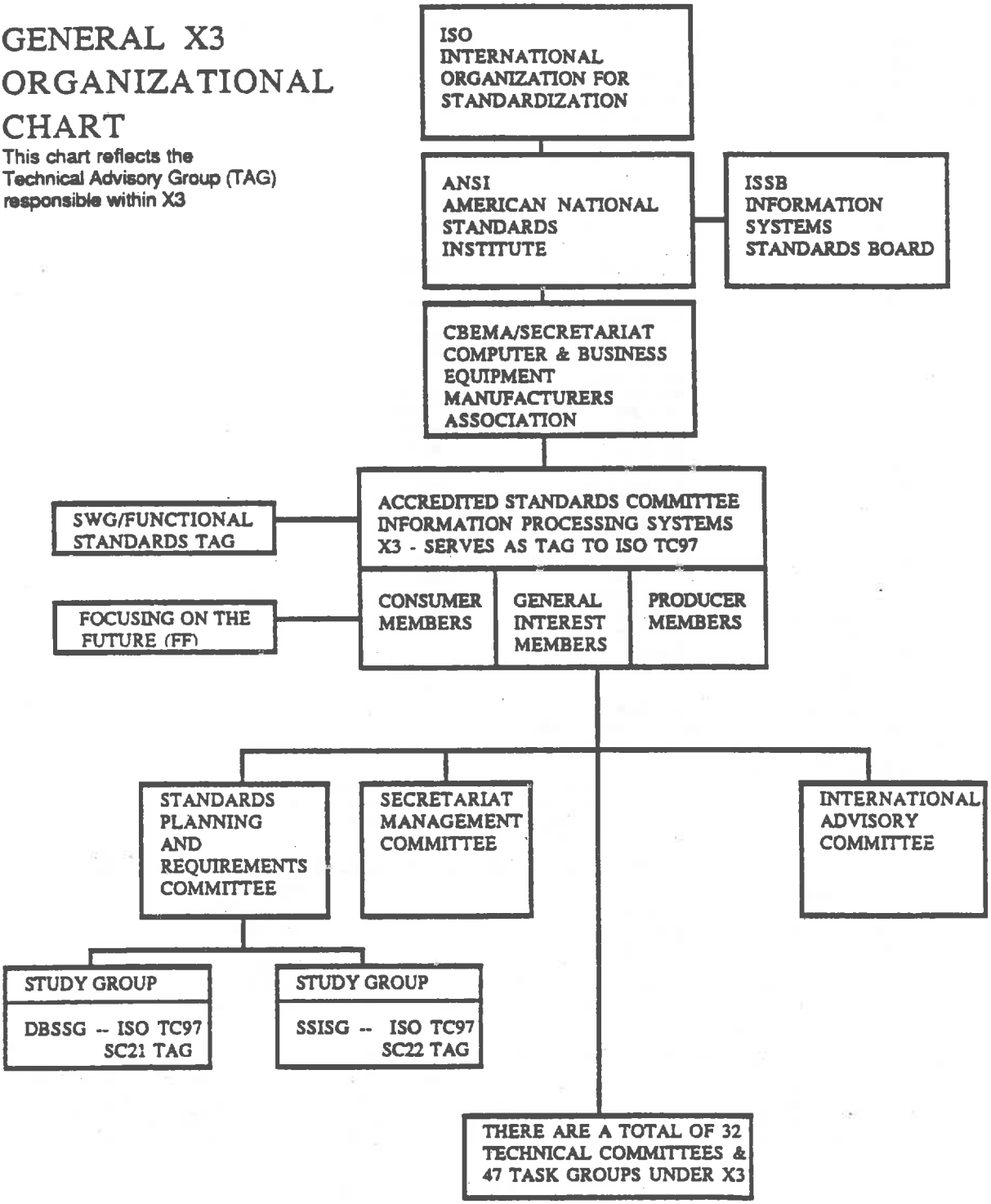
ISO/TC68 BANKING - MARV BASS
TC145 GRAPHICS - MARY ANNE GRAY
TC154 DATA ELEMENTS - BOB ROUNTREE
TC159 ERGONOMICS - GARY ROBINSON

ISO/TC184 IND'L AUTOMATION - ED KELLY
IEC/TC3 GRAPHICS - SAVA SHERR
SC47B MICROPROCESSORS - SAVA SHERR
TC74 PRODUCT SAFETY - MARV BASS
EMI - VACANT
TC86 FIBER OPTICS - VACANT
ACOS - SAVA SHERR
CCITT/SGVII NETWORKS - RICHARD GIBSON
VIII TERMINALS - MARY ANNE GRAY
XVII DATA COMM. - RICHARD GIBSON
XVIII DIG. NETWORKS - BOB ROUNTREE
IEC/TC83 INFO. TECH. EQPT. - SAVA SHERR

ECMA - GARY ROBINSON
IEC - SAVA SHERR
CCITT - RICHARD GIBSON
ISO - JOSEPH DEBLASI

GENERAL X3 ORGANIZATIONAL CHART

This chart reflects the Technical Advisory Group (TAG) responsible within X3



DETAILED X3 TECHNICAL COMMITTEE ORGANIZATIONAL CHART

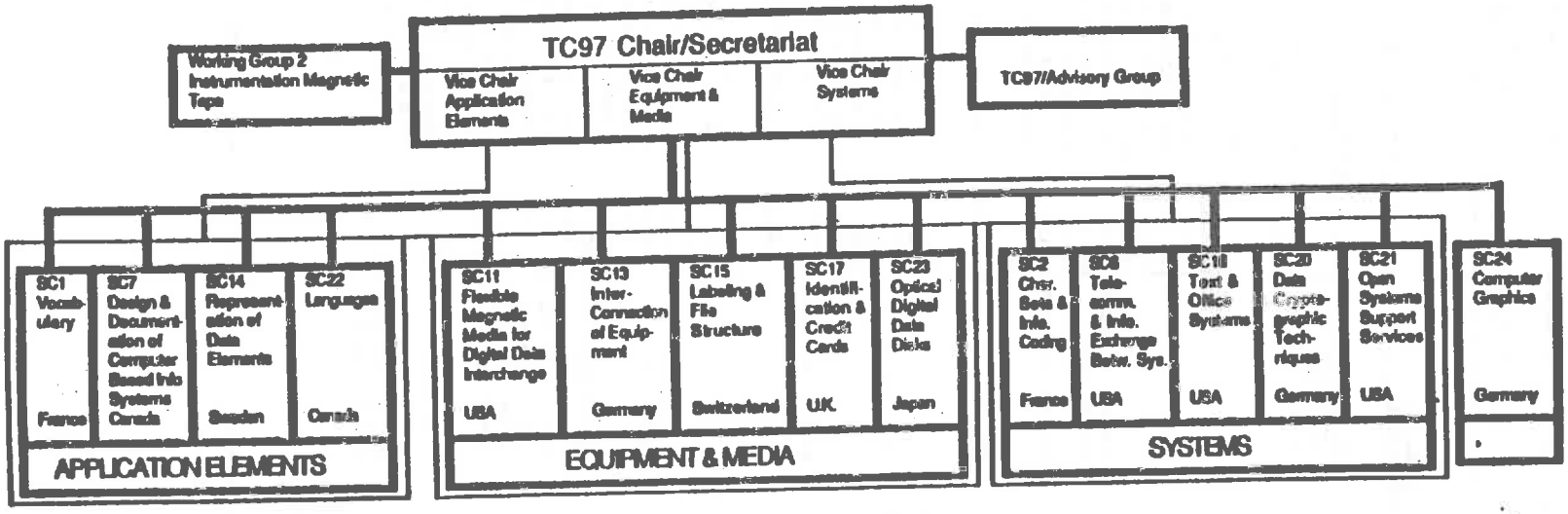
X3 TECHNICAL COMMITTEE		TECH. ADVISORY GROUP (TAG) RESPONSIBILITY
U.S. TAG TO SC7		ISO/TC97 SC7
U.S. TAG TO SC21		ISO/TC97 SC21
U.S. TAG TO SC22		ISO/TC97 SC22
A . RECOGNITION		
X3A1	OCR & MICR	
X3A1.1	FONT DESIGN	
X3A1.2	OCR SUPPLIES & FORMS	
X3A1.3	IMAGE DEF. & MEASUREMENT	
B . MEDIA		
X3B5	DIGITAL MAGNETIC TAPE	ISO/TC97 SC11/SC15
X3B6	INSTRUMENTATION TAPE	ISO/TC97 WG2
X3B7	MAGNETIC DISKS	
X3B8	FLEXIBLE DISK CARTRIDGES	ISO/TC97 SC11/SC15
X3B8.1	TRACK FORMATS FOR FDCS	
X3B9	PAPER FORMS/LAYOUTS	
X3B10	CREDIT/ID CARDS	ISO/TC97 SC17
X3B10.1	INTEGRATED CIRCUIT CARDS	ISO/TC97 SC17 WG4
X3B10.2	REVISION OF X4.18	
X3B10.3	MIN. PHYS. REQTS/SAVINGSBOOKS	
X3B10.4	OPTICALLY ENCODED CARD MEDIA	
X3B11	OPTICAL DIGITAL DATA DISKS	ISO/TC97 SC23
H & I . LANGUAGES		
X3H2	DATABASE	ISO/TC97 SC21 WG3
X3H3	COMPUTER GRAPHICS	ISO/TC97 SC21 WG2
X3H3.1	PHIGS	
X3H3.2	FDVT	
X3H3.3	VIRTUAL DEVICE INTERFACE	
X3H3.4	LANGUAGE BINDING	
X3H3.5	GKS	
X3H3.6	DISPLAY MGMT. GRAPHICL DEV.	
X3H4	INFO. RESOURCE & DICT.	ISO/TC97 SC21
X3H4.1	IRDS REFERENCE MODEL	
X3H4.2	IRDS EXTER. SOFTWARE INTPCE	
X3J1	PL/I	ISO/TC97 SC22
X3J1.3	GENERAL PURPOSE SUBSET	
X3J2	BASIC	ISO/TC97 SC22 WG8
X3J3	FORTRAN	ISO/TC97 SC22 WG5
X3J4	COBOL	ISO/TC97 SC22 WG4
X3J7	APT	ISO/TC97 SC3
X3J7.1	PROCESSOR LANGUAGES	
X3J7.2	POSTPROCESSOR LANGUAGES	
X3J7.3	LATHE LANGUAGES	
X3J7.4	ROBOTICS LANGUAGE	
X3J9	PASCAL	ISO/TC97 SC22 WG2
X3J10	APL	ISO/TC97 SC22 WG3
X3J11	C LANGUAGE	
X3J12	DIBOL	
X3J13	COMMON LISP	
X3J14	PROGRAMMING LANGUAGE FORTH*	

X3 TECHNICAL COMMITTEE		TECH. ADVISORY GROUP (TAG) RESPONSIBILITY
K . DOCUMENTATION		
X3K1	COMPUTER DOCUMENTATION	ISO/TC97 SC7
X3K5	VOCAB. FOR INFO. PROC. SYS.	ISO/TC97 SC1
L . DATA REPRESENTATION		
X3L2	CODES & CHARACTER SETS	ISO/TC97 SC2
X3L2.1	VIDEOTEX/TELETEXT	
X3L2.2	ADD. CONTR. FUNCTS. FOR X3.64	
X3L2.3	TWO-BYTE GRA. CHARACTER SET	ISO/TC97 SC2 WG2
X3L8	DATA REPRESENTATION	ISO/TC97 SC14
X3L8.4	GEOGRAPHIC UNITS	
X3L8.5	ATTRIBUTES OF DATA ELEMENTS	
X3L8.6	CLASSIF. OF DATA ELEMENTS	
X3L8..7	MNEM. CODES FOR DATA ELEM.	
S . DATA COMMUNICATION		
X3S3	DATA COMMUNICATION	ISO/TC97 SC6
X3S3.1	DATA COMM. PLANNING	
X3S3.2	DATA COMM. VOCABULARY	
X3S3.3	NETWORK LAYER	ISO/TC97 SC6 WG2
X3S3.4	CONTROL PROCEDURES	
X3S3.5	COMM. SYS. PERFORMANCE	
X3S3.7	PUB. DATA NETWORK ACCESS	
T & V . SYSTEMS TECHNOLOGY		
X3T1	DATA ENCRYPTION	ISO/TC97 SC20
X3T2	DATA INTERCHANGE	
X3T5	OSI	ISO/TC97 SC21
X3T5.1	OSI ARCHITECTURE	ISO/TC97 SC21 WG1
X3T5.4	OSI MNGMT. PROTOCOLS	ISO/TC97 SC21 WG4
X3T5.5	APPLIC. & PRES. LAYERS	ISO/TC97 SC21 WG6
X3T9	I/O INTERFACE	ISO/TC97 SC13
X3T9.2	LOWER LEVEL INTERFACE	ISO/TC97 SC13 WG3
X3T9.3	DEVICE LEVEL INTERFACE	
X3T9.5	LOCAL DIST. DATA INTFC.	
X3T9.6	CARTRIDGE TAPE DRIVES	
X3V1	TEXT: OFF. & PUB. SYS.	ISO/TC97 SC18
X3V1.1	USER REQ. M.S.T.	ISO/TC97 SC18 WG1
X3V1.3	DOCUMENT ARCHITECTURE	ISO/TC97 SC18 WG3
X3V1.4	TEXT INTERCHANGE	ISO/TC97 SC18 WG4
X3V1.5	CONTENT ARCHITECTURE	ISO/TC97 SC18 WG5
X3V1.8	TXT DESCR. & PROC. LANGS.	ISO/TC97 SC18 WG8
X3V1.9	USER SYS. INTFC & SYMBOLS	ISO/TC97 SC18 WG9

This Chart is Organizational only & does not reflect the Standards Approval Process

* To be established

INTERNATIONAL ORGANIZATIONAL CHART



KEY:

——— ISO STRUCTURE

——— Coordination responsibilities of Vice Chairmen

* Effective October 1, 1987

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SC17/WG3	CHARLES B. FISCHER AIR TRANSPORT ASSOC. 1709 NEW YORK AVE., NW WASHINGTON, DC 20006 202-626-4222	SC17/WG5	BERYL ANN BARBER CHASE MANHATTAN BANK, N.A. 3 SHORTLANDS HAMMERSMITH LONDON W68HZ UK	SC18/WG8	JAMES D. MASON OAK RIDGE NAT'L LABORATORY P.O. BOX X, 4500-S OAK RIDGE, TN 37831 615-574-6973
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SC22/WG4	MABEL VICKERS NATIONAL BUREAU OF STDS. TECH. BLDG. 225, RM A-367 GAITHERSBURG, MD 20899 301-975-3277	SC22/WG9	VIRGINIA CASTOR AJPO, DIRECTOR COMPUTER SOFTWARE & SYS. 1211 SOUTH FERN STREET ROOM C107 ARLINGTON, VA 22202 202-694-0209	SC22/WG11	DONALD F. NELSON TANDEM COMPUTERS, INC. 10555 RIDGEVIEW COURT CUPERTINO, CA 95014 408-996-6340

*POSIX WG JIM ISSAK
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617-626-1000

*TENTATIVE

(33)

To: X3J3

105(*)JKR-3

From: John Reid

Subject: X3J3 membership (Bellevue scribe notes)

Date: 5th August 1987

I failed to make a note of the scribe for the session on X3J3 membership on the last day of the Bellevue meeting. In fact, Kurt Hirchert was the scribe. He wrote some excellent notes and posted them on June 1, but by surface mail and they did not arrive until July 24. Thinking that there was no scribe, I put a brief summary of the discussion in the minutes. Kurt's notes are attached. I hope the committee will agree to regard them as part of the minutes even though they do not meet the two-week rule.

38 X3J3 membership policies and procedures

Discussion leader: Wagener

Scribe: Hirchert

Reference: 103.JLW-3 (X3J3/205, p. 105)

Wagener: In addition to the text distributed, I have already added a sentence notingthat normally there can be only one principal member from a single institution.

B Martin: Note that the Federal government is not considered a single institution. Isn't the rule that there can be only one vote, not that there can be only one member, from a single institution.

Adams: If there is two members from an institution, then one is an alternate. We don't have a choice about this rule. SPARC has instructed us to enforce it.

Johnson: X3J11 has two members who are Bell employees, but only one of them is considered to be from Bell. The other represents /usr/grp.

B Martin: There are two changes here from our previous practice: First, we have not previously been requiring information about the background of alternate members, only principal members. Second, provisional status could be avoided if one had attended the previous meeting, even if one had not attended two of the last three. Does this latter provision apply to new members as well?

Adams: Apparently not.

B Martin: It would be desirable if there were consistency in the handling of new and old members.

Johnson: In order for a new member to vote, must s/he have attended the previous meeting *as an applicant for membership?*

Wagener: This is not required.

Ellis: These rules need to be spelled out very clearly for the benefit of the prospective new member. You should add examples.

Hirchert: The money paid to the X3 secretariat is a service fee, not membership dues.

Harris: The membership rules are established by X3. You can't have additional rules.

Campbell: The X3 rules say the technical committe can have additional rules.

Wagener: I will consult the X3 SD-2 and make sure there is no conflict.

Allison: We need to be careful to distiguish membership status from voting status.

Wagener: I will rewrite this and distribute it for the next meeting. Should we make it a standing document?

Adams: Can we apply the "2 out of 3 meetings" rule to new members as well?

Wearing: This seems aimed at preventing new members from voting right away and seems insulting to me.

Campbell: It is no more insulting to new members than it is to old members who a put on provisional status for failing to attend 2 out of 3 meetings.

Adams: All of these requirement came originally from the X3 requirements.

Wagener: If we are going to make this a standing document, we need a vote.

Metcalf: We need to see the rewritten version before we can vote on it.

Adams: We also need to note that foreign members cannot be a part of US delegations or take part in establishing US positions in international standardization issues.

Hirchert: That's based on your employer, not your citizenship.

Philips: We are supposed to be individual experts on this committee, not representatives of our employers.

Hirchert: True, but our opinions still tend to be affected by the interests of our employers. The justification is similar to that for the rule requiring only one principal member from a single organization.

Wearing: I didn't know about this rule. You need to warn me when I am not eligible to vote.

Ellis: As a recent member, I have received the changes to the X3 SD-2, but not the original document.

Adams: CBEMA should have sent it to you when you joined.

Reid: SD-2 says 'Applications for membership shall be made in writing to the respective Chair. Applicants shall state their qualifications – directly and materially affected by the activity, willingness and ability to participate actively. A prospective member shall attend one meeting of the subgroup as an observer and reaffirm

interest in the work of the subgroup. Membership privileges begin with the opening of the next meeting attended.'

Adams: Our deliberations on these matters are not secret. "Foreign" members can hear them and even take part in the discussions. They just can't vote on them.

Harris: You seem to be trying to limit the input of new members.

Wagener: We are just trying to address the anomaly in the differing continuity requirements for new and old members.

Harris: The "2 out of 3" rule is intended to provide evidence in continued interest in the work. New members are presumed to be interested, so the "2 out of 3" rule isn't applicable.

Brainerd: We disagree on the purpose of the "2 out of 3" rule. We are just proposing that old privileges as new members with respect to voting status. The alternative to requiring that a new member attend 2 out of 3 meeting before voting is to allow old members to vote if they have attended the previous meeting.

Martin: Otherwise, an old member who had missed two meeting and then attended one would be unable to vote as a continuing member, but would be able to vote if s/he resigned and immediately applied for new membership.

Johnson: In Loren Meissner's version of the voting rules, you could vote if you attended the last meeting or the two preceding it. Perhaps we should continue with that rule.

105(*)JKR-4

HARWELL

Computer Science and Systems Division
AERE Harwell, Oxfordshire
OX11 ORA
Tel: Abingdon (0235) 24141 Ext.
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Telex 83135

(34)

16th June 1987

Dr. J.R. Wood,
IBM Corporation,
E37/656-3,
P.O. Box 12195,
Research Tri. Pk.
NC 27709,
USA

Dear Dr. Wood,

Fortran Glossary

A copy of your letter of 11 May to Jim Matheny was copied to me since I was the original author of the glossary that is now part of the new draft Fortran that has been submitted to X3 for release for public comment. I am, of course, delighted in your interest in the glossary.

The reason for this letter is that I would appreciate clarification as to whether you want a glossary for Fortran 77 or Fortran 8x. If you want a glossary for Fortran 77 (which is what you say in the second line of page 1), a very substantial revision will be needed, since many of the terms apply only to Fortran 8x. This is because my main motivation in writing the glossary was to firm up the meanings of terms used inconsistently in the draft.

I am afraid I will not be able to get to your meeting in July, but I will try to provide comments for you beforehand.

Yours sincerely,

J.K. Reid

cc. J.H. Matheny
J.C. Adams

Accredited Standards Committee
X3, INFORMATION PROCESSING SYSTEMS*

Doc. No.: X3K5/87-17

Date: July 27, 1987
Project: 0026-D
Ref. Doc.:
Reply to: J. R. Wood
IBM Corporation
E48/B656-3
P.O. Box 12195
RTP, NC 27709
(919) 254-0182

To: J. K. Reid
Computer Science and Systems Division
Harwell Laboratory
United Kingdom Atomic Energy Authority
Oxfordshire OX11 ORA5
England

Dear Mr. Reid,

Thank you for your letter of June 16.

For the purposes of Committee ASC X3K5, I believe that a general Fortran glossary would best serve the needs of those who purchase future editions of the American National Standard Dictionary for Information Systems. K5 plans to include glossaries for both Fortran and COBOL in the next edition.

Terms specific to particular versions of Fortran could also be included. Such terms would be qualified: "In Fortran 77...," or "In Fortran 8x...," etc. Terms that apply to all versions would not be qualified. I do not know if this satisfies your current objectives, but I would think that a comprehensive Fortran glossary would also be of great value to Fortran Committee X3J3. Glossaries specific to a version could be easily subsetted from the comprehensive set of entries.

I am including an X2K5 meeting schedule. Your participation at a future meeting of K5 would be very welcome. If you cannot attend, your responses to the K5 comments would be appreciated prior to our November meeting.

Sincerely,

John Wood /a/

John R. Wood
Chairman, ASC X3K5

cc: Jeanne Adams, Chair X3J3
James H. Matheny, Chair X3J3-VR

Subject: KEYED ACCESS 07/05/87 105(16)JHM-03

To: X3J3 From: J. H. Matheny

PREFACE

This proposal, with no changes, was presented to X3J3 at the 101th meeting in Halifax, Nova Scotia in August 1986. A voice vote to defer consideration of this new topic until /S8 was approved by X3J3. It appeared to be unanimous.

REFERENCES

101(16)JHM-02
ISO SC22/WG5 Bonn Resolutions, R29
ISO SC22/WG5 Bonn Proposal, Keyed Access
96(16)WS-01 Keyed Access Proposal
ANSI X3.23-1986 COBOL Standard

INTRODUCTION

The Fortran 77 (and now Fortran 8X) Standard provides a very simple, and limited, direct access capability. COBOL, and many extensions to Fortran 77, provide more capability. Such a capability is proposed here.

In preparing this proposal, it seems appropriate to propose the new features, with some incremental add-ons, as succeeding proposals, and then to prepare text if the proposal seems viable. For expository reasons, many asides are included in the proposal text, but they are not a part of the proposal. They are delineated by matching asterisks, ***This is not a part of the proposal,***, e. g.

PROPOSAL I Add to Standard Fortran a KEYED Access Method

Add to the access methods described in Fortran 8X (SEQUENTIAL and DIRECT) the access method KEYED. The "name" of a record can thus be null (purely positional), an integer, or a specified field within the record, that is, arbitrary.

Add to the OPEN statement the access specifier ACCESS = "KEYED". This specifies the connection to be keyed.

*** X3J3, in Standard Fortran, has declined to specify attributes of a file, but rather only the attributes of a connection to a file. DEC, and most implementors of Fortran, can be more explicit. Thus this proposal does not specify attributes of a file.***

A keyed connection defaults to unformatted, like DIRECT. *** The user (program) can specify the connection to be formatted with

the FORM= specifier.***

Add to the INQUIRE statement the return value "KEYED" to the ACCESS= specifier. This value is returned to the *scalar-char-variable* if the file is connected with the ACCESS = "KEYED".

Add to the OPEN statement the additional specifier KEY=.

KEY = *int-expr-1 : int-expr-2 [, int-expr-1 : int-expr-2]...*

where *int-expr-1* and *int-expr-2* are the beginning and ending positions of each key, and succeeding keys, if any (primary, secondary, tertiary ...), are concatenated on the right. For formatted connections the key positions are character positions in the record. For unformatted connections, the key positions are values in the record.

*** Fortran 77 does not describe a relationship between a character storage unit and a numeric storage unit, and in Fortran 8X, the mapping is rather more complex. We don't know what a byte is, and are unwilling to measure the record size of an unformatted record in any specified unit. Also we explicitly permit garbage-padding in unformatted records to improve efficiency.***

Add to the control information list of a READ statement the specifiers:

KEY = *expr-1 [, expr-2]...*
KEYGE = *expr-1 [, expr-2]...*
KEYGT = *expr-1 [, expr-2]...*

KEY specifies that the key found in the record is equal to the *expr*. KEYGE specifies that the key found in the record is greater than or equal to the *expr* specified. KEYGT specifies that the key found in the record is greater than the *expr* specified.

For a formatted READ, the expressions are evaluated as character, concatenated, and the specified record is located and read.

For an unformatted READ, the expressions are evaluated in binary, are concatenated in binary, and the specified record is located and read.

If a specified record is not found, an error condition exists.

If the target key specified in the control information list of the READ statement is shorter than the key (primary, secondary, tertiary...) of the records in the file specified in the connection, the comparison is as though the target key is

logically padded with the character blank for a formatted connection, and with a null for an unformatted connection.

For a WRITE statement, the key specifications (fields in the record) are specified in the connection. In the control information list of the WRITE statement, add the KEY = specifier to control the write:

KEY = *scalar-char-variable*

where *scalar-char-variable* has the value "REPLACE' or "ADD". If the value is REPLACE, and an existing record has the same key, it is replaced with the record described in the output list. If the value is "ADD", the record is added after the other records with the same key. *** In DEC Fortran, the switch is always ADD, and a separate statement, REWRITE, is used to accomplish replacement.*** The default is ADD.

PROPOSAL II. ISAM

For READ with a connection KEYED, provide an "index sequential" read, that is, if:

1. A file is connected for ACCESS = 'KEYED', and

2. A record is read by key, and

3. Succeeding records are read sequentially, that is, no KEY= specifier is in the control information list.

then the file is read from the specified starting point sequentially.

*** Note that the ADD specifier in the keyed write above makes little sense unless this capability is present. With this and ADD, one can conceptually operate on a file as though it contained subfiles when the logic of the program/problem makes this desirable.***

PROPOSAL III. Delete capability

*** In Fortran 77, and in Fortran 8X so far, there is no provision for making a direct access file smaller; no delete. This was silly in 1977, and is so today. Fortran 77 is frozen, but we are proposing the adding of a capability here.***

In the control information list of a WRITE statement for a file connected for ACCESS = "KEYED", add to the *scalar-char-variable* the value "DELETE". The key has been specified in the OPEN statement (is known in the connection). This usage deletes the record named with the "key" from the file. *** DEC requires a

DELETE statement, and CSC requires a CALL to a library routine DELETE.*** Where more than one record has the same key (name), the first is deleted.

*** Note that in these proposals there is no ORGANIZATION OPEN specifier as in the DEC implementation and in the COBOL 8X Standard. This specifier is judged as too machine and system specific. Also the proposal does not contain the KEYLENGTH, KEYTYPE OPEN specifiers of CSC, or the KEYERR= *cilist* specifier. Repeating, the goal is portability.***

*** Note also that Standard COBOL contains this functionality. Thus most file management systems now have the ability to cope. Hence the implementation is straightforward.***

105 (*) JCA-19
f. 1 of 4

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June 30, 1987

Stanley Allen
X3 Secretariat
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Washington, D. C. 20001-2178

Dear Mr. Allen;

I received your two requests for TC comments on the public review question and on procedures developed by TC's. This letter answers both these memos.

I approve the motion as stated in your June 24 memo allowing automatic public review of draft standards. In the supporting material for the draft Fortran standard, both negative and affirmative comments were included along with the committee response to both. I am stongly in favor of speeding the process of standardization once the draft is approved by the TC.

The remainder of these remarks concern your second request for administrative procedures used by TC's. The X3J3 committee is administered by the chair, with the advice of a steering committee consisting of the committee officers. The full committee has about 35-40 members on the average and is divided into subgroups that process technical proposals before they are submitted to the full committee for a vote. A subgroup heads meeting is held each meeting to assist the vice-chair in determining the next meeting agenda, and discuss other technical issues. The full committee meets 2/3 of the time, with subgroup time usually in the afternoon, except Fridays which are full committee meetings during both morning and afternoon sessions. Visitors and observers are welcomed to all sessions. There are no meetings where attendance is restricted. The general policy is "open meetings" for all sessions, including the steering committee. Details of each meeting and the committee organization are included in the minutes, to which I refer you. Administrative matters are carried out according to the SD-2; the officers make every effort to follow the rules stated in the SD-2 document. The chair distributes all X3 standing documents to X3J3, as they are received from X3.

A membership statement, based on rules from the SD-2, has been prepared. This document is helpful for new members. A copy is being sent under separate cover by the vice-chair of X3J3. A standing document on Task Groups was prepared in 1980. Since we have had no Task Groups for many years, this document is not in use, and would have to be reevaluated before release. This document is not enclosed.

The current draft standard has been distributed after each meeting with few exceptions. This document, S8, is kept current by inserting or changing the words to reflect all technical proposals passed at the previous meeting. One member does the typesetting, another member does the reproductions and distribution. These distributions are extensive, and many requests

105 (*) JCA-19

for copies have been distributed to the general public. There has been a continual effort to keep the public aware of the work by these distributions and by forums held frequently in different parts of the United States and in Europe.

An active participation is supported for all Working Group 5/SC22/TC97 meetings. Members of the ISO group are kept fully informed about our progress. WG5 meets once a year, their resolutions are processed by X3J3 on a regular basis. The dispositions are included in the minutes of the X3J3 meetings.

If there is any other information that I may provide, I will be happy to comply.

Regards,

Jeanne Adams

Jeanne Adams
Advanced Methods Group, SCD
Chair, Fortran Standards Committee, X3J3

cc. X3J3 Distribution

105(X) JCA-19

Accredited Standards Committee
X3, INFORMATION PROCESSING SYSTEMS*

Doc. No.: X3/87-06-121-M
T, (Chairs only)
Date: June 24, 1987
Project:
Ref. Doc.:
Reply to:

TO: Chairs, X3 Technical Committees

SUBJECT: TC Internal Procedures

One of the responsibilities of the Secretariat Management Committee is to review the procedures which may have been developed by each Technical Committee.

So that SMC may carry out this duty, I have been asked to write and request that you send to the Secretariat any procedures which your committee may be using to govern your program of work.

We would appreciate your forwarding them as soon as possible to the Secretary, SMC, X3 Secretariat, Suite 500, 311 First Street, N. W., Washington, D. C. 20001.

Sincerely,

Stanley Allen
Secretary, SMC

105 (*) JCA-19

Accredited Standards Committee
X3, INFORMATION PROCESSING SYSTEMS*

Doc. No.: X3/87-06-123-M
T, (Chairs only)
Date: June 24, 1987
Project:
Ref. Doc.:
Reply to:

TO: Chairs, X3 Technical Committee

SUBJECT: Forwarding Draft Standards for Public Review

At its May meeting, the Secretariat Management Committee reviewed the issue of forwarding draft standards for public review.

The specific issue in question is whether only negative comments, or all comments, should accompany a dpANS through public review. After discussion, the following motion was submitted for SMC's consideration:

> "SMC recommends to X3 that the SD-2 be changed to allow automatic public review of draft standards, approved for forwarding by a TC provided that applicable documentation is included on all unresolved objections and negatives, as well as comments accompanying affirmative votes."

The motion was tabled and I was asked to write and request your input on this motion so that SMC could have the opportunity to review any comments you may have regarding this proposal.

SMC would appreciate your forwarding your comments to the Secretary, SMC, X3 Secretariat, Suite 500, 311 First Street, N. W., Washington, D. C. 20001

Sincerely,

Stanley Allen
Secretary, SMC

105(*) JCA-20

Information Technology Standards Commission of Japan

ITSCJ

Information Processing Society of Japan

Kikai Shinko Building No. 3-5-8 Shiba-Koen Minato-ku, Tokyo 105, JAPAN

TEL : 03-431-2808
FAX : 03-431-6493
TX:02425340 IPSJ J

(37)

July 9, 1987

Ms. Jeanne Adams
Chairperson, X3J3
National Center for Atomspheric Research
P.O. Box 3000
Boulder, Colorado 80307
USA

Dear Ms. Adams:

I would like to express my hearty appreciation to you and X3J3 for giving us a thoughtful response to my ballot on FORTRAN 8X.

The X3J3 response is big and good news not only to Japan but also to countries using very large character sets. This contributes to the enhancement of usability of FORTRAN and to making FORTRAN 8X a truly international programming language supporting various national languages including Japanese.

Considering the importance of the multi-byte facility to countries using very large character sets, we decided to take the following national position to the Liverpool meeting:

> Japan will keep a No vote on the FORTRAN 8X public review until a multi-byte facility is included in 8X, and also take a No vote on the development of the multi-byte facility during public review in order to have it reviewed in detail by other countries using very large character sets before public review.

We have no intention to change our position stated at the time of the last letter ballot, but would like to clarify our intention as above.

Of course, we would like to do every supports to X3J3 for the development of the multi-byte facility.

Thank you again for your thoughtful response.

Sincerely yours,

Tadayoshi Kan

T. Kan
Chairman, FORTRAN WG of
Japanese National Committee
for ISO/TC 97/SC 22

X3/87/07-002-X, S
Project 460-D

Accredited Standards Committee
X3, INFORMATION PROCESSING SYSTEMS*

NEWS RELEASE

For more information contact:
Peter R. Bono, X3H3 Chairman
203-464-9350

Date: June 30, 1987

*** * * "ROUND THREE" COULD BE THE CLINCHER * * ***

X3 ANNOUNCES A THIRD PUBLIC REVIEW AND COMMENT PERIOD ON DRAFT AMERICAN NATIONAL STANDARD X3.144-198x, PROGRAMMER'S HIERARCHICAL INTERACTIVE GRAPHICS SYSTEM

Washington, D. C. -- X3, the Accredited Standards Committee on Information Processing Systems, announces a third two-month public review and comment period on draft proposed American National Standard, X3.144-198x. The public review period extends from July 30, 1987 to September 30, 1987.

Changes in the October 1986 draft standard have resulted from ISO (International Standards Organization) processing. This standard allows graphics application programs to be easily transported between installations; aids graphics applications programmers in understanding and using graphics methods; guides device manufacturers on useful graphics capabilities; and performs many functions currently performed by graphics applications, thus, offloading the graphics application development effort. The standard defines an application level programming interface to a hierarchical interactive and dynamic graphics system.

This draft standard is available for public review and comment for a two-month period ending September 30, 1987. Copies may be obtained from GLOBAL ENGINEERING DOCUMENTS, INC. by calling 800-854-7179 on the West Coast, or 800-248-0084 on the East Coast.

Single Copy Price: $75.00
International Orders: $97.50

\# \# \# \# \#

*Operating under the procedures of The American National Standards Institute.
X3 Secretariat: Computer and Business Equipment Manufacturers Association
311 First Street, N.W., Suite 500, Washington, DC 20001-2178

Tel: 202/737-8888
Fax: 202/638-4922

105(X) JCA-22

Accredited Standards Committee
X3, INFORMATION PROCESSING SYSTEMS*

Doc. No.: X3/87-07-036-X,I,S
Date: July 8, 1987
Project:
Ref. Doc.:
Reply to:

ATTENTION H AND J OFFICERS -- SEE ACTION REQUESTED

TO: Chair, SC22 TAG -- FOR IMMEDIATE RECOMMENDATION TO X3
*******H&J OFFICER RECIPIENTS OF X3 MAILINGS -- PLEASE NOTE --
REPRODUCE FOR YOUR TC'S ASAP**********
Members, X3 -- for accelerated letter ballot

SUBJECT: Advance Transmittal of DTR 9547, Text Methods for Programming Language Processors -- Guidelines for their Development and Acceptability (DTR9547)

Attached is the subject-referenced DTR which is being circulated for an accelerated letter ballot prior to the SC22 meeting. This places additional pressures on all of us, along with the summer season.

H AND J OFFICERS are requested to review this document as soon as possible, and submit their comments and recommendations to the SC22 TAG Chair so that he may compile a recommendation to X3 who must then conduct an accelerated ballot in time for the SC22 Plenary.

WE'RE SORRY, SORRY, SORRY, BUT WE CAN'T ELIMINATE THE PROBLEMS OF MEETINGS SCHEDULED IMMEDIATELY FOLLOWING THE SUMMER SEASON.

Catherine A. Kachurik
Administrative Secretary, X3

Attachment: DTR9547

american national standards institute, inc.
1430 broadway, new york, n.y. 10018
(212) 354-3300
Sales Department: (212) 642-4900

1987-06-05

TO: P and L Members

ISO/TC 97
INFORMATION PROCESSING SYSTEMS

Dear Members:

Subject: DTR 9547, Test Methods for Programming Language Processors - Guidelines for their Development and Acceptability

Enclosed please find document ISO/TC 97 N 1933, DTR 9547, Test Methods for Programming Language Processors - Guidelines for their Development and Acceptability.

Also enclosed is a letter ballot seeking the approval of TC 97 to publish 97 N 1933 as a Technical Report Type 3. Please complete the letter ballot and return it to the Secretariat by 1 September 1987 if possible. This will permit discussion of the results at the SC 22 Plenary scheduled in Washington D.C. 7-11 September 1987.

Thank you for your cooperation with this request.

Sincerely,

Frances E. Schrotter

Frances E. Schrotter
Secretariat, ISO/TC 97

FES:ss

Encl: 97 N 1933 + L.B.

cc: Mr. L.J. Rankine, Chmn TC 97
Mr. J. Coté, Sec 97/22

87 JUN 15 P1:16

DRAFT PROPOSAL ISO/ DTR9547

FORM 8

date	reference number
1987-06-05	ISO/TC 97 N 1933

supersedes document ISO/TC 97/SC 22 N 275

THIS DOCUMENT IS STILL UNDER STUDY AND SUBJECT TO CHANGE. IT SHOULD NOT BE USED FOR REFERENCE PURPOSES.

ISO/TC 97

Title
INFORMATION PROCESSING SYSTEMS

Secretariat (ANSI)

Circulated to P- and O-members, technical committees and organizations in liaison for:

- discussion at
- comments by
- voting by 1987-09-12 (P-members only)

Title DTR 9547, Test Methods for Programming Language Processors - Guidelines for their Development and Acceptability (Type 3)

Reference language version: ☒ English ☐ French

Introductory note

The second Working Draft on Test Methods for Programming Languages Processors - Guidelines for their Development and acceptability was circulated to SC 22 as document 97/22 N 275. A letter ballot requesting approval to register this document as a DP or as a DTR was attached to document 97/22 N 275.

The summary of voting and comments received were circulated to SC 22 as document 97/22 N 322 and forwarded to SC 22/WG 12 for their review and recommendation on further processing of this document.

SC 22/WG 12 reviewed the comments during a meeting held in London on 1987-04-22/24. During this meeting, the UK comments that resulted in a vote of disapproval were resolved in this revised version. The other negative vote (Sweden) was not supported by any comment.

As recommended by SC 22/WG 12, document TC 97 N 1933/SC 22 N 333, the revised version of 97/22 N 275, is hereby submitted to letter ballot of TC 97 Member Bodies as a Draft Technical Report.

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TEST METHODS FOR PROGRAMMING LANGUAGE PROCESSORS — GUIDELINES FOR THEIR DEVELOPMENT AND ACCEPTABILITY

TABLE OF CONTENTS

0. INTRODUCTION

The programming language area is a living topic: new languages are developed, old ones are revised. In those two cases, conformity requirements should not be forgotten; therefore, test considerations should be included in the development of language standards and their revisions.

The aim of this document is to provide guidelines for the development of a test method based on a set of test programs and precise steps that should be taken in order for a test method to get formal approval from ISO. These guidelines should be read in conjunction with a given language standard so as to produce a specific test method for programming language processors.

These guidelines are written for test method developers and for those who will approve these test methods in ISO. The availability of specific test methods will help implementers in producing standard conforming language processors, thereby benefiting end users.

When reading these guidelines, it should be borne in mind that programming language standards have not yet reached a level of precision and completeness to allow conformity tests to be produced for every aspect and feature of a language described in a progamming language standard. Testing issues are rarely the primary objective of standardisation committees, and this may cause problems in applying these guidelines strictly to any given programming language standard.

1. SCOPE AND FIELD OF APPLICATION

These guidelines describe a methodology for determining whether a programming language processor possesses the required characteristics stated in the International Standard for the particular programming language for which it is intended.

Assessment of conformity of a language processor can be carried out with the "Test Suite Methodology". Other methodologies are not excluded but are not described here.

2. DEFINITIONS

For the purpose of these guidelines, the following terms apply.

2.1 LANGUAGE PROCESSOR : a compiler, translator or interpreter working in combination with a configuration.

2.2 CONFIGURATION : host and target computers, any operating system(s) and software needed to operate a language processor.

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2.3 EXTENSION : a facility in the implemented language that is not given in the language standard but that does not cause any ambiguity or contradiction when added to the language standard (although, in some languages, it may serve to lift a restriction).

2.4 IMPLEMENTATION DEFINED : dependent on the processor but required by the language standard to be defined and documented by the implementer.

2.5 TEST PROGRAM : a sequence of characters intended to be submitted to a language processor in order to determine whether or not this language processor exhibits a specific instance of a certain property.

2.6 TEST SUITE : a reference set of test programs that is designed to assess conformity of a language processor with a language standard.

2.7 TEST TOOLS : any additional means that can improve the efficiency, the reliability and the ease of use of the different phases of testing (e.g. implementation of the test suite, ensuring integrity processing of the test suite, collecting test results, analysis of test results, producing a test report).

2.8 REQUIRED DOCUMENTS : the set of documents required by the programming language standard.

2.9 SUBSET : a subset S of programming language L is a programming language such that every program in S
- is also a program in L and
- has the same meaning in S as it has in L.

3. OBJECT TO BE TESTED

As a language processor only works in combination with a configuration, some conditions should be taken into account.

3.1 The language processor to be tested and the configuration relevant to the testing should be fully specified.

3.2 A single copy of a language processor should be tested on a specific configuration.

4. DESCRIPTION OF TEST METHODS

In this context the technical procedure utilises a test suite, test tools and possibily data.

4.1 TEST SUITE

A test suite should be designed to test conformity of language processors by submitting test programs to them. Each test exercises some rules of the language standard and their interaction. A test suite should be designed only for conformity testing, but if the test suite includes tests not uses to determine conformity, then such tests shall be clearly delineated from conformity tests.

The test suite should, wherever feasible, cover all aspects of the language standard and investigate implementation issues as far as conformity is concerned.

The test suite should not be too large: the economical aspects should be taken into account (e.g. relative costs of conformity testing versus development cost of an implementation).

The test suite should be written in such a way that it can be readily maintained under version control, subject to a review procedure.

The test suite should be designed so as to take into account the possible levels or options specified in the language standard. Thus the test suite should be modular.

The test programs should, as far as possible, be independent of each other, and their sequence of execution should not influence each other's results. Where this is not possible or desirable, due to some aspects of language design, the relationship between any tests (or source code modules) which depend upon each other should ve clearly documented.

Each test program should have a single objective related to standard's requirements.When this is not practical results of individual objectives must be readily identifiable. Test programs should produce a result in accordance with the stated objectives.

The test suite should contain test programs that are in accordance with the rules of the language standard. It should also contain test programs that are not in accordance with the rules of the language standard, in those situations were the language standard specifies syntactic or semantic properties that must be rejected. Test programs should be self-checking and hence report the success or failure by a message (which should aid automated production of a report).

The test suite should allow for the use of parameterized values that take into account the operating environment of the language processor.

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4.2 TEST TOOLS

Provision should be made for the development of test tools. Automation of both the testing and the analysis of results is essential to facilitate rigorous testing on an economical basis.

4.3 TECHNICAL PROCEDURES

4.3.1 OVERALL SCHEME FOR THE TESTING

The test method should define the overall scheme for the testing as described below.

Using the language processor to be tested, a test suite should be run on a designated configuration. The results (pass or fail) of testing a specific processor on a specific configuration (all components being completely defined) will be reproduceable if no modification has occurred to any components.

The information given in the required documents should be inspected for conformity to the language standard and should be compared with the results of testing.

The output from a language processor that has been tested with the test suite should be analyzed in accordance with clearly defined rules. These rules should give criteria for objective evaluation of all possible outputs, which may include no output at all, for each test program in the test suite.

The results of testing conformity to the standard need to be analyzed and compiled in a report. The report should provide and summarize all the information pertaining to the testing of conformity to the language standard (set up of testing, actual testing, major events during testing). If the test suite includes tests which are not mandated for determining conformity to the standard, then the results of such tests should be clearly differentiated from the results of conformity tests. It should be possible to deduce the results of execution of each test program from the report. The analysis and report production should be as automated as possible. The degree of automation should depend upon the kind of testing and the format of results.

4.3.2 RELATED DOCUMENTATION

The test method should specify documentation including:

- the description of test classification together with the objectives of each class.
- the order of the execution of the tests when required.

5. GUIDELINES FOR THE DEVELOPMENT OF THE TEST METHODS

Several points should be taken into account when preparing a test method. Those points are listed below.

5.1 CONSIDERATION OF EXISTING TEST METHODS

Test methods that have been used for other language processors should be examined to determine how sucessfully they have achieved the design objectives for which they were constructed. When the design objectives for a new test method are similar to those for existing test methods, consideration should be given to the feasibility of adapting the applicable construction principles to the new test method.

5.2 CRITERIA FOR DESIGN OF TEST SUITES

Each test program should be written in such a way that its understanding is facilitated by the use of clear documentation in it that includes:

- comments that are clear, concise and not redundant from one test program to another
- reference to clauses of the language standard
- clear statements of assumptions made in test suite design.

The test suite should be written in such a way that its understanding is facilitated by the use of coding rules such as the use of:

- naming conventions for test programs
- mnemonic identifiers
- clear coding style
- upper and lower cases.

The test suite should be written in such a way that it takes into account several technical aspects specified in the language standard that are implementation defined.

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- implementation parameters (for example use of the largest integer supported)
- maximum and minimum parameter values with a reasonable selection in between (for instance, measure of depth nesting)
- use of features that do not exist in subsets
- floating-point precision
- use of files and external data
- input and output facilities.

The test suite should be written in such a way to minimize the use of features which could be restricted by configuration or implementation characteristics. Where such features are used in the test suite for assessing other aspects of conformity, the reasonnableness should be exercised with regards to dependency limitations (e.g. numerical values, size fo arrays).

5.3 TESTABILITY

The test method should be designed in such a way that it should not be too difficult to implement. The test method should be a useful tool for implementers, hence incorporating the use of a test suite for testing a compiler during development and maintenance should not be too expensive.

The volume of output created during the application of the test method should be kept to a minimum.

5.4 LANGUAGE FEATURES NOT COVERED BY THE TEST SUITE

Some features of the language may not be testable. In such cases, there should be a list of features of the language which are not testable.

Extensions when allowed by the language standard and not provided for by the language standard are out of the scope of conformity testing. The absence of extensions, when they are not allowed, cannot comprehensively be tested.

5.5 SUBSET TESTING

The test method should be designed in such a way that subsets (when allowed by the language standard) can be tested by using a subset of the set of test programs.

5.6 PORTABILITY REQUIREMENTS

To acheive maximum portability of the test suite, it should be designed to use a minimum set of basic features of the language to test other more complex ones. Programs that do not conform to the language standard should differ from it only as necessary in order to satisfy a specific testing objective.

The test suite should be portable on different configurations. A small configuration should not be penalized. Thus, each single program should be able to run on a small configuration, as well as on a large one. The result of testing (i.e., pass or fail) should not be influenced by the program's size.

5.7 TEST TOOLS

Automated test tools should, if possible, be written using the language whose processor is being tested, and should be portable to different configurations.

6. MAINTENANCE OF TEST SUITES

Provisions should be made for maintenance of test suites through a public review and according to a published timetable.

7. AVAILABILITY

Test suite and tools should be available on media formats that are generally used within the industry.

8. ACCEPTABILITY OF TEST METHODS

The following points should be considered for a specific test method to acheive acceptability.

8.1 CRITERIA FOR ACCEPTABILITY OF THE TEST METHOD

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Several criteria exist.

1) The related language should be an ISO standard.

2) The test objective and test programs should relate to conformity requirements of the standard.

3) The test suite should be complete in the sense that it tests all the points of the language, wherever possible.

4) The execution of test programs should be practical. For example, the execution of the test suite should not take too much time and should not cost too much.

5) The problems relative to patents or to industrial property should have been resolved. For example, there should be no exclusivity on the rights of use of the test suite or test tools.

6) The test method should be flexible enough to encompass configurations on which language processors may be tested. In any case, conformity should be determined solely on the basis of the test suite and not be dependent upon the ability to utilize any particular tool.

7) Provisions for modifications or evolution should be clearly specified.

8) The revision of the test method should be undertaken upon revision of the language standard.

9) Provisions should be clearly made for dealing with questions concerning defects in the test suite and interpretations of the standard.

10) If the language standard has been specified using a formal definition, the test suite should have been verified against this definition.

8.2 REVISION OF THE TEST METHOD

Provision should be made for revision of the test method as required.

american national standards institute, inc.
1430 broadway, new york, n.y. 10018
(212) 354-3300
Sales Department: (212) 642-4900

RETURN TO TC 97 SECRETARIAT BY:

1987-09-12

L E T T E R B A L L O T

from the Member Body of _____

on the publication of document ISO/TC 97 N 1933, Test Methods for Programming Language Processors - Guidelines for their Development and Acceptability as a Technical Report, Type 3

We approve ☐

We approve with comments ☐

We disapprove for the reasons attached to this ballot. ☐

We abstain. ☐

Date and Place _____

_____

Signature _____

NOTE: We request that you make an effort to return this ballot by 1, September 1987 in order that comments may be addressed at the SC 22 Plenary in Washington, D.C., 7-11 September 1987

105(*) JCA-23

Accredited Standards Committee
X3, INFORMATION PROCESSING SYSTEMS*

Doc. No.: X3/87/07-065-X,S
Date: July 14, 1987
Project: 67-R
Ref. Doc.:
Reply to:

Ms. Jeanne Adams
National Center for Atmospheric Research
SCD
P.O. Box 3000
Boulder, CO 80307

Dear Jeanne:

Subject: RESULTS OF SPARC COMPLIANCE REVIEW of X3J3 dprANS, Fortran; see X3/87/05-035

You will be happy to hear that SPARC revieved this dprANS at their July meeting and determined that the draft revised standard was in compliance with the authorizing document.

Since the result of the X3J3 ballot on forwarding the dprANS was 29-7, the Secretariat will issue a 30-Day X3LB on the four-month public review and comment period for the draft revised standard immediately.

Sincerely,

Gwendy

Gwendy J. Phillips
Recording Secretary, SPARC

cc: Jerrold Wagner, Technical Editor

105(X) JCA-24

Accredited Standards Committee
X3, INFORMATION PROCESSING SYSTEMS*

Doc. No.: X3/87/07-025-X, S
Date: July 7, 1987
Project: 067-R
Ref. Doc.:
Reply to:

To: X3J3 -- FOR INFORMATION

Subject: BSR X3.9-198x, Programming Language Fortran, TRANSMITTAL OF PRE-PUBLIC REVIEW COMMENTS

Attached are three comments received prior to the public review of X3.9-198x which should be of interest to X3J3 but which are not registered as public review comments. The commentors are Presley Smith from Convex Computer Corporation, J. L. Turner from Boeing Computer Services, and J. K. Reid from International Federation for Information Processing.

Catherine A. Rachurik
Administrative Secretary, X3

Attachment: Three Comments

cc Jeanne Adams, X3J3 Chair

CONVEX

CONVEX COMPUTER CORPORATION 701 PLANO ROAD RICHARDSON, TEXAS 75081 (214) 952-0200

June 29, 1987

X3 Secretariat/CBEMA
311 First Street, N.W.
Suite 500
Washington, DC 20001-2178

Attn: Gwendy J. Phillips

Dear Gwendy,

I believe that the proposed X3J3 Fortran 8x standard does not meet the requirements of the project proposal. Listed below are a number of quotes from the project proposal, and reasons why the proposed standard conflicts with these parts of the project proposal.

PROJECT PROPOSAL

2.1 Purpose

> "The purpose of the standard is to promote portability of FORTRAN programs for use on a variety of data processing systems."

3.0 Expected Benefits

3.1 Interchange

> "The standard provides for a degree of portability of both programs and programmers between different computers and computer operating systems."

PROPOSED STANDARD

A number of the members who voted Negative on the question of forwarding the Proposed Standard noted that the language described in that document is "very" large. Even the committee members who voted Affirmative agreed that the language is significantly larger than FORTRAN 77. In fact, the language contains all of FORTRAN 77 plus all major features of Ada except tasking. Ada is well-known to be a very large language.

The size of the language has a very significant impact on portability. Ada is such a complicated language that vendors have had great difficulty putting a validated Ada compiler on an IBM-PC class machine, without requiring hardware enhancements. If FORTRAN is put in the same class as Ada, it may never become available on such machines. Surely portability means nothing if processors are unavailable for a large class of computers.

PROJECT PROPOSAL

2.3 Scope

2. "Carry out procedures to maintain the continuous responsiveness of the standard to industry needs."

PROPOSED STANDARD

A number of user organizations have made it clear that they feel complete facilities for manipulating BIT and POINTER data essential for a new FORTRAN standard. Neither of these facilities are included in the draft standard. These organizations represent both research and industrial users, indicating a widespread need for these features. Several of these organizations voted against forwarding the standard because of these omissions.

PROJECT PROPOSAL

4.0 Feasibility of Development

4.1 State of the Art

"During the development of a new revision to X3.9, it is likely that augmentation will mainly drawn from functionality that exists in advanced implementations of existing processors."

PROPOSED STANDARD

The standard identifies five major areas in which it modifies the definition of the FORTRAN language:

1) array operations,

2) facilities for abstract definition of real data types,

3) facilities for user defined data types,

4) facilities for modular program definitions,

5) decremented features.

Of the first four areas, only (parts of) the array operations feature have been implemented in commercially available FORTRAN processors. Items 2, 3, and 4 were designed by the X3J3 committee. Without the input that users and implementors can provide from an actual implementation, these drastic changes are untried and untested in a FORTRAN processor.

PROJECT PROPOSAL

5.3 Cost Considerations

"One of FORTRAN's most important characteristics is that efficient processors can be implemented at a reasonable cost. One of the most important goals during the next revision will be to retain this characteristic."

PROPOSED STANDARD

The MODULE/USE feature forces a change from the philosophy of independent compilation to dependent compilation. This means that a processor must do much more work in compilation, and will thus be slower. Ada compilers are notoriously slow, and one of the reasons is that Ada supports the same dependent compilation model.

I am forwarding this list of concerns to you prior to the public review period because I believe that they should be addressed as part of the decision as to whether the proposed standard is ready for public review. SPARC or some other group within the X3 process should review compliance with the original project plan and determine if the committee has complied with the plan. I don't believe that committee has complied with the project plan in several areas as descibed in this letter and would recommend that X3 disapprove the proposed standard for public review until compliance with the project plan is complete.

Thanks for your consideration in this matter.

Sincerely,

Presley Smith
Manager, Development Software

BOEING COMPUTER SERVICES

P.O. Box 24346
Seattle, Washington 98124-0346

A Division of The Boeing Company

June 8, 1987
G-1581-HJQ259

Catherine A. Kachurik,
ANSI X3 Administrative Secretary
X3 Secretariat/CBEMA
311 First Street, NW Suite 500
Washington, DC 20001-2178

Subject: Fortran 8X Draft Standard

Dear Ms. Kachurik:

The Boeing Company has major concerns about the draft Fortran 8X standard recently passed by the X3J3 committee. If Fortran evolves according to the strategy proposed by X3J3, we feel the resulting adverse impacts on the Boeing software inventory will far outweigh advantages. Therefore, Boeing strongly urges the ANSI X3 committee to return the proposed standard to the X3J3 committee rather than releasing it for public comment. The following are major reasons for our concern:

- When obsolescent and deprecated features are deleted by future Fortran standard committees, we anticipate a major expense will be incurred to convert our extensive inventory of Fortran code.

- Casual Fortran users are expected to have considerable difficulty with a more complex language that has many redundant features.

- Major vendors have predicted poor performance for compilation and for the efficiency of generated code.

- We anticipate a long period of partial implementations when the language will not be uniformly available. Fortran portability will be severely impacted during this period.

- We anticipate a lack of compilers across our wide range of computers. Vendors have indicated that because of size and complexity this language would not be implemented on PCs.

If requested, we are prepared to submit a more detailed analysis. We need the benefits of modern programming languages. However, we feel the route proposed by the X3J3 committee will not be successful., Boeing is anxious to participate in defining guidelines to direct future standard development activities.

Sincerely,

J.H. Turner
Director, Quality Assurance
and Application Systems Technology

cc: Jeanne C. Adams, X3J3 Chairman
Willliam C. Rinehuls, SPARC Chairman

IFIP

INTERNATIONAL FEDERATION FOR INFORMATION PROCESSING

X3 SECRETARIAT
'87 JUN 22 A11:45

Date: 15th June 1987

Address reply to:

Dr. J.K. Reid
CSSD,
Building 8.9,
Harwell Laboratory,
Oxon OX11 ORA

X3 Secretariat,
Computer and Business Equipment Manufacturers Association,
311-First Street, N.W.
Suite 500,
Washington DC 2001-2178,
USA.

Dear Sirs,

Fortran Standardization

The Fortran Committee X3J3 approved the current draft standard for submission to X3 for further processing during its meeting in Seattle, USA, May 11-15. IFIP Working Group 2.5 (Numerical Software) considered this at its meeting in Como, Italy, May 22-24 and passed the following resolutions unanimously.

1) IFIP WG2.5 re-affirms its belief that the current draft of Fortran 8X should be released as soon as possible for public review, and notes with approval the recent vote in favour of this by X3J3.

2) We urge X3 and ISO/TC97/SCC22 to send the draft standard out for public comment as soon as possible.

I would be most grateful if you would draw this to the attention of X3.

Yours faithfully,

J.K. Reid

J.K. Reid, Chairman WG2.5.

105(*) JCA-25

Accredited Standards Committee
X3, INFORMATION PROCESSING SYSTEMS*

Doc. No.: X3/87/07-069-X, S
Date: July 14, 1987
Project: 67-R
Ref. Doc.:
Reply to:

To: X3 for Balloting
SPARC, IAC, SMC
Officers, X3/TC's, TG's, and SPARC/SG's

Subject: TRANSMITTAL OF X3LB 916, Approval to Forward dprANS, X3.9-198x, Programming Language FORTRAN, to BSR for a Four-Month Public Review and Comment Period; see X3/87/05-035, X3/87/07-065

Technical Committee X3J3 has voted 29-7 to forward this document to SPARC and X3 for further processing; see X3/87/05-035. SPARC reviewed the dprANS for compliance at their July meeting and found that it did comply with the authorizing document; see X3/87/07-065.

In accordance with the green SD-2, Page 44, Section 9.2, Milestone 11, the Secretariat is conducting a 30-Day X3 letter ballot on approval to forward this dprANS to BSR for public review. Please review the referenced documents and return your letter ballots by August 20, 1987.

Gwendy

Gwendy J. Phillips
Recording Secretary, X3

Attachments: X3LB 916 (P's and A's only)

X3 Secretariat: Computer and Business Equipment Manufacturers Association
311 First Street, N.W., Suite 500, Washington, DC 20001-2178
Tel: 202/737-8888
Fax: 202/638-4922

105 (+) JCA-27.

U.S. COMMENTS on SC22 N275
Test Methods for Programming Language Processors

The U.S., except as may be specifically commented upon below, is in general agreement with the content of the document. There are, however, several areas where the document does not meet the spirit of the ISO Directives for adoption as a standard. Thus, we are committed to the opinion that the document should be a technical report and not a standard. For example:

- The Directives specify that the "statement of properties of products in International Standards are to be considered as requirements concerning the products, unless it is explicitly stated that they are mentioned for information only" (Part II, clause 4.1.1). It is difficult to envision how the rules and conditions stated in the proposed document are to be applied - requirements or information only. Therefore, the third paragraph of the Introduction should be modified to read:

  This document is to be considered as information only in guiding the developers of test methods and those who will be approving test methods within ISO. The...

- The Directives, when discussing the "Principles concerning the choice of technical requirements to be standardized" says about the "Principle of verifiability" (Part II, clause 4.2.3): "Whatever the aims of the International Standard, only such characteristics should, in principle, be included that can be verified". Because the proposed document is intended to apply to test method development for all programming languages and to a wide variety of test conditions, it is very general in nature and not suited to verification. In fact, in many areas of the document, the requirements as specified are judgmental and not suited for standardization; e.g., "wherever feasible", "not be too large", "as far as possible".

- The proposed document, in order to be most useful in today's environments, should also address testing of technologies involved in interactive processes such as graphics, screen management, etc.

- The topic of alternative (multiple) test methods is adequately provided for in the Directives. It does not need to be further dealt with in the proposed document (section 8.5).

SPECIFIC COMMENTS:

- Title. The title identifies two specific topics for the document, i.e., "guidelines" and "procedures". It, therefore, is unclear whether the approval procedures (section 8) are intended to be used as guidelines (information only) or requirements. Possibly a better title would be: "Test Methods for Programming Language Processors - Guidelines for their Development and Acceptability". In this connection, the word "approval" should be replaced by "acceptability" throughout the document since procedures for approval do not exist.

- Section 2.6. The inference of this section is that a single test satisfies the requirements of a single property. It would better be stated "...whether or not this language processor exhibits a specific instance of a certain property."

- Section 4.1. The phrase "by running test programs" should be deleted from the first sentence. In fact, some programs may never be run if they contain syntactic or otherwise recognizable errors.

- Section 4.1, 4th paragraph. The sentence should read: "The test suite should be written in such a way that is can be *readily* maintained."

- Section 4.1, 5th paragraph. The last sentence would better be written: "Thus, the test suite should be written to be modular."

- Section 5.2. Missing from the proposal is a discussion of the "levels" of testing, i.e., what level of program correctness can be assumed as a result of testing. Attached is a discussion of program correctness written by a member of the U.S. TAG to SC22. It appears that the guidelines are intended for tests which would, in this context, attain approximately level 3.

PROGRAM CORRECTNESS

A language processor is merely a special form of a program and prudence demands that we assume each new program is incorrect until we can demonstrate otherwise. We must accept the fact that testing is an integral part of the programming process - and that a program (or compiler) is not really "finished" until we have demonstrated its correctness. "Program correctness" is not easily defined. The programmer and user of a program may interpret "correctness" quite differently and hence have different expectations of program performance. Various interpretations of correctness are listed below in order of increasing difficulty of achievement:

1. The program contains no syntax errors that can be detected during translation by the language processor.
2. The program contains no errors, either of syntax or invalid operation, that can be automatically detected during translation or execution of the program.
3. There exists some set of test data for which the program will yield the correct answer.
4. For a typical (reasonable or random) set of test data the program will yield the correct answer.
5. For deliberately difficult sets of test data the program will yield the correct answers.
6. For all possible sets of data that are valid with respect to the problem specification, the program yields the correct answers.
7. For all possible sets of valid test data, and for all likely conditions of erroneous input, the program gives a correct (or at least reasonable) answer.
8. For all possible input, the program gives correct or reasonable answers.

Considering, however, the higher levels (say 4, 5 or 6), it is clear that satisfactory performance on any single set of test data is not sufficient grounds for an assertion of correctness. Moreover, failure on a single test is sufficient to demonstrate that the program is not correct. No matter how many tests the program may have passed successfully, just one test on which it fails is enough to show that it is not correct. This is not inherently a democratic process, and a program that works "most of the time" is a dangerous tool.

From the user's point of view a reasonable definition of correctness is certainly not less than level 6. Level 7 is better and level 8 is what we would really like. The programmer may maintain that a literal interpretation of problem specifications cannot demand more than level 6, while the user will maintain that certain implied requirements do not have to be explicitly stated. The user would like to have level 8 correctness - but this is often unrealistic. Level 7 is a reasonable compromise, which is obviously going to lead to arguments since it leaves critical questions open to varying interpretations. The implementor's dilemma is that level 5 is the highest that can be achieved by purely empirical means - by running the program on test cases - so he must thoughtfully design test cases that permit a plausible assertion that level 6 has been achieved. To achieve level 7 the programmer must know enough about the intended use of the program to estimate what errors are likely to be encountered, and what response is appropriate.

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105(*)JCA-28

MEMO TO: X3J3

FROM: Jeanne Adams, Chair

DATE: July 1987

SUBJECT: EDITORIAL ITEMS for General Submission

Proposal A

Interchange Appendix E and Appendix F

Rationale

The two index sections need to be juxtaposed for easier cross reference.

Proposal B

I would like to resubmit item 3. from my ballot comments. It is:

3. Appendix C, Sections 10, 11, 12
These notes need some paragraph headings for improved readability. For example,

p. C-9	after line 4.	C10.1.	Records Read and Written.
	after line 20.	C10.2.	List Directed Input.
p. C-10	after line 3.	C11.1	Names.
	after line 10.	C11.2.	Conformance.
	after line 22.	C11.3.	Dependent Compilation.
p. C-11.	after line 13.	C11.4.	Modules.
p. C-12.	after line 14.	C11.5.	Transfer Function SET.
p. C-14.	after line 20.	C12.1.	Portability and procedures.
p. C-15.	after line 2.	C12.2.	Procedure Interfaces.
	after line 22.	C12.3	Argument Association.
p. C-16.	after line 18.	C12.4.	Argument Intent Specifications.
	after line 37.	C12.5.	Restrictions on Dummy Arguments.

(45)

TO: X3J3

FROM: Jerry Wagener

SUBJECT: Large Character Sets in Fortran

The attached paper, entitled "On the Interface Between the High Level Languages and Chinese Character Information", appeared in the most recent issue of Computer Standards & Interfaces. It deals with processing Chinese characters in Fortran, and thus with the same issues as those raised by the Kanji presentation at X3J3 meeting #104. The experiences reported in this paper could be helpful in our work on large character sets. For example, the author's emphasis on "Chinese-western language compatibility" may be a particularly important consideration.

end 105.JLW-3

On the Interface Between the High Level Languages and Chinese Character Information

Maojiang WANG

Beijing Document Service, P.O. Box 167, Beijing, China

A very interesting and greatly practical problem in China is how to process Chinese characters in standard high level programming languages, such as, ISO FORTRAN, ISO COBOL, ISO PL/1 etc. This paper will report on work we have done on the Univac 1100/10 computer, discuss the relevant problems of processing Chinese character information on existing computers in high level languages, and put forward some rules and points of view.

Keywords: High level programming language, Chinese character, Chinese character code, Chinese character identification, Chinese character terminal, Communication protocol, Protocol emulator, Chinese-western language compatibility.

1. Introduction

With increasing development in Chinese information processing technology, it is really an interesting subject of practical values on how to provide Chinese character information processing capability for existing computer system software, such as, various high level programming languages, especially most used languages which already have international standard e.g. ISO FORTRAN, ISO COBOL, ISO PL/1 and ISO PASCAL.

We connected China-made ZD-2000 Chinese character terminal to the terminal network of the Univac 1100/10 computer by way of protocol emulation and made it a complete computer system with Chinese-western language compatibility. The original FORTRAN, COBOL, PL/1 and other language processors can absolutely accept Chinese character information (See Figs. 1–5). In this paper, we will discuss the rules for Chines character extension and other questions, and make a short introduction about our work.

The author is a staff member of the Beijing Document Service, engaged in the research work on programming languages for a long time, and on the interface between Chinese character information and programming languages in the last few years. He is the first man who translated the programming language FORTRAN 77 into Chinese and introduced it to readers in China.

```
@ed.tu P.1

ED 15R2-TUE-18/21/86-09:58:12-<6.7>
EDIT
@:lnP!

        1:   *****春   晓*****
        2:                    孟浩然
        3:      春眠不觉晓，
        4:      处处闻啼鸟。
        5:      夜来风雨声，
        6:      花落知多少。
EOF:6
@:ex!

LINES:6 ASCII
```

Fig. 1.

North-Holland
Computer Standards & Interfaces 6 (1987) 181–186

```
@ed.qu ppp.3

ED 15R2-TUE-10/21/86-09:54:48-(3.4)
EDIT
@:inp!

        1:        REAL X.Y.Z
        2:        WRITE (6,11)
        3:     11 FORMAT (20X,'欢迎曾庆和同志们参观指导')
        4:        WRITE (6,12)
        5:     12 FORMAT (20X,'**************************')
        6:        DO 5 K=0.7
        7:        X=0.001
        8:        X=X*K
        9:        Y=SIN(X)
       10:        Z=COS(X)
       11:        WRITE (6,13)X.Y.Z
       12:      5 CONTINUE
       13:     13 FORMAT (10X,'X的值=',E9.4,4X,'SINX的值=',
       14:       @E9.4,4X,'COSX的值=',E9.4)
       15:        WRITE (6,14)
       16:     14 FORMAT (20X,'谢谢曾庆和同志们')
       17:        STOP
       18:        END
EOF:18
```

Fig. 2.

2. Rules for the Connection of Chinese Character Terminal and for the Extension of Chinese Character Capability

In general there are two ways to connect Chinese character terminal equipment to large or medium computers. One way is to analyze and modify the operating system and language compiler run on the host to enable it to accept the Chinese character information from the Chinese character terminal. The other way is to ignore the host OS and language compiler, but establish an interface which emulates the communication protocol of the terminal and the host and which gives the Chinese character codes necessary and proper processing. The former, of course, has many advantages, but it must be pointed out that the OS and compiler of a large or medium computer are usually enormous. This takes a lot of time and manpower to analyze and get familiar with them, and might bring unexpected potential errors after the modification. In comparison, the latter has no such problems. It is much easier to familiarize oneself and to analyze the communication protocol than do the OS and compiler. So for extending the Chinese character capability, we draw up

```
                欢迎曾庆和同志们参观指导
                **************************
X的值=.0000          SINX的值=.0000          COSX的值=.1000+001
X的值=.1000-002      SINX的值=.1000-002      COSX的值=.1000+001
X的值=.2000-002      SINX的值=.2000-002      COSX的值=.1000+001
X的值=.3000-002      SINX的值=.3000-002      COSX的值=.1000+001
X的值=.4000-002      SINX的值=.4000-002      COSX的值=.1000+001
X的值=.5000-002      SINX的值=.5000-002      COSX的值=.1000+001
X的值=.6000-002      SINX的值=.6000-002      COSX的值=.1000+001
X的值=.7000-002      SINX的值=.7000-002      COSX的值=.1000+001
                谢谢曾庆和同志们
```

Fig. 3.

```
@ed.gu FFFF.4

ED 1SR2-TUE-18/21/86-09:56:26-(2.3)
EDIT
@:inp?

       1:          IDENTIFICATION DIVISION.
       2:          PROGRAM-ID.'检索程序'
       3:          AUTHOR.北京文献服务处
       4:          ENVIRONMENT DIVISION.
       5:          CONFIGURATION SECTION.
       6:          SOURCE-COMPUTER. UNIVAC-1108.
       7:          OBJECT-COMPUTER. UNIVAC-1108.
       8:          INPUT-OUTPUT SECTION.
       9:          FILE-CONTROL.
EOF:9
@:ex1

LINES:9 ASCII
```

Fig. 4.

several following design targets:

1) Make no change in the system software and hardware of the Univac 1100/10 (or any other host on which Chinese character capability will be offered). In this way, on one hand, the use of overmuch manpower and material is avoided, and on the other hand, it is beneficial to the system software upgrading via version modification and it will bring no unexpected ill-effect.

2) Make no change in the software and hardware of the ZD-2000 Chinese character terminal (or any other Chinese character terminal), that is, take no care about specific features of any Chinese character terminal. Thereby the connection of any kind of Chinese character terminal to the host will require only a little work.

3) Chinese characters can be used in the source program of high level language of the host. In particular term, Chinese characters can be written in character data or Hollerith constants as well as

```
@ed.gu FF.Z

ED 1SR2-TUE-18/21/86-09:57:18-(4.5)
EDIT
@:inp?

       1:1a:  proc options(main);
       2:     dcl 1 a,
       3:            2 b char(20),
       4:            2 c char(26);
       5:     dcl d binary fixed;
       6:     b='欢迎首长和同志们参观指导';
       7:     d=181;
       8:     c='谢谢!再见了,同志们!';
       9:     put skip edit (b) (a);
      10:     put skip edit (c) (a);
      11:     end 1a;
EOF:11
@:ex1

LINES:11 ASCII
```

Fig. 5.

in comments. In program running, various prompt information can be displayed to users in the mode of Chinese character on the Chinese character terminal, and users are allowed to answer the computer in Chinese. Thus, man machine dialogue in Chinese can be realized. It must be emphasized that only under the support of the protocol emulator can the host high level language have the Chinese character capability. No extension is made to the host high level language itself.

4) When the Chinese character terminal is on line, it can make the best use of varied software sources the host provides, such as, high level language processor, data base management system and text editor. For example, the original editor in a western language can successfully be used to edit Chinese files.

3. Brief Introduction on the Protocol Emulation Method

We used the TP80-1 microprocessor as a physical device for interface between the Univac 1100/10 host and the ZD-2000 Chinese character terminal, illustrated in Fig. 6.

Communication between the Univac 1100/10 computer and the U200 English language terminal adopts the extended data link control protocol. The first task of the TP801 protocol emulator is to emulate U200 in place of ZD-2000 to implement the communication by data link control protocol. On the other hand, the National Standard(1) stipulates that one Chinese character must be represented by two ASCII characters. In order to put all of 6763 Chinese characters into the host high level language, Chinese codes must be handled to avoid some specific symbols commonly used by the high level language, e.g. "千", "学" and other Chinese characters with "′" symbol in Chinese codes. These frequently used Chinese characters have a second byte whose code is the "′" symbol. Entering the high level language, they would clash with the delimiter symbol "′" of character constants in the language and cause compiling errors. So, we used ASCII codes $(7F)_{16}$ in place of "′" symbol in Chinese character codes. Because of the unavoidable inputting mixture of Chinese and western language characters into the host, the proper beginning and end Chinese character markers should be added before and after Chinese character codes which are entered into the host. When Chinese character information is fed into the ZD-2000 Chinese character terminal from the host, converse work should be carried out. This is the second task that the protocol emulator must perform and differs from general protocol emulators so that special attention must be paid in designing an emulator.

4. Discussion on the Some Problems Which Should Be Solved with the Extension of Chinese Character Capability

4.1. Chinese Character Representation in the Computer

Although Chinese character codes for information interchange are defined in the National Standard GB2312-80, i.e. two ASCII characters solely represent one Chinese character, this kind of Chinese character codes will clash with the original English numerical character codes when loaded into the computer which produces ambiguity. To solve the problem, there are two alternative ways: a) To use specific symbols as beginning and ending of Chinese character markers before and behind Chinese characters. b) To set 1 to the left-most bit of two ASCII codes of Chinese characters. The former can be done independent of the host system software, but designators may vary and lead to non-unique representation which would create non-portability of source programs in the high level language with Chinese characters. This is a physical not logical problem, i.e. the program with Chinese characters and the Chinese character data should be interchangeable or por-

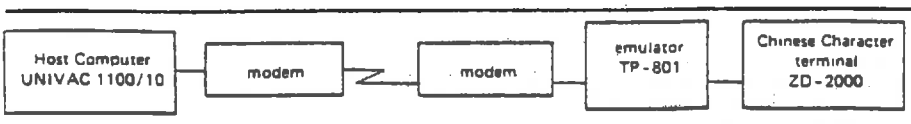

Fig. 6.

table in appearance. The interchange could not be realized unless the program and data are re-processed. Naturally the latter representation does not result in non-unique representation for Chinese characters in the computer, but setting 1 at the high bit often needs the host system software to perform. It would require modifying the system software. A better Chinese character representation method is needed on computers at home and abroad.

4.2. Degree of High-Level Language on this issue Chineserization

There are roughly two views. One thinks to higher the degree is, the better it will be. Not only the Chinese characters as character constants (or called literal) can be put into the high level language source program, but also identifiers, variable names, file names, even keywords (or reserved words e.g. GOTO etc.) should be permitted in Chinese. The reason is to increase program readability and it make it easier for Chinese to learn and use. The other view is that it is enough for Chinese characters as character constants to enter the source program or appear as character data. In this way the program can not only reach the target of prompting information to users in Chinese, but also allow users to response in Chinese and have a man machine dialogue. Furthermore, one can make comments on the program in Chinese. These functions are enough for all kinds of management with the computer.

The author of this paper agrees with the latter view for the following reasons: a) It is no easy job to get Chineserization of identifiers and keywords realized. Even with a re-designed compiler, the amount of work is enormous, but the benefit is little. The program readability looks as if it is increased but actually not. According to the authors experience, it is not an easy thing for ordinary people to load some Chinese characters into the computer, for the problem on how Chinese characters can easily be loaded into computers has not satisfactorily been solved yet, and present methods for code inputting is too complicated with too many regulations which could be memorized. The author (perhaps average programmers who did something with Chinese inputting into computers also) found it may be no easier to learn and master a method for Chinese character code inputting than to learn a programming language. So, in the authors' opinion, considering the practical difficulty of Chinese character inputting, unnecessary Chinese should be given little chance to appear in programming if possible. b) Besides, another ill-effect is that the style and portability of the original international standard languages are destroyed, and generally accepted and familiar style of programming languages becomes neither Chinese nor western. That is a regrettable thing which can not be ignored. For example, due to above Chinese character inputting difficulties, many application programs with Chinese characters the authors wrote, such as "Catalogue retrieval system of science and technology document in Chinese" were in fact input and debugged on the western language terminal before verification on the Chinese language terminal. This proved it is quite important to maintain the style of original programming languages.

4.3. Whether a new data type is needed to introduce into languages – Chinese data type

The authors believes that to handle Chinese data, it is enough to use character data types of existing programming languages e.g. FORTRAN, COBOL, PL/1 and so on. There is no need to add a new data type in languages in order to extend Chinese character capability. It must be understood that a type addition in language texts needs definition on its attribute and operation. This would lead to modification of the description of every relevant part of the whole language; on the other hand, addition of a new data type would bring no more benefit but unnecessary burden to the language itself.

4.4. Compatibility of Chinese-western languages

It can be easily seen from above what the author pursues is "Chinese-western language compatibility". The meaning of the phrase should be as follows:

a) For a computer system, Chinese-western language compatibility means a computer can accept and process both western language information and Chinese language information, e.g. the text editor on the computer can edit files in western languages as well as in Chinese.

b) For a high level language, Chinese-western

language compatibility means the language processor can process and compile a source program in the original form as well as a source program containing Chinese characters. Moreover, a source program with Chinese characters can be regarded both as Chineserized source program of that language and as a western language source program involving ASCII character strings designated by special symbols. The authors stress the latter remark is quite important, for the authors once saw a certain COBOL processor which could accept the source program containing Chinese characters produced and input from a certain given Chinese language terminal. Unfortunately, this kind of Chinese source program could not be fed into the host from other Chinese language terminals or western language terminals. The cause is that Chinese-western language compatibility was not realized.

It is obvious that so long as these two points are carried out, present International Standard languages, e.g. ISO FORTRAN, ISO COBOL and so forth, can be taken without any modification as true national standard languages of the People's Republic of China.

Acknowledgement

The people involved in this work: Mr. Wu Zhengyi, Mr. Wu Baokun and Mr. Ma Li.

References

[1] GB 2312-80 National Standard of the People's Republic of China, Chinese coding character collection for information interchange (basic part).

Footnotes

1. ZD-2000 is a very common Chinese character terminal equipment with keys of international standard. On this Chinese character terminal ZD-2000, there are several ways to input Chinese characters and one of them is the "method of five strokes" with which a Chinese character can be input by striking key two to four times. The following is an example:

IWPR	OR	43	54	45	52
NUIP	OR	31	42	43	45
BXY	OR	32	35	41	

2. Figures 1–5 show the output from the processor (such as FORTRAN) of the host computer, and this output is sent to the ZD-2000 Chinese character terminal.

(46)

TO: X3J3

FROM: Jerry Wagener

SUBJECT: Module for Variable-length Strings

The attached module subprogram is a first attempt at providing varying length strings (STRING) in Fortran using the module mechanism. It is in very rough form, needing appropriate commentary and descriptions of functionality, and probably needing technical refinements. Assuming that it is correct and provides the appropriate functionality (or can be made so), it could be considered as a candidate for an intrinsic STRING module.

This module extends concatenation, comparison, and assignment to STRING objects, and any combination of STRING and CHARACTER objects. It also extends intrinsic functions CHAR, ICHAR, INDEX, SCAN, VERIFY, and REPEAT to STRING and (in the case of INDEX, SCAN, and VERIFY) to any combination of STRING and CHARACTER for the first two arguments.

Nothing special is provided for STRING I/O, under the assumption that the transfer functions STRING and CHAR provided between STRING and CHARACTER objects is probably appropriate and sufficient functionality for STRING I/O. (And of course there is always the COMPLEX technique for I/O of explicitly handling each structure component in the I/O stream.) It may be that blanks need to be trimmed from input, and a special I/O function possibly could be added for that, and there may be other special I/O needs.

There is a fundamental question (controversy) over whether a substring of a STRING object, using the CHARACTER substring colon notation, should be considered a fixed length object or a varying length object. Perhaps it is just as well, therefore, (better, in fact) that this module version of STRING does not permit the CHARACTER substring notation with STRING objects. A SUBSTR function has been provided, however, that permits the extraction of arbitrary substrings of a STRING object, and hence provides arbitrary manipulation of any STRING object.

end 105.JLW-4

```
!***************************** varying length character data type ********
module String

 implicit type ( String(*) ) (A-Z)

  type String ( MaxLen )        ! MaxLen is the maximum no. of characters
    private
    integer                    ::  String_Len          ! active length
    character ( len=MaxLen )   ::  String_Val          ! character data
  end type String

contains

!********************************** string length functions ***********

  integer function Len ( S )        ! Len returns the active length
    Len = S % String_Len
  end function Len

  integer function MLen ( S )       ! MLen returns the maximum length
    MLen = len ( S % String_Val )
  end function MLen

!*****************************************************************************

!********************************** transfer functions between ********
                                    ! String and CHARACTER
  function String ( C )
    character(*)  ::  C
    String = string ( len(C), C )
  end function String

  character(*) function Char ( S )
    Char = S % String_Val ( 1 : Len(S) )
  end function Char

!*****************************************************************************

!********************************** String substring function *********

  function Substr ( S, L, R )
    integer              ::  L
    integer, optional    ::  R
    integer              ::  P
    if ( present(R) ) then; P = R
                      else; P = Len(S)
    endif
    Substr = String ( S % String_Val(L:P) )
  end function Substr

!*****************************************************************************

!********************************** extend ICHAR to String ************

  integer function Ichar ( S )
    Ichar = ichar ( S % String_Val(1:1) )
  end function Ichar

!*****************************************************************************

!************************************ extend INDEX to any combination
                                      ! of String and CHARACTER
  integer function Index ( S, SS, BACK)
    logical, optional  ::  BACK
    Index = index ( Char(S), Char(SS), BACK )
  end function Index

  integer function Index ( S, C, BACK)
    logical, optional  ::  BACK
    character(*)       ::  C
    Index = index ( Char(S), C, BACK )
  end function Index

  integer function Index ( C, S, BACK)
    logical, optional  ::  BACK
    character(*)       ::  C
    Index = index ( C, Char(S), BACK )
```

```
  end function Index

!*************************************************************************

!************************************ extend SCAN to any combination
                                      ! of String and CHARACTER
  integer function Scan ( S, SS, BACK)
    logical, optional  ::  BACK
    Scan = scan ( Char(S), Char(SS), BACK )
  end function Scan

  integer function Scan ( S, C, BACK)
    logical, optional  ::  BACK
    character(*)       ::  C
    Scan = scan ( Char(S), C, BACK )
  end function Scan

  integer function Scan ( C, S, BACK)
    logical, optional  ::  BACK
    character(*)       ::  C
    Scan = scan ( C, Char(S), BACK )
  end function Scan

!*************************************************************************

!************************************ extend VERIFY to any combination
                                      ! of String and CHARACTER
  integer function Verify ( S, SS, BACK)
    logical, optional  ::  BACK
    Verify = verify ( Char(S), Char(SS), BACK )
  end function Verify

  integer function Verify ( S, C, BACK)
    logical, optional  ::  BACK
    character(*)       ::  C
    Verify = verify ( Char(S), C, BACK )
  end function Verify

  integer function Verify ( C, S, BACK)
    logical, optional  ::  BACK
    character(*)       ::  C
    Verify = verify ( C, Char(S), BACK )
  end function Verify

!*************************************************************************

!************************************ extend the concatenation *******
                                      ! operation to any combination
                                      ! of String and CHARACTER
  function String_Concat ( S1, S2 )  operator ( // )
    String_Concat = String ( Char(S1) // Char(S2) )
  end function String_Concat

  function String_Concat ( S, C )  operator ( // )
    character(*)  ::  C
    String_Concat = String ( Char(S) // C )
  end function String_Concat

  function String_Concat ( C, S )  operator ( // )
    character(*)  ::  C
    String_Concat = String ( C // Char(S) )
  end function String_Concat

!*************************************************************************

!************************************ extend REPEAT to String ********

  function Repeat ( S, NCOPIES )
    integer  ::  NCOPIES
    Repeat = String ( repeat ( Char(S), NCOPIES ) )
  end function Repeat

!*************************************************************************

!************************************ provide assignment between *****
                                      ! String and CHARACTER
  subroutine String_Assign ( S, C )  assignment
```

```
    character(*)  ::  C
    S = String ( C )
  end subroutine String_Assign

  subroutine String_Assign ( C, S )  assignment
    character(*)  ::  C
    C = Char ( S )
  end subroutine String_Assign

!*******************************************************************************

!********************************** extend .EQ. (==) to any ************
                                    ! combination of String and CHARACTER
  logical function String_eq ( S1, S2 )  operator ( .eq. )
    String_eq = Char(S1).eq.Char(S2)
  end function String_eq

  logical function String_eq ( S, C )  operator ( .eq. )
    character(*)  ::  C
    String_eq = Char(S).eq.C
  end function String_eq

  logical function String_eq ( C, S )  operator ( .eq. )
    character(*)  ::  C
    String_eq = C.eq.Char(S)
  end function String_eq

  logical function String_eq2 ( S1, S2 )  operator ( == )
    String_eq2 = Char(S1).eq.Char(S2)
  end function String_eq2

  logical function String_eq2 ( S, C )  operator ( == )
    character(*)  ::  C
    String_eq2 = Char(S).eq.C
  end function String_eq2

  logical function String_eq2 ( C, S )  operator ( == )
    character(*)  ::  C
    String_eq2 = C.eq.Char(S)
  end function String_eq2

!*******************************************************************************

!********************************** extend .NE. (<>) to any ************
                                    ! combination of String and CHARACTER
  logical function String_ne ( S1, S2 )  operator ( .ne. )
    String_ne = .not. ( S1.eq.S2 )
  end function String_ne

  logical function String_ne ( S, C )  operator ( .ne. )
    character(*)  ::  C
    String_ne = .not. ( S.eq.C )
  end function String_ne

  logical function String_ne ( C, S )  operator ( .ne. )
    character(*)  ::  C
    String_ne = .not. ( C.eq.S )
  end function String_ne

  logical function String_ne2 ( S1, S2 )  operator ( <> )
    String_ne2 = .not. ( S1.eq.S2 )
  end function String_ne2

  logical function String_ne2 ( S, C )  operator ( <> )
    character(*)  ::  C
    String_ne2 = .not. ( S.eq.C )
  end function String_ne2

  logical function String_ne2 ( C, S )  operator ( <> )
    character(*)  ::  C
    String_ne2 = .not. ( C.eq.S )
  end function String_ne2

!*******************************************************************************

!********************************** extend .GT. (>) to any ************
                                    ! combination of String and CHARACTER
```

```
logical function String_gt ( S1, S2 )  operator ( .gt. )
  String_gt = Char(S1) gt.Char(S2)
end function String_gt

logical function String_gt ( S, C )  operator ( .gt. )
  character(*)  ::  C
  String_gt = Char(S).gt.C
end function String_gt

logical function String_gt ( C, S )  operator ( .gt. )
  character(*)  ::  C
  String_gt = C.gt.Char(S)
end function String_gt

logical function String_gt2 ( S1, S2 )  operator ( > )
  String_gt2 = Char(S1).gt.Char(S2)
end function String_gt2

logical function String_gt2 ( S, C )  operator ( > )
  character(*)  ::  C
  String_gt2 = Char(S).gt.C
end function String_gt2

logical function String_gt2 ( C, S )  operator ( > )
  character(*)  ::  C
  String_gt2 = C.gt.Char(S)
end function String_gt2

!*************************************************************************

!********************************** extend .LE. (<=) to any ************
                                    ! combination of String and CHARACTER
logical function String_le ( S1, S2 )  operator ( .le. )
  String_le = .not. ( S1.gt S2 )
end function String_le

logical function String_le ( S, C )  operator ( .le. )
  character(*)  ::  C
  String_le = .not. ( S.gt.C )
end function String_le

logical function String_le ( C, S )  operator ( .le. )
  character(*)  ::  C
  String_le = .not. ( C.gt S )
end function String_le

logical function String_le2 ( S1, S2 )  operator ( <= )
  String_le2 = .not. ( S1.gt.S2 )
end function String_le2

logical function String_le2 ( S, C )  operator ( <= )
  character(*)  ::  C
  String_le2 = .not. ( S.gt C )
end function String_le2

logical function String_le2 ( C, S )  operator ( <= )
  character(*)  ::  C
  String_le2 = .not. ( C.gt S )
end function String_le2

!*************************************************************************

!********************************** extend .LT. (<) to any ************
                                    ! combination of String and CHARACTER
logical function String_lt ( S1, S2 )  operator ( .lt. )
  String_lt = Char(S1) lt.Char(S2)
end function String_lt

logical function String_lt ( S, C )  operator ( .lt. )
  character(*)  ::  C
  String_lt = Char(S1).lt.Char(S2)
end function String_lt

logical function String_lt ( C, S )  operator ( .lt. )
  character(*)  ::  C
  String_lt = Char(S1) lt.Char(S2)
end function String_lt
```

```
  logical function String_lt2 ( S1, S2 )  operator ( < )
    String_lt2 = Char(S1).lt.Char(S2)
  end function String_lt2

  logical function String_lt2 ( S, C )  operator ( < )
    character(*)  ::  C
    String_lt2 = Char(S1).lt.Char(S2)
  end function String_lt2

  logical function String_lt2 ( C, S )  operator ( < )
    character(*)  ::  C
    String_lt2 = Char(S1).lt.Char(S2)
  end function String_lt2

!*************************************************************************

!********************************** extend  GE. (>=) to any ***********
                                    ! combination of String and CHARACTER
  logical function String_ge ( S1, S2 )  operator ( .ge. )
    String_ge = .not. ( S1.lt.S2 )
  end function String_ge

  logical function String_ge ( S, C )  operator ( .ge. )
    character(*)  ::  C
    String_ge = .not. ( S.lt.C )
  end function String_ge

  logical function String_ge ( C, S )  operator ( .ge. )
    character(*)  ::  C
    String_ge = .not. ( C.lt.S )
  end function String_ge

  logical function String_ge2 ( S1, S2 )  operator ( >= )
    String_ge2 = .not. ( S1.lt.S2 )
  end function String_ge2

  logical function String_ge2 ( S, C )  operator ( >= )
    character(*)  ::  C
    String_ge2 = .not. ( S.lt.C )
  end function String_ge2

  logical function String_ge2 ( C, S )  operator ( >= )
    character(*)  ::  C
    String_ge2 = .not. ( C.lt.S )
  end function String_ge2

!*************************************************************************

end module String
```

Japan's response to "KANJI derived type" of J. H. Matheny

August 10, 1987

Requirements: Good availability as same as current character type must be given.

(1) a KANJI character string length is the number of KANJI characters.

(2) Escape sequences are hidden from users.

Evaluation

	item	KIND = n (Japan)	derived type (J.H. Matheny)
language facility	constant	OK	impossible
	assignment	OK	OK
	comparison	OK	OK
	concatenation	OK	impossible
	substring	OK	impossible
	editing	OK	impossible
	miscellaneous (e.g. IDENTIFY)	OK	impossible
efficiency	compilation	good	bad
	execution	good	bad

	KIND = n	derived type
Constant		
listing	A = '漢字'	A = KANJI(2)('TO', '漢字', 'FROM') cannot specify the escape-seq.
internal representation	A = 'TO漢字FROM'	A = KANJI(2)('TO','TO漢字FROM','FROM') cannot remove the escape-seq.
Concatenation		
	A = B//C	cannot define the function that defines the operator //. Length of the result value of the next function is not the sum of LEN(L) and LEN(R). FUNCTION CONCAT(L,R) OPERATOR(//) TYPE (KANJI(*)) L,R,CONCAT CONCAT%VALUE = L%VALUE//R%VALUE END
Substring		
assignment	B = A(2:3)	B%TO = A%TO B%VALUE = A%VALUE(3:6) B%FROM = A%FROM
argument	CALL SUB(A(2:3))	impossible

KIND = n	derived type
Editing	
output WRITE(6,100)A 100 FORMAT(1X,A4)	WRITE(6,100)A 100 FORMAT(1X,A3,A8,A3)
input two character '漢字' TO漢字 FROM READ(5,200) B,C 200 FORMAT(2A1) <—	READ(5,200) BZVALUE,CZVALUE 200 FORMAT(3X,2A2)
TO漢 FROM TO字 FROM READ(5,200) B,C 200 FORMAT(2A1) <—	READ(5,200) BZVALUE,CZVALUE 200 FORMAT(3X,A2,3X,3X,A2)
SAME	

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(48)

To; FORTRAN 8X Officers 1987-06-17

Reference; FORTRAN 8X X3J3/S8.103

Dear sirs,

I propose to extend a rule as:

R617 parent-array is array-variable-name
or array-constant-name
or array-constructor (R422)

I believe it will offer a simple and beautiful descriptive power to the language as:

```
print *, (/' ','.', '+', '*' /)(k)
```

Thank you.

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Japan's Proposal to FORTRAN8x
-- Extension of CHARACTER Type for National Character Handling --

CONTENTS

- Needs for various kinds of codes
- Reasons to be intrinsic, not derived
- Language specifications
- Implementation - Japan's experience
- Example of KANJI handling feature
- Current status of Japan

FORTRAN WG of Japanese National Committee

for ISO/TC97/SC22

August , 1987

Needs for various kinds of codes

- In the world, there are large number of people who wish to use FORTRAN and their native language is not English. Their needs for the handling of the national character code are strong.

- KANJI is now widely used on computers.
  - In Japan, recent innovations in word processing facilitated the KANJI input/output problem.
  - There are more than 10,000 characters in KANJI. Therefore KANJI cannot be mapped into any single byte code.

Reasons to be intrinsic, not derived

■ Efficiency

- We wish to process codes efficiently for our own language.

■ Availability

- We need the conformance of specifications between one byte code and multi byte codes.
- We wish to manipulate not only KANJI but also other kinds of characters(e.g. ASCII data) in the same program.

■ Japan's experience of implementation

- In Japan, most vendors have already implemented the data type for KANJI and this feature has been supplied to users. This implementation is successfully carried out as the intrinsic data type for FORTRAN77.
- New character type and its constant has necessarily been adopted.

Language specifications(1/3)

- New CHARACTER type and new CHARACTER constant
  - A processor may have a number of character sets, each is associated to a distinct character type. (For the present the number would be one or two.) The first of them(current one) shall include the FORTRAN character set, and others shall include the blank character.
  - The length of a character string is not the number of occupied bytes but the number of characters in the string.
  - User need not know and need not handle escape sequences.

- Operations and assignments are also applied to the new character type similarly to the current character type in general. Some of such features are processor dependent. (e.g. collating sequence)

Language specifications(2/3)

■ CHARACTER type-statement

R502 type-spec is ~
or CHARACTER [kind-length-selector]
or ~

R508 kind-length-selector is(type-param-value)
or (LEN=type-param-value [,KIND=char-Kind])
or (KIND=char-kind [,LEN=type-param-value])
or * char-length [,]

R5xx char-kind is scalar-int-constant

The default char-kind is one.

The relationship between the value of a char-kind and the associated character set is processor-dependent. (The programmer would be allowed to change this correspondence through a compiler parameter, if the processor can handle multiple character sets.)

ex: CHARACTER (KIND=2) A,B

Language specifications(3/3)

■ Character Constant

R414 char-literal-constant is [char-kind] ' [character] ...'
or [char-kind] " [character] ..."

'R5xx char-kind is scalar-int-constant

char-kind shall represent the kind of the contained characters.

char-kind may be omitted only when char-kind is one.

```
ex:  '1st kind'     ! 1st kind character constant
     2'第２種'      ! 2nd kind character constant
     1'      '      ! 1st kind blank
```

■ Character Constant Edit Descriptor

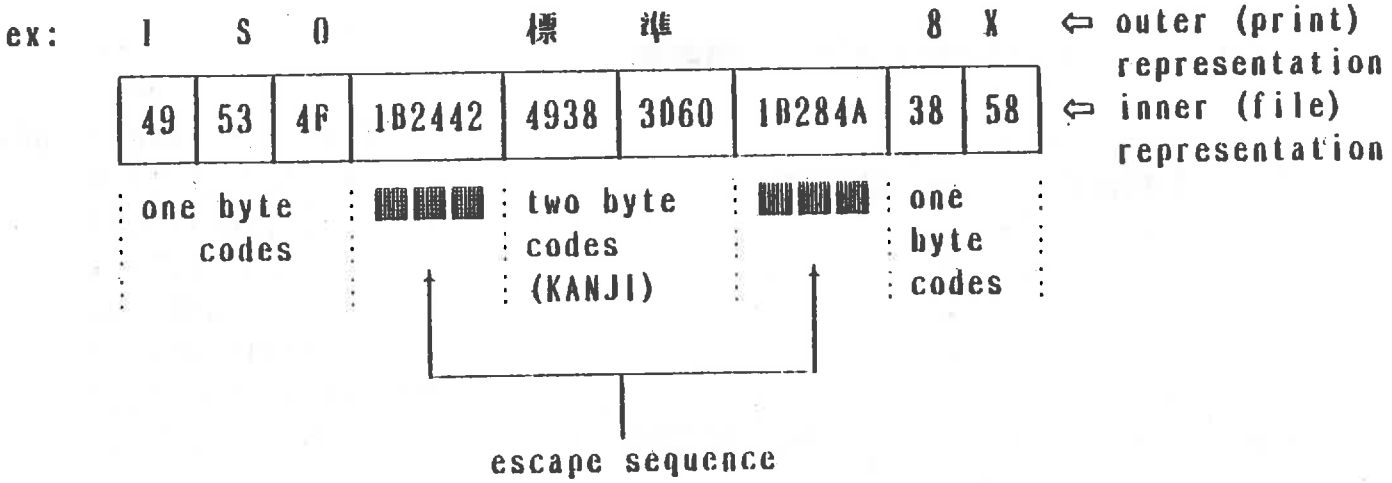
Character constant edit descriptor is defined similarly to character constant.

■ Character Editing

A [w] edit descriptor is used, where w is a character length.

Implementation - Japan's experience

- Escape sequences are necessary to distinguish the character kind in the same data stream.

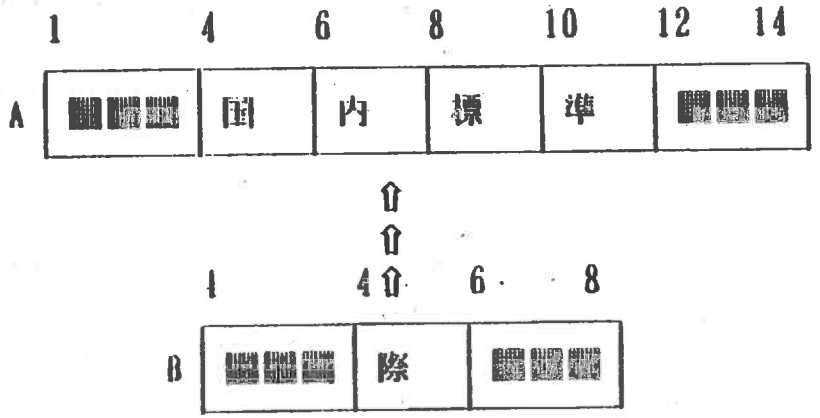


- Escape sequences are handled only by the processor.
  - The data in the program has no escape sequence.
  - Insertion and deletion of the escape sequences are done by the processor when input or output of the data is performed.

Example of KANJI handling feature

■ When KANJI feature is not suppoted, user must take care of the escape sequences.

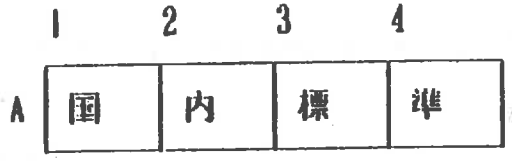
```
      PROGRAM   KANJI1
      CHARACTER A*14, B*8
      A= '国内標準'
      B= '際'
      WRITE(2, 100) A
      A(6:7)=B(4:5)
      WRITE(2, 100) A
100   FORMAT (1X , A14)
      STOP
      END
```



■■■:escape sequence code(3 bytes)

■ When KANJI feature is supported, user can handle KANJI strings easily.

```
      PROGRAM   KANJI2
      CHARACTER (KIND=2) A*4
      A=2'国内標準'
      WRITE(2, 100) A
      A(2:2)=2 '際'
      WRITE(2, 100) A
100   FORMAT (1X , A4)
      STOP
      END
```



1987年　カレンダ

8月

日	月	火	水	木	金	土
**	**	**	**	**	**	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	**	**	**	**	**

(メモ欄)	
1(土)	16(日)
2(日)	17(月)
3(月)　ＩＳＯ会議	18(火)
4(火)　〃	19(水)
5(水)　〃	20(木)
6(木)　〃	21(金)
7(金)　〃	22(土)
8(土)	23(日)
9(日)	24(月)
10(月)　ＡＮＳＩ会議	25(火)
11(火)　〃	26(水)
12(水)　〃	27(木)
13(木)　〃	28(金)
14(金)　〃	29(土)
15(土)	30(日)
	31(月)

EXAMPLE OF FORTRAN OUTPUT USING KANJI FEATURE.

Current status of Japan - Standardization

- KANJI feature special committee has made the guideline of KANJI feature on programming language, computer graphics, database, documentation etc.

- Status of standardization on KANJI feature

  FORTRAN: Japanese standard draft has been completed and proposed to 8x.

  C : studying

  LISP : Japanese standard draft has been completed and proposed to ANSI.

  COBOL : studying

  SQL : Proposal to ISO/TC97/SC21/WG3 SQL2 has been prepared.

Current status of Japan - FORTRAN

- We have already had the Japanese FORTRAN standard draft on KANJI feature.
  - The specification of the draft differs from that of currently proposed to 8x by Japan. In the draft, new character type is defined by keyword NCHARACTER, and it confirms the specification which has already been implemented on most compiler systems in Japan.

- Why we don't propose NCHARACTER ?
  - Only one kind of national character can be handled by NCHARACTER. We consider that it will be necessary to be able to handle more than two kinds of national characters in the same program in the future.
  - FORTRAN8x aims at abstracting and unifying of data type.
    ex: DOUBLE PRECISION

We understand that the philosophy of FORTRAN 8x is to modernize FORTRAN so that FORTRAN will be more widely used in the future. Therefore we believe that it is necessary for FORTRAN 8x to support the national character feature.

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LIVERPOOL RESOLUTIONS

AUGUST 3RD-7TH, 1987

R1 SUBMISSION OF S8 TO SC22

That WG5 confirms the action of its convenor in forwarding S8.104 to SC22 for processing as a Draft Proposed Standard.

28-7-0 7-2-0

R2 FRENCH TRANSLATION

That WG5 appreciates the offer of the French member body (AFNOR) to be responsible for the French translation of the final standard.

34-0-1 9-0-0

R3 X3J3 SCHEDULES

That WG5 explicitly states that all recommendations to X3J3 and requests for additions, deletions, study, etc. of Fortran 8X features contained in the Liverpool resolutions should be processed by X3J3 in a way which does not delay the public comment process.

31-3-1 8-1-0

R4 STATUS OF HALIFAX RESOLUTIONS

That WG5 thanks X3J3 for its work in response to the Halifax resolutions, acknowledges receipt of N227 (Status of Halifax

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Resolutions) and notes that no further work is requested of X3J3 on those resolutions.

31-0-4 9-0-0

R5 RESOLUTION LIFE CYCLE

That WG5 now establishes a standing operating procedure whereby reporting of actions and responses to resolutions shall not be carried forward beyond the next regularly scheduled WG5 meeting, and that unresolved resolutions from the previous meeting shall be withdrawn unless they are the subject of explicitly reaffirmed or amended resolutions.

35-0-0 9-0-0

R6 CONTENT OF RESOLUTION RESPONSE DOCUMENT

That WG5 requests its convenor to ensure that responses to WG5 resolutions shall be recorded in a document which includes the following for each resolution:

1. the full text of the resolution, including the WG5 voting figures.
2. the response, including the voting figures and explanation where relevant.

35-0-0 9-0-0

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R7 TEMPORARY NATURE OF AN EXTENSION FEATURES APPENDIX (cf. Halifax 3)

That WG5 reaffirms its Halifax resolution 3 (1986), namely that WG5 recommends to X3J3 that the final published document not contain an appendix of suggested extension features.

23-9-3 8-1-0

R8 POINTERS (cf. Halifax 11)

That WG5 reaffirms the intent of Halifax resolution 11 (1986), namely that WG5 feels that a major feature that is lacking in the current S8 is that of a pointer facility.

22-3-10 8-0-1

R9 POINTERS AND IDENTIFY

That WG5 recommends that if pointers are adopted by X3J3 they should either be integrated into the Identify facility, or else the latter facility should be deleted.

13-9-13 3-2-4

R10 DEPRECATED FEATURES (cf Halifax 13)

That WG5 withdraw its Halifax resolution 13 (1986).

30-0-5 7-0-2

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R11 DECREMENTAL FEATURES

That WG5 recognises the motivation for splitting decremental features in Fortran 8X into two different classes.

However, WG5 requests X3J3 to consider the possibility of identifying both obsolescent and deprecated features in the text of the standard, consistent with the requirement imposed on processors for detecting both classes of decremental features.

28-4-3 8-0-1

R12 SIGNIFICANT BLANKS (cf. Halifax 14)

That WG5 reaffirms the intent of Halifax resolution 14 (1986), namely that WG5 believes that significant blanks are logically associated with free source form and that the appropriate time to introduce this feature is at the same time as the free source form, even if no syntax in Fortran 8X is dependent on its presence. The presence of significant blanks in Fortran 8X will give greater flexibility for the future development of the language and will simplify development of software tools.

WG5 notes the response prepared by X3J3 to Halifax resolution 14 but requests X3J3 to reconsider this matter as part of its processing of the comments received during the public review period.

26-8-1 9-0-0

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R13 NAME-DIRECTED I/O (cf. Halifax 22)

That WG5 withdraw its Halifax resolution 22 (1986).

23-6-6 5-0-4

R14 LANGUAGE AND STYLE

That WG5 appreciates that X3J3 has made significant improvements in the readability of S8, and particularly wishes to thank Lloyd Campbell and Walt Brainerd for their efforts.

WG5 suggests to X3J3 that the index be improved and that more examples be added.

35-0-0 9-0-0

R15 SECTION NOTES

That WG5 requests X3J3 to introduce some reference mechanism between the text of the standard and the section notes.

27-4-4 9-0-0

R16 REVISION INDICATION

That WG5 suggests to X3J3 that each succeeding internal draft of Fortran 8X have some indication of changes and deletions with respect to the previous draft.

25-5-5 9-0-0

R17 PROGRAM SIZE AND COMPLEXITY

That WG5 requests that X3J3 investigate the possibility that a standard conforming processor should be capable of detecting and reporting violation of its processor dependent limits on program size and complexity.

20-9-6 7-1-1

R18 USAGE OF INTERFACES

That WG5 requests that X3J3 add more examples to clarify definition and usage of the concept of interfaces.

33-0-2 9-0-0

R19 MULTIPLE CHARACTER SETS

That WG5 recommends that X3J3 in cooperation with the Japanese member body add a facility to the Fortran language to manipulate as data within a single program unit more than one character set, with very different numbers of characters in each set, so as to allow for the use within Fortran of natural languages such as Chinese or Kanji. Further WG5 recommends that such a facility accommodate mixtures of characters from different character sets in input and output.

24-1-10 7-0-2

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R20 REFERRAL TO SC22 OF PROCESSING IDEOGRAPHIC LANGUAGES

That WG5 requests its convenor to report to SC22 the concerns of WG5 that projects in the programme of work of SC22 and related committees allow for the processing of ideographic languages such as Chinese and Kanji in a consistent and efficient manner.

34-0-0 9-0-0

R21 USE OF NATIONAL CHARACTERS

That WG5 expresses to X3J3 its concern about the negative effect on the production of standard-conforming processors if characters in the national use positions in ISO 646, such as square brackets, are required in the Fortran 8X character set.

31-0-4 9-0-0

R22 BIT DATA TYPE

That WG5 believes that there is a significant unsatisfied demand for a BIT datatype facility in Fortran and that the need for such a facility will tend to increase during the lifetime of Fortran 8X. It therefore recommends that X3J3 review its earlier decision to remove BIT from 8X.

22-3-10 7-0-2

R23 PASSED-ON PRECISION

That WG5 draw the attention of X3J3 to the concerns of the German member body (DIN) about passed-on precision contained in paper N245.

25-2-8 8-0-1

R24 RANGE AND SET RANGE

That WG5 recommends to X3J3 that the RANGE and SET RANGE facilities be deleted from the language.

12-10-12 4-3-2

R25 APPRECIATION OF X3J3 WORK

That WG5 expresses its appreciation of the significant progress made by the X3J3 committee in developing the Fortran 8X document.

21-0-14 9-0-0

R26 VOTE OF THANKS

That WG5 would like to express its appreciation to the Convenor (Jeanne Martin), the Chairman (Jeanne Adams), the Secretary (David Vallance), the Drafting Committee, the organisers (Lawrie Schonfelder and Steve Morgan), the University of Liverpool and its staff (Margaret Jones and Helen Forster) and to those organisations who provided further support and have contributed to the success of the meeting (IBM, CDC, Cray and DEC).

35-0-0 9-0-0

Digital NEWS

The Newspaper for VAX Computing

$3.95

AUGUST 3, 1987

Special Section: Used VAX Dealers

ASK To Acquire NCA/6

DEC's VAXBI Upgrade/6

ESDI Disk Controllers/30

WASHINGTON

New Fortran Stirs Fight

By STEPHEN LAWTON

Digital Equipment Corp., along with IBM Corp. and several other major computer companies, is leading a challenge against a draft version of a new Fortran standard.

The draft, currently called Fortran 8X, is being challenged in the American National Standards Institute's Fortran X3J3 technical committee by Digital, IBM, Unisys Corp., Boeing Computer Services Corp. and Harris Corp. Vendors favoring the draft include Hewlett-Packard Co., Alliant Computer Systems Corp., Control Data Corp., Data General Corp., Prime Computer Corp., Cray Research Inc., Masscomp, Perkin-Elmer Corp. and ICL Inc.

Three votes have been taken by the X3J3 committee. The proposal failed on the first ballot by four

Continued on page 6

Junebug Clark

IN THE COMPUTER CENTER OF GENERAL MOTORS' Pontiac East truck assembly plant, Robert Booth, director of control engineering for the company's Truck & Bus Group, is surrounded by a Digital 8600 VAXcluster.

PONTIAC, MICH.

GM Unfolds MAP On Factory Floor

First plant-wide use of protocol

By KATHRYN ESPLIN

General Motors Corp. officially rolled out the first large-scale, plant-wide implementation of its Manufacturing Automation Protocol last Thursday when it opened the doors of its Pontiac, Mich., plant, which has a MAP 2.1 network installed on the factory floor.

"Welcome to the 21st century," announced Charles Katko, GM vice president and group executive of the company's Truck & Bus Group. Highlighting GM's GMT400 flexible manufacturing project at the Pontiac East truck plant, the company played host to reporters and consultants, showing off the culmination of more than two years work in implementing MAP 2.1. The system is based around a mixture of Digital Equipment Corp., IBM Corp. and Hewlett-Packard Co. computers.

The GMT400 project originated as a concept in 1982, said Ernest O. Vahala, director of manufacturing engineering operations for the Truck & Bus Group.

The refurbished Pontiac East and Oshawa, Ontario, plants and a new operation in Fort Wayne, Ind., are three of five plants in the GMT400 project, which was undertaken to demonstrate GM's continued commitment to computer-

Continued on page 5

SAN DIEGO

ANAHEIM, CALIF.

Proposed Fortran Standard Stirs Challenge

Continued from page 1

votes before passing on two subsequent ballots by 29-7 and 26-9 margins.

The proposed standard now goes to the "parent" committee of X3J3, known as X3, which recently sent ballots to its members to determine if the document will go out for public comment. Balloting is slated to end Aug. 20, according to one member. If approved for public comment, he says, copies of the document should be available by Oct. 1 and comments will be accepted for four months. It then will take approximately six months to analyze the comments, he says.

DIGITAL NEWS obtained copies of the X3J3 ballots submitted following the second vote earlier this year. The ballots required members voting "no" to explain why they did not support the proposal.

According to a committee member who opposed the proposal, the draft language is still so big that it could result in a reduction in Fortran's universality. Currently, he says, virtually any company that uses Fortran-77 has a Fortran compiler. Although compiled programs might not be directly portable, he says, the code can be recompiled to run on most systems. With the proposed standard, it "could be years" before new compilers are available and even then the code may not be as portable as it is now, he adds.

Many of the members voting "no" support that contention, along with at least one nonvoting committee observer. Convex Computing Corp.'s Robert Metzger, project leader for Fortran and C front ends and libraries, says that if the new Fortran is approved as the standard, it will be years before compilers are developed to implement it.

Commands dropped

Metzger notes the proposal calls for programs written in Fortran-77 to be rewritten in the new Fortran. Fourteen current Fortran commands have been designated as "decremented" in the new language and are slated to be removed. At the next revision of Fortran, those decremented statements would be dropped, he says. While the new Fortran provides alternatives to the statements that would be eliminated, he says, programs that are not rewritten would not be able to use new compilers. That, he notes, would force companies to decide whether to support the old Fortran, the new Fortran or both.

Another observer without a current voting member, Floating Point Systems Inc., supports the proposal. Grant Gibson, marketing communications manager, says the likely reason why manufacturers of scalar-based systems, such as IBM and Digital, are not supporting the proposal is that it tends to incorporate what vector-based manufacturers would want. However, Convex, which also manufactures a vector-based minisupercomputer, staunchly opposes the proposal.

Digital representative Kevin Harris cites several reasons why he voted against the language. "Users have expressed the need for improved data type support in several areas, particularly the need for new intrinsic types for supporting bit, pointer and varying-length string operations," he states on his ballot. "This proposal attempts to provide these through a set of language extensibility mechanisms rather than new intrinsic types. The implementations resulting from this attempt will be too inefficient.

"The new source manipulation capabilities are more powerful than necessary, too complex and untested," he adds. "The new features intended to enhance portability of numerical software are untested by practice and are not ready to replace the existing default REAL and DOUBLE PRECISION declarations. They are not clearly effective at attaining the desired portability because they do not account for major sources of variability, such as round-off error and intrinsic function accuracy." Harris further states that "the features chosen for the obsolescent and deprecated features list are not justifiable based on potential benefits or costs."

Gary Robinson, [illegible] manager of corporate stan[illegible] and representative on the X3 committee, patible with Fortran-77 and another that incorporates many of the new features, he says. If the language, as it currently is worded, becomes the ANSI standard, it might create a situation in which vendors are supporting two separate Fortrans. That would occur, he says, if the deprecated statements are removed at the next Fortran revision. Digital then would have to support 8X and the next generation of Fortran because of the massive amount of Fortran code that supports statements in the former that would be missing from the latter.

Robinson adds that, while Digital is against the wording in Fortran 8X, the company supports a new Fortran standard. The "no" vote, he says, is a technical maneuver to submit comments that would "improve" the wording of the standard and give users a chance to understand Digital's position.

IBM response

On his ballot, IBM representative Richard Weaver says IBM makes no judgments on the "quality" of the language, but rather "on the somewhat surprising observation that the result of X3J3's work is in a new language and not a revision of Fortran." Weaver agrees with Robinson's concerns, calling for the committee to split the new language into two separate languages. Weaver notes the new Fortran would be considerably larger than Ada, already considered as a large language in the industry

Because of the new language's size and memory requirements, says Convex's Metzger, it will be difficult, if not impossible, to implement it on many desktop computers, such as IBM PC XT/AT-class systems. In addition to the sheer size of the language, implementation will be expensive [illegible] complexity, the language will change from one that is readily usable by nonprofessional programmers into one that is not."

Like Robinson and Weaver, Philips calls for the committee to implement two standards — one downwardly compatible with Fortran-77 and the second implementing most of the new features of 8X.

In its response to IBM, the committee said, "Two versions of Fortran would impede program portability, the very thing that standardization is supposed to enhance. In addition, [IBM's] proposal to make the array processing extensions optional would further limit the portability of the programs using those extensions."

Cray, which voted "yes" at the voice vote, was among the only four companies that changed its vote; the other three companies changed from aye to nay. While Cray representative Richard Hendrickson was unavailable to comment, his ballot notes a "large number of technical errors and holes" in the original draft. "The number of flaws in the current document ... make it unlikely that we will get any meaningful public comment."

Robert Allison of Harris says his company is "marginally in favor of submitting the draft to X3 for further processing. We have some serious misgivings about the draft, but are willing to see if a public review indicates that the public has similar misgivings."

In addition to the U.S.-based firms that are part of the ANSI committee, International Standards Organization members also vote on draft standards. Of those voting, 25 members of the Working Group 5 (essentially the equivalent of the X3J3 technical group) and four countries voted "yes," while two members — from West Germany and the United Kingdom — voted "no."

John Wilson, a WG5 member, supports the draft, but only to the

LOS ALTOS, CALIF.

ASK To Acquire NCA

By EVAN SCHWARTZ

ASK Computer Systems Inc. will acquire NCA Corp. under terms of a proposed [illegible] million cash transaction.

The two companies are now direct competitors in the same sce- diate effect on Manman or MaxCIM, ASK president and chief executive officer Ronald Braniff indicated that the product lines will eventually be integrated into a single software system. He says that the company plans "to provide a growth path for both sets of cus-

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Another observer without a cur-

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Gary Robinson, Digital's manager of corporate standards and representative on the X3 committee, says his biggest concern is for the user. Because the proposed wording has been in development for 10 years, technology and ideas have changed, he says, adding that the language, as proposed, is too cumbersome and might not be compatible with Fortran-77. Essentially, he says, the technical committee has created a new and different Fortran.

One possible solution is to split the proposed standard into two separate languages — a Fortran that is completely downward-com-

revision of Fortran. Weaver agrees with Robinson's concerns, calling for the committee to split the new language into two separate languages. Weaver notes the new Fortran would be considerably larger than Ada, already considered as a large language in the industry

Because of the new language's size and memory requirements, says Convex's Metzger, it will be difficult, if not impossible, to implement it on many desktop computers, such as IBM PC XT/AT-class systems. In addition to the sheer size of the language, implementation will be expensive, he says. Metzger notes that 8X would have a major impact on many existing Fortran compilers. "All parts of a compiler would be affected by the significantly larger language."

From the user's perspective, Ivor Philips of Boeing Computer Services echoes the sentiment that the draft standard is too large and complex. Philips wrote on his ballot that "the standard has deviated too far from Fortran-77. The language is considerably more complex than its predecessor . . . Because of this

[illegible] are willing [illegible] review indicates that the public similar misgivings."

In addition to the [illegible]-based firms that are part of the ANSI committee, International Standards Organization members also vote on draft standards. Of those voting, 25 members of the Working Group 5 (essentially the equivalent of the X3J3 technical group) and four countries voted "yes," while two members — from West Germany and the United Kingdom — voted "no."

John Wilson, a WG5 member, supports the draft, but only to the extent of publishing it for user comments. He says, "My 'yes' vote indicates I am in favor of submitting the Fortran 8X document for public comment. I do not think the draft standard, nor especially the document itself, is yet suitable as a new Fortran standard.

"However," he adds, "it is high time the general computing public was given the opportunity to give detailed evaluation of the proposal. Any further delay is likely to cause the proposed standard to lose credibility." ■

LOS ALTOS, CALIF.

ASK To Acquire NCA

By EVAN SCHWARTZ

ASK Computer Systems Inc. will acquire NCA Corp. under terms of a proposed $43 million cash transaction.

The two companies are now direct competitors in the same segment of the Digital Equipment Corp. VAX software market.

Both ASK and NCA develop and distribute software for the manufacturing resource planning (MRP II) market concerned with comprehensive control of factory floor materials and finances. ASK says that it will continue to distribute and support the product lines of both companies, which have a combined installed base of more than 1,800 users, about half of which are on VAXs.

Alice Greene, who tracks the MRP II market for International Data Corp. in Framingham, Mass., says that ASK and NCA are the two top players in the MRP II arena for Digital computers. She adds that their total number of installations is outnumbered only by IBM Corp.

"ASK and NCA were competing for the same customers," says NCA spokesman A.J. Sekel. "Together, the two companies are very powerful on the DEC platform."

ASK markets the Manman information system for VAXs and Hewlett-Packard Co. computers. The software consists of 18 modules designed for management of manufacturing, accounting, human resources, field service and decision support. The company recently added a new tracking module to the system [*see story, page 21*].

NCA markets the MaxCIM manufacturing system for Digital VAX and PDP series computers. Similar in functionality to ASK's package, the system was recently outfitted with a new communications facility

diate effect on Manman or MaxCIM, ASK president and chief executive officer Ronald Braniff indicated that the product lines will eventually be integrated into a single software system. He says that the company plans "to provide a growth path for both sets of customers to eventually use a common system over the next few years."

Under the proposed agreement, NCA, now headquartered in Santa Clara, Calif., will be merged with ASK, based in Los Altos, Calif. The combined company will be relocated to a new facility in Mountain View, Calif., in September, says Braniff.

NCA vice president of operations and chief financial officer Peter Cassidy says the companies will attempt to retain as many of NCA's 170 employees as possible in the new combined firm, though he and company president and chief executive officer, John Cavalier, will be leaving after assuring a smooth transition.

The proposed cash transaction is contingent on federal government approval and at least a 50-percent tendering of NCA common stock and convertible debentures, says Cassidy. An offer of $8.50 per share was made to all NCA shareholders, which Cassidy says is about $2.50 higher than the stock's trading price.

NCA recently posted financial figures for its second quarter that show net profits down 84.7 percent from second quarter 1986. Cassidy says that last year's quarter was especially strong due to a large sale of MaxCIM software to Digital for internal use. He adds that the company has been profitable four out of five quarters since a management change in March 1986.

In addition to marketing their software for the VAX, ASK and NCA are both resellers of VAX computers and peripherals under

MERRIMACK, N.H.

DEC Offers BI Performance Upgrade Kits

By JOHN COX

VAXBI computer owners can now buy upgrade kits from Digital Equipment Corp. that boost performance from 50 to 130 percent, depending on the system.

Digital announced last week that these kits include 4M bytes to 16M bytes of memory, optional hard disk storage, VMS or Ultrix operating system license upgrades, full Digital Field Service installation and a one-year, onsite warranty. For each upgrade, a field service representative reviews the system at the customer's site to ensure a smooth migration, according to the company.

With the upgrade packages, customers can turn a VAX 8200 or 8250 into an 8350, an 8530 into an 8550, and an 8700 into an 8800. No

ing to the announcement.

The VAX 8200 is the bottom of Digital's BI-bus line of computers. A Digital spokesman declines to say at how many millions of instructions per second (MIPS) the 8200 is rated by the company, asserting that Digital's policy is not to publish MIPS ratings. Industry analysts have listed the 8200 as a 1-MIPS machine.

The actual performance may vary by application and configuration. The 8250, 8350 and 8530 are midrange BI systems introduced last March [*"New VAXBI Trio Fills Out Midrange,"* DIGITAL NEWS, *March 16, 1987, page 1*].

According to a chart accompanying Digital's release, the performance increases (relative to the 8200 as a base of 1.0) are significant. The 8200-to-8350 upgrade increas-

of 91 percent. With 4M bytes of memory, the total package price starts at $43,000. The RA81 hard disk device, with 456M bytes of storage, adds another $16,000. The 8250 upgrade boosts performance 91 percent, from 1.2 to 2.3 times the 8200.

The 4M-byte memory package starts at $34,000; the hard disk option again adds $16,000.

The 8530 upgrade raises performance from four to six times that of the 8200, a 50 percent increase. The 16M-byte memory package starts at $166,000; two RA81 hard disk devices add another $34,000. Finally, the 8700 upgrade boosts performance from a factor of six to 12. With 16M bytes of memory, the upgrade is $336,000; an SA482 storage device (2.5G bytes) adds $84,000.

MIS pros

BY DOUGLAS BARNEY
CW STAFF

More than half of the 2,000-plus MS OS/2 Developers Toolkits shipped so far by Microsoft Corp. have been snapped up by corporate developers, many of whom say they plan to develop a new generation of personal computer applications with ties to minicomputers and mainframes.

In interviews with *Computerworld*, corporate developers said MS OS/2 will allow applications on a mainframe and minicomputer level to be moved to microcomputers.

"They are talking about the same thing we have had on mainframes for 20 years," said Charlie McLoughlin, manager of software support for auditing at Touche Ross & Co. in New York.

The finished operating system is set to be available early next year. According to Microsoft Chairman Bill Gates, corpotions have expressed much more interest in developing for MS OS/2 than they ever did for his firm's MS-DOS.

For one user, MS OS/2 is not just interesting but crucial. "We are running out of gas in 640K because of networks," said Ali Semsarzadeh, senior computer systems officer in charge of future strategy directions for the International Monetary Fund in Washington, D.C. "Our communications cards require 80K to 150K [bytes] and prevent some of our applications from running. That has put our networking in jeopardy."

Semsarzadeh is looking forward to increased internal development under MS OS/2, in particular taking advantage of its large memory and multitasking

Continued on page 6

CW STAFF

In a major push for its new line of 9370 processors, IBM is accelerating some delivery schedules by up to six months and detailing future enhancements that will extend the 9370s into the mainframe realm.

At an analysts' briefing in Dallas last week in which IBM atypically discussed a range of competitive benchmarks, the company said its 9370 Models 20 and 60 will begin general availability shipments today, according to John McCarthy, an analyst with Forrester Research, Inc. in Cambridge, Mass.

When contacted by *Computerworld*, IBM would neither confirm nor deny the shipping date.

However, IBM had previously said that general availability would begin in July.

Six months early

In addition, IBM has informed several customers that they can take delivery of the new line of processors, while Boeing Computer Services provides Fortran business and engineering applications to many customers, including its Seattle aerospace parent, Boeing Co.

"Boeing as a whole makes massive use of Fortran. We have a very strong interest in the new standard," said X3J3 Committee member Ivor R. Philips, the Boeing Computer Services official who voted against the new standard. He said the company was still debating how to explain its opposition.

"We're in for a certain

Continued on page 8

told by the company.

Gerald Giuliani, manager of MIS at Komline-Sanderson Engineering Corp., said he has a 9370 on order for the spring of 1988 but that IBM "wanted to

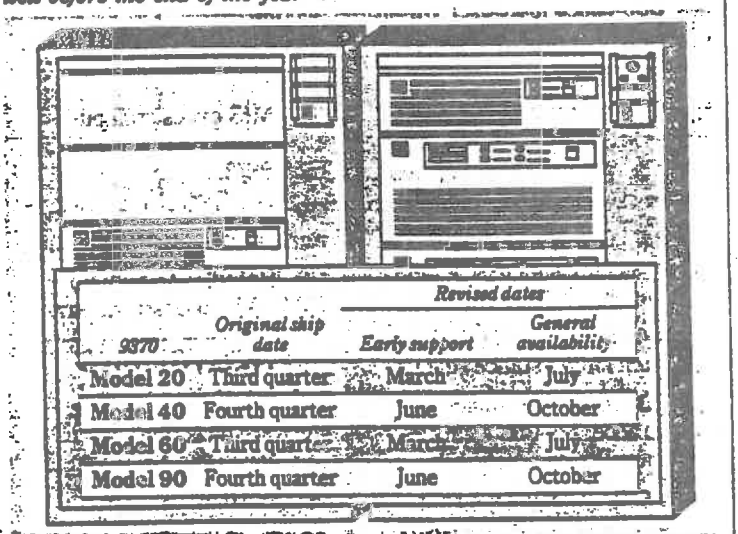
told to expect the machine in mid-1988 was recently advised that he can take delivery in December.

A software developer report-

Continued on p

Pouring out the iron

IBM set to establish installed base of all 9370 models well before the end of the year



9370	Original ship date	Revised date: Early support	Revised date: General availability
Model 20	Third quarter	March	July
Model 40	Fourth quarter	June	October
Model 60	Third quarter	March	July
Model 90	Fourth quarter	June	October

CW CHART: MITCHELL J. HAYES

ANSI Fortran revamp rankles giants

BY CHARLES BABCOCK
CW STAFF

A revision of Fortran that recently stirred up the opposition of a powerful set of Fortran compiler developers and users is being advanced by a technical committee of the American National Standards Institute.

IBM, Digital Equipment Corp., Unisys Corp. and Boeing Computer Services Co. representatives were among the nine X3J3 Committee members voting in Philadelphia recently against what is likely to be Fortran 87 or Fortran 88, currently designated Fortran 8X.

Several of the features added to Fortran 8X make it too unwieldy, opponents say, while other needed features were left out. If these complaints strike a responsive chord in the user community during the public review process, negative comments on the ANSI standard could force it back to the X3J3 Committee for further modification.

IBM, DEC and Unisys all produce Fortran compilers for their

U.S. firms lobby for Toshiba

Vendors urge Congress to withhold sanctions

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Computer industry lobbyists last week urged Congress to shield the industry from any import ban or other trade sanctions imposed against Japan's Toshiba Corp., which is under fire for a subsidiary's sale of military technology to the Soviet Union.

Representatives of the Computer and Business Equipment Manufacturers Association, the Computer & Communications Industry Association and Apple Computer, Inc. said U.S. computer manufacturers depend on Toshiba-made semiconductors and other components and that those companies are worried about foreign retaliation in response to U.S. sanctions.

The comments were made at a hearing held by the House Ways and Means Committee, which is considering legislation similar to the two-year import ban passed by the Senate 30 [CW, July 6]. A week later, the Department of Commerce suspended Toshiba's blanket li-

Continued on page 94

INFORMATION PROVIDED BY CRWTH COMPUTER COURSEWARES
CW CHART

ple thought they better have an information center because they thought, 'The competition has one,' or, 'The guy I play golf with has one,' " said Larry Des Jardines, manager of user services at United Student Aid Funds, Inc. "But now we're getting looked at."

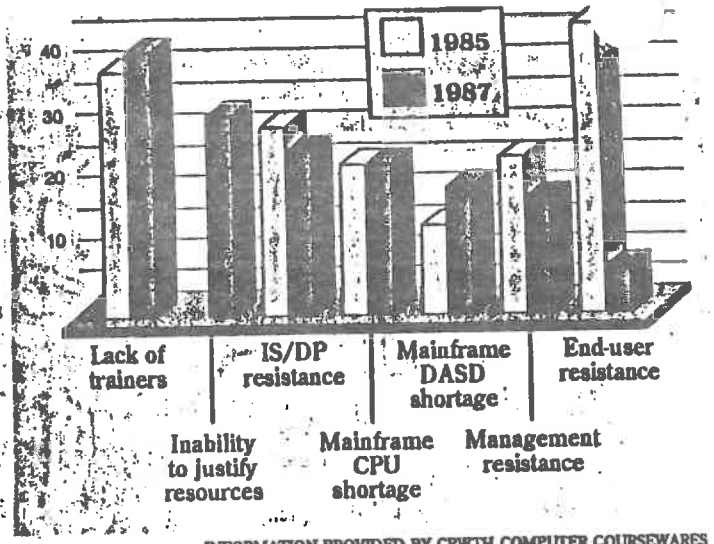
Many consultants at the Information Center Conference and Exposition, held here last week, suggested future survival depends on the information center's ability to market itself to the corporation. Some information center managers, however, said the key is for their department reported that a chief obstacle is the ability to justify resources. When this survey was conducted two years ago, this question was not included because it was not an issue, a Crwth spokeswoman said. But when she surveyed 100 information center managers this year to help establish the questions for the 1987 questionnaire, "they made the suggestion that we include this issue," she said.

'A real hot issue'

At McCormick & Co., a specialty foods manufacturer in Baltimore, the end-user services or- was hired to [illegible]ate McCormick's inform[illegible] systems requirements. "They said we were redundant. But management did not agree," Artes added.

The information center department at Storage Technology Corp. took a similar approach. Ron Carroll, manager of the DP information center, said the firm's management recently saw the immediate results of an inventory-reporting system that was put together by Carroll and members of the information center.

The microcomputer-based system is being installed nationwide, and, as a result of this automation, Carroll said, each city that comes on-line shows an av-



INFORMATION PROVIDED BY CRWTH COMPUTER COURSEWARES

Revamp

FROM PAGE 1

amount of controversy now. I'm bracing myself," said X3J3 Committee Chairwoman Jeanne C. Adams.

She called the proposed changes in Fortran, which include the addition of array processing and derived data types, necessary modernizations of the language.

The X3J3 Committee also proposes to do away with what it calls duplicative or obsolete features of the language over an unspecified time period. That extended time frame has stirred little opposition, said X3J3 Vice-Chairman Jerrold L. Wagener of Amoco Corp.

IBM could not be reached for comment at press time, but Adams said the IBM representative's opposition was based in part on a desire to keep Fortran compact enough to run efficiently on a personal computer. The array processing features are a sizable addition to Fortran, she said.

Negative vote

Boeing Computer Services' representative cast a negative vote because the company was looking for additional features in Fortran, such as bit data types and pointers, Wagener said.

Boeing Computer Services' Philips said his company was not ready to announce its stance in opposition to Fortran 8X. But each committee member voting against the proposed standard must put his reasons on the record, Adams said.

Unisys representative Larry Rolison charged that the committee strayed into designing a new language rather than standardizing features common to the best existing Fortran compilers. "We thought they added too much to the language," he said.

The opposition, while influential, "is equally split between those who say we've got too much in the new standard and those who say we've got too little," Wagener noted. As a result, the X3J3 Committee "is in a tricky situation. To satisfy one of the groups will make the other one unhappy."

The situation reminds some observers of the dilemma faced by another ANSI technical committee when it attempted to get the new Cobol 85 standard accepted. Powerful opposition emerged during the public review process, challenging modernizations that would have required the conversion of the huge library of existing Cobol applications. Compatibility does not appear to be an issue in the debate over Fortran 8X.

Positive outcome

The X3J3 Committee's proposed standard is undergoing a 30-day letter ballot consideration by parent X3 Committee members, the positive outcome of which will allow the standard to be submitted for four months of public review and comment. The opposition to Cobol 85 emerged during its public review period.

An X3 advisory committee has already forwarded both negative comments and proposed changes to the parent group. ANSI's Standards Planning and Requirements Committee, which checks procedural matters, took the step as a way of making certain that opponents get their point of view represented to all parties.

"The negative comments are going to have an effect," said Wagener, an advocate of the new standard. But, he said, a solid two-thirds majority of the X3J3 Committee held together in spite of the disagreements.

The proposed changes, according to committee observers, include the following:

- Provide array operations or process sets of data simultaneously. This feature is already offered by several vendors of Fortran compilers.
- Provide an abstract means of specifying the representation of numbers, leaving it to the compiler to determine whether numbers should be stored as single- or double-precision figures. Commercially available compilers do not provide this feature.
- Provide derived data types, whereby a data type for employee numbers, for example, could prevent an attempt to add employee identification numbers together, even if an application mistakenly called for such a result. This feature is another that is not currently available on Fortran compilers.
- Provide modular definitions, which allow a programmer to link the common elements of subroutines or other objects.
- Provide for the removal of obsolete, or so called "depreciated," features of the language at an unspecified future date. The deletions would occur with the full revision of Fortran that is set to follow the currently debated one.

(53)

ISO Standardization Process

August 3, 1987

Jeanne Martin
Convener, ISO/TC97/SC22/WG5

ISO has 7 Stages for Standardization

Stage 1 - Development of WD (Working Draft)

Stage 2 - Registration of DP (Draft Proposal)
- 3-month comment/vote period among P members of SC22
- 2-month vote period for successive drafts
- SC Secretariat decides when to proceed

Stage 3 - Registration of DIS (Draft International Standard)
- 6-month vote period in TC97
- 75% of votes cast must approve or revert to Stage 2

Stage 4 - Four months allowed to prepare (possibly revised) DIS and report of processing history for Central Secretariat

Stage 5 - If no more than 2 negative votes cast in Stage 3, go to Stage 7
- Otherwise the Council decides the outcome within 6 weeks

Stage 6 - Council decides to publish or revert to Stage 2

Stage 7 - Publication of IS (International Standard)

Some important points are:

- No changes can be made to the draft without the approval of the Working Group
- Editorial changes can be made without rebalioting
- At Stage 2, a number is assigned to the draft that it retains through all further processing and for the published International Standard
- Once past Stage 2, the project can never revert to Stage 1 The project may be officially abandoned
- In some cases Stages 2 and 3 can be combined

There are 22 P Members of ISO/TC97:

Austria
Belgium
Canada
Czechoslovakia
Denmark
Finland
France
Germany, F.R.
Hungary
Iran
Iraq
Italy
Japan
Norway
Poland
Sweden
Switzerland
United Kingdom
USA
USSR

Stage 1

- WG5 (via X3J3) develops a WD (S8)
- WG5 decides by passing a resolution at a meeting or by correspondence that the WD is ready to be a DP
- The SC22 Secretariat forwards the WD to the Central Secretariat for registration as a DP where it is allocated a number. The published IS will have this number.

Stage 2

- SC22 Secretariat circulates the DP to P members and liaison organizations for comments/votes (3-month period)

- Comments/votes are sent to SC22 Secretariat where they will be summarized and distributed with a report on the action taken

Possible Actions:

  - The SC22 Secretariat judges that substantial support has been obtained - move to Stage 3

  - The WG is asked to make editorial changes - move to Stage 3

  - The WG is asked to revise the draft - Repeat Stage 2 except the comment/vote period is reduced to 2 months

When is substantial support obtained?

The decision is based not only on numerical voting results, but also on the views of those P members who have a substantail interest in the subject.

The decision is made by the SC22 Secretariat, in consultation with the Central Secretariat, if necessary.

Stage 3

- The SC22 Secretariat submits the DP to the Central Secretariat for registration as a DIS

- The DIS is circulated to P members of TC97 for voting (6-month period)

- The vote:
  - -- approval (with or without comments)
  - -- disapproval (for reasons stated)
  - -- abstention

- If 75% of the votes cast approve - go to Stage 4
  if not, revert to Stage 2

Stage 4

Within 4 months the DIS (possibly revised by WG5) and a report on its processing history (prepared by the SC22 Secretariat) are sent to the Central Secretariat

Stage 5

- If there were no more than 2 negative votes in Stage 3 - go to Stage 4

- If there were more than 2 negative votes,
  The Secretary General will make a special enquiry
  The Council meets to decide whether the DIS can be published

Stage 6

Council decides to publish or returns the draft to Stage 2

Stage 7

Publication as an International Standard

(54)

TO : X3J3

FROM : IVOR R. PHILIPS

SUBJECT : MINUTES OF THE 103 RD MEETING

PAGE 59 DISCUSSING THE PHILIPS BALLOT CONTAINS THREE SERIOUS INACCURACIES. TO CORRECT THE FIRST TWO INACCURACIES, REPLACE, IN THE SECOND PARAGRAPH LINE 3, "One would be forward looking the other backward looking" BY "One would immediately drop all obsolescent and deprecated features of FORTRAN 77 and add new features from FORTRAN 8X, the other would add features in the spirit of FORTRAN 77 but not have any planned obsolescence or deprecation."

TO CORRECT THE THIRD INACCURACY, REPLACE, IN THE THIRD PARAGRAPH LINE 3, "Overloaded operators would produce code of limitless obscurity." BY "Overloaded operators encourage the production of code of unbounded obscurity."

(55)

August 9, 1987
105(16)CDB-5

TO: X3J3
FROM: Carl Burch

SUBJECT: MODULE Approach to Kanji Support

Background

Kanji are Japanese ideographic characters derived from ancient Chinese. Each Kanji symbol typically corresponds to one or more English words. There are over 10,000 Kanji defined, leading to existing implementations that use 16bits to store each Kanji symbol.

Japanese delegations made presentations at the Bellvue X3J3 meeting and again at the Liverpool WG5 meeting (in rather more detail). The Bellvue discussion centred on the alternative means of support proposed by the CHARACTER (KIND=2) syntax (implying a processor-dependent intrinsic datatype) and the use of the F8X MODULE and derived datatype features. A decision was made for sub-group 16 to investigate the MODULE option. Jim Matheny laid the groundwork for this approach in 105(16) JHM-02. this proposal fleshes out his scheme with the benefit of further consultation with the Japanese WG5 delegation, but without Kevin Harris's presentation on existing Fortran implementations that provide Kanji extensions to FORTRAN 77.

WG5 discussions in Liverpool served to clarify some basic issues:

- The Japanese (and, by extension, the Chinese) do have a problem in processing Kanji with FORTRAN 77 programs.

- Though the overall problem is much wider than any one (or even all) programming languages, there is a component of the problem specific to Fortran.

- There is a requirement to mix Kanji and CHARACTER items in I/O, though there seems to be little conversion between them. That is, their relationship seems similar, but even more separate than that of REAL and DOUBLE PRECISION - printing and reading them side-by-side is far more common than conversion between them.

- The requirement for Kanji and CHARACTER data to simultaneously exist in a given program implies that:

  (1) The possibility of a vendor implementing CHARACTER in 16 bits is not sufficient to produce output in the column alignment used by Japanese documents.

  (2) The facility being requested is not for the purpose of portability - the use in Japan of existing programs originating in the West (and vice versa). A separate Kanji facility is for writing new programs, treating the Japanese language as an application area needing specific tools. In this sense it is more like BIT datatype, a tool to address a set of common problems in one or more application areas.

Levels of Kanji Support

Supporting Kanji on a computer system developed in the West is a challenge on many levels. Terminals must be designed or adopted to input and display Kanji, printers must be adapted or replaced, text editors and formatters rewritten to allow multibyte characters and represent them, data bases must be enhanced to do Kanji comparisons, just to name a few. All these are external to any programming language, though some of the general solutions generated must also be extended to compilers. After all, compilers are (among other things) text processors, reading text files as source code and producing a program listing as one of the output forms.

The levels of compiler support for Kanji I see are:

0. Kanji strings embedded in comments and CHARACTER literal strings.
1. Kanji datatype to allow mixing with CHARACTER and I/O to files and Kanji devices.
2. Allowing Kanji identifier names.
3. Replacing language keywords with their Kanji equivalents.

Clearly, the last two are fundamental changes in the lexical conventions of any programming language. The Japanese proposal does not include anything of the sort, though they seem willing to discuss them as a very long-term topic. On the other hand, they make a wonderful trial balloon - since everyone is so relieved to shoot them down that the actual proposal seems trivial and cheap by comparison.

The first level seems simple enough, preserving Kanji strings in comments and quoted literal strings (still CHARACTER datatype). This is largely the same support needed in every other text processor - it makes strings a little harder to scan (since the Kanji strings are allowed to have bytes that match ASCII quote or apostrophe characters), but otherwise requires no more than that for European languages (leave the eighth bit in ASCII alone). Oddly enough, this might well be the hardest to define in standardese (if we so choose) - the current text says very little beyond "Any character representable in the processor may occur in a character string." The remainder of this paper assumes that Kanji strings may be embedded in character strings - I suspect Kevin will deal further with this topic in his tutorial.

The second level of support is the subject at hand; how to support Kanji data mixed with CHARACTER data, both internally and in I/O? As is usually the case when discussing features existing in current implementations, we start with where we are today.

Notes on the J.I.S. NCHARACTER Implementation

The Japanese Industrial Standard for Fortran defines the NCHARACTER (National or Nippon Character) datatype. It defines NCHARACTER items to be 16 bits and to be read and written with 3-byte escape codes preceding and following the data bytes. E.g., an NCHARACTER*5 item is read or written as 16 bytes (5*2 bytes data, 2*3 bytes start/stop codes). As an aside, I found the most interesting part of this to be the fact that the default mode is eight bits - the escape codes that support mixing are around the Kanji symbols, not the ASCII or EBCDIC data.

Kanji formatted I/O is done via the Nw format descriptor, which outputs "w" Kanji characters, inserting the start and stop escape codes as

described above. Tab formats (and all others) are still defined in CHARACTER units.

The module sketched below is intended as a simulation of the current NCHARACTER implementation - a simulation is not an emulation. It is intended as a technology demonstration, not a final solution or absolute clone of the current J.I.S. The CHARACTER type was chosen as an abstract datatype to target as a better-defined version of the current Japanese proposal.

Comparison of an Intrinsic Kanji Datatype and a Kanji Module

An intrinsic datatype is the most powerful mechanism available to the language designer. In principle, anything that is computable can be conveniently defined as an intrinsic datatype with its associated operators. As usual, there's no such thing as a free lunch - the most powerful mechanism available is also the most expensive. In this case, the most expensive mechanism isn't terribly expensive, about two engineer-month's per compiler.

The KIND=2 proposal represents a means of (open-ended) language extension, unfortunately one defined to be absolutely processor-dependent in practically all of its semantics. Our designed means of language extension is the combination of derived datatypes and modules. If such an extension (to a higher level of abstraction, unlike BIT) cannot be done by a module, we need to find out why and fix it. I believe that our current facilities (with one extension) fulfil the requirements for handling Kanji data.

One bonus in using a MODULE for Kanji is that it should provide portability back into European languages that an intrinsic datatype could only offer by a compiler directive. By replacing the Kanji module with an equivalent version using only the original CHARACTER data and operations, Japanese software could be imported to the West. The equivalent transformation could be done by compiler directive (i.e. interpret all NCHARACTER declarations as CHARACTER) - but standards committees exist in part to eliminate the kind of choices that vendors punt to their users by means of compiler directives.

The Japanese WG5 delegation raises the issue of performance - a common concern relative to any more-structured coding techniques, considering the fact that more structure generally means more procedure calls. This question is not persuasive in at least two ways. First, character operations are seldom performance-critical. Production Fortran programs are often floating-point bound, sometimes I/O bound almost never bound by character manipulation. Secondly, there is nothing about an intrinsic datatype that ensures its efficient implementation. I'm told that until recently a large multinational computer vendor with a three-letter name still implemented the native CHARACTER datatype's operations through library calls.

If done by a module, a fair question exists as to the status of this module. Kurt Hirchert suggested a supplementary standard at the WG5 meeting. Making the module intrinsic has been mentioned at FIDS, though I see little advantage in intrinsic status except when defining a portable interface to a module that internally must directly operate upon the processor-dependent representation of the data. At least its current status as a Japanese Industrial Standard is essential.

Kanji I/O

I/O is the prime purpose of Kanji datatype support - as it is with CHARACTER. The operators provided are minimal in both cases, just those needed to rearrange input into output. There are four types of transfers in Fortran I/O: unformatted, formatted, list-directed and NAMELIST. Unformatted is deliberately processor-dependent to maximise performance, so whether or not escape sequences are included in a question for the compiler writer.

List-directed and NAMELIST can be lumped together since any given iolist item is formatted according to its datatype, by the same set of rules. The escape codes used in the current J.I.S. mesh satisfactorily with our current definitions (at least when implemented in ASCII - my grasp of EBCDIC is happily lacking). That is, the escape codes themselves do not include single or double quotes for the quoted form of character item; nor blanks, slashes, or commas in the non-quoted form. In practice, Kanji characters are allowed to have bytes (gasp!) that are identical to the delimiter characters listed above, so it is necessary to include the escape characters in the finite state automation for scanning input strings.

It seems to me that the FORMAT statement needs extension to support abstract datatypes. Exporting a CHARACTER constant from a module for concatenation into a format string suffices for use in a READ or WRITE, but there is no such mechanism for FORMAT statements. Jim Matheny had addressed this problem in 105(16)JHM-01. In this use, the modules' exported format fragment would take the place of a new intrinsic format descriptors for the abstract datatype provided by the module.

Rough Draft of NCHARACTER Module

The following is a rough draft of a module to simulate the J.I.S. NCHARACTER implementation. It differs in the syntax to declare Kanji items and to take NCHARACTER substrings, but other syntax and external semantics are the same.

Note that it is not necessary to explicitly provide for I/O - our current rules define that the components of a derived type are output in sequence of their declaration. Since the list-directed and NAMELIST formatting rules (for DELIM=NONE files) specify that CHARACTER items are output without blanks preceding them, the components are implicitly concatenated in the output.

For list-directed or NAMELIST files meant to be read back, DELIM values other than NONE must be specified, just as for normal CHARACTER datatype.

The format fragment specified in "NCHAR_FMT" serves as a format descriptor for each Kanji item in the formatted I/O list.

There is also an additional subroutine (NCHAR_CHECK_READ) provided as a consistency check on READs to ensure that the escape codes are maintained. This function (at least in some implementation) would be in the I/O library of an intrinsic datatype implementation.

```
MODULE NCHARACTER

! Module to simulate J.I.S. "NCHARACTER" Data Type
```

```
INTEGER, PARAMETER, PRIVATE :: ESCAPE_LEN=3
   ! Length of escape codes in characters

TYPE NCHAR (LENGTH)
   PRIVATE
   CHARACTER (LEN=ESCAPE_LEN) START_ESCAPE
   CHARACTER (LEN=2*LENGTH) VALUE
   CHARACTER (LEN=ESCAPE_LEN) STOP_ESCAPE
END TYPE NCHAR

CHARACTER (LEN=ESCAPE_LEN), PARAMETER, PRIVATE :: &
   START_ESCAPE_VAL = CHAR(27)//CHAR(36)//CHAR(74), &
   STOP_ESCAPE_VAL = CHAR(27)//CHAR(40)//CHAR(82)
   ! Three-byte escape codes defined by J.I.S.

CHARACTER (LEN=*), PARAMETER, PUBLIC :: NCHAR_FMT='(3A)'
   ! Simulates Nw format when concatenated into a format
   !   string, with "w" preceding "NCHAR_FMT" as a repeat count.
   ! Example: "(1X, N5, N1)" becomes "(1X,5"//NCHAR_FMT//
   ! ",1"//NCHAR_FMT//")"

CHARACTER*2, PARAMETER, PRIVATE :: NCHAR_BLANK = ' '
   ! One NCHAR blank (different than two CHARACTER blanks)

! End Data Structures

PRIVATE SUBROUTINE INIT (VAL)
!  local procedure to set escape codes.
TYPE (NCHAR(*)) :: VAL
VAL%START_ESCAPE = START_ESCAPE_VAL
VAL%STOP_ESCAPE = STOP_ESCAPE_VAL
END SUBROUTINE INIT

SUBROUTINE ASSIGN_CHAR_TO_NCHAR (LEFT,CH) ASSIGNMENT
! Initialise NCHAR from CHARACTER (usually literal) string
! This procedure assumes nothing in CH but an NCHAR string
! i.e., an escape sequence bracketing one KANJI string.
! A production version would have to handle general mixed
! CHARACTER and NCHARACTER strings.
! This is one means of constructing NCHAR constants,
! to use structure constructors would require the escape
! codes to be PUBLIC

CHARACTER *(*) CH
TYPE (NCHAR(*)), INTENT(OUT) :: LEFT

IF (MOD(LEN(CH),2)==1) STOP'NCHAR Conversion Error - Odd length'
CALL INIT (LEFT)
LEFT%VALUE = CH(ESCAPE_LEN+1:LEN(CH)-ESCAPE_LEN)
  ! let blank-pad or truncate

DO I = LEN(CH)-(2*ESCAPE_LEN)+1, LEN(LEFT%VALUE),2
   LEFT%VALUE (I:I+1)=NCHAR_BLANK ! blank-pad with Kanji blanks
END DO
END SUBROUTINE ASSIGN_CHAR_TO_NCHAR

SUBROUTINE ASSIGN_NCHAR (LEFT,RIGHT) ASSIGNMENT
! Assign one NCHAR to another
```

```
TYPE(NCHAR(*)), INTENT(IN) :: RIGHT
TYPE(NCHAR(*)), INTENT(OUT) :: LEFT

CALL INIT(LEFT)
LEFT%VALUE=RIGHT%VALUE

DO I = LEN(RIGHT%VALUE)+1, LEN(LEFT%VALUE), 2
   LEFT%VALUE (I:I+1) = NCHAR_BLANK
END DO
END SUBROUTINE ASSIGN_NCHAR

TYPE (NCHAR(STOP-START+1)) FUNTION NCHAR_SUBSTR &
   (STR, START, STOP) RESULT (RES)
! Take substring of NCHAR string
TYPE (NCHAR(*)), INTENT(IN) :: STR
INTEGER, INTENT(IN) :: START, STOP

CALL INIT(RES)
RES%VALUE = STR%VALUE((START-1)*2+1 : (STOP*2))
END FUNCTION NCHAR-SUBSTR

SUBROUTINE NCHAR_CHECK_READ (VALUE_READ)
TYPE (NCHAR(*)), INTENT(IN) :: VALUE_READ
! Check NCHAR input items after a READ for consistency

IF( ( VALUE_READ%START_ESCAPE<>START_ESCAPE_VAL) OR &
   (VALUE_READ%STOP_ESCAPE<>STOP_ESCAPE_VAL)) &
   STOP 'NCHAR READ Failed-escape code'
END SUBROUTINE NCHAR_CHECK_READ

TYPE (NCHAR(LEN(LEFT%VALUE) + LEN(RIGHT%VALUE)) &
   FUNCTION NCHAR_CONCAT(LEFT,RIGHT) &
   OPERATOR (//) RESULT(RES)
! Concatenate NCHAR strings
TYPE (NCHAR(*)), INTENT(IN) :: LEFT, RIGHT

CALL INIT(RES)
RES%VALUE = LEFT%VALUE // RIGHT%VALUE
END FUNCTION NCHAR_CONCAT

INTEGER FUNCTION LEN(VAL) RESULT (LENGTH)
TYPE (NCHAR(*)), INTENT(IN) :: VAL
! Overload of character LEN intrinsic functions
LENGTH = LEN(VAL%VALUE)/2
END FUNCTION LEN

INTEGER FUNCTION INDEX (STR, SUBSTR) RESULT (POSITION)
! Overload of CHARACTER INDEX intrinsic function
TYPE (NCHAR(*)), INTENT(IN) :: STR, SUBSTR
INTEGER OFFSET

POSITION = 1 ; OFFSET = 0

DO
   POSITION=INDEX(STR%VALUE(POSITION+OFFSET:), &
      SUBSTR%VALUE)
   IF (POSITION == 0) RETURN ! not found
   IF (MOD(POSITION+OFFSET,2) == 1) THEN ! correct position alignment
```

```
      POSITION = ((POSITION+OFFSET)/2)+1
      RETURN
    ELSE ! incorrect alignment, spurious match
      OFFSET=OFFSET+POSITION-1
      POSITION=1
    ENDIF
  END DO ! loop until found or verified absent
  END FUNCTION INDEX

  END MODULE NCHARACTER
```

(56c)

LIVERPOOL AGENDA

105(*)JKR-5c

	Monday	
2.	Opening business	Adams/Wagener
3	WG Liverpool resolutions	Martin/Ellis
	Tuesday	
4.	Minutes of meetings 103 & 104	Adams/
5	Standing document on membership	Wagener/
6.	Report on test methods	Johnson/Hendrickson
7.	Glossary	Metalf/Hoover
8.	Tutorial on pointers	Burch/Paul
	Wednesday	
9	X3J3 organisation	Adams/
10.	Multi-byte character sets	Harris/Matheny
11.	Unbuffered I/O	Burch/Matheny
	Thursday	
12	Multi-byte character sets (cont)	Burch/Matheny
	Friday	
13	Remarks from chair	Wagener/
14.	Subgroup heads reports	
15.	WG5 Liverpool resolutions	
16	Editorial document	Metalf
17	Glossary (cont)	Metcalf
18.	Derived-type I/O	Matheny
19.	Varying character module	Wagener/
20.	Exponent letter	Burch/
21.	Closing business	Wagener/
22	Other business	

(57)

Some Comments on X3J3/S8.104

M. K. Shen, Munich

26th July 1987

Prologue

The following comments deal only with editorial aspects of the document and are mostly quite trivial. The paper is thus not worth any discussion at the WG5 meeting. It is presented for being forwarded to the editors of the document for processing and for calling attention to the necessity of a timely and thorough editorial review of the document by WG5.

P.2-4. Under Sec.2.2.4 a subsection should be devoted to intrinsic procedure.

P.4-2, L30. "a variable or function result" should read "a variable, a constant or a function result".

P.4-3, L27-28. It is not apparent whether a processor is required to report any failure to satisfy the specified precision and exponent range of a program. If such failures are kept unknown to the applications, the usefulness of precision specifications of Fortran 8X will probably not be as great as it appears to be.

P.4-10, L17-18. These lines could be deleted without affecting the understandability of the example.

P.5-2, L22-24. The term "automatic data objects" is rather ill-chosen for designating the set of entities listed here. For the definition as given seems to imply that objects other than those listed here are not "automatic". However, "automatic", being first introduced by the PL/I language definition, is an already well-established qualifier. It refers to objects that "automatically" come into being upon invocation of an instance of a subprogram. In this sense "automatic data objects" should include all the "nonsaved data objects" referred to on P.12-11, L9 (cf. comment on that), e.g. a DO-variable which is an integer and which does not qualify as an automatic data object according to the definition given on L22-23.

P.5-13, L5-11 and P.5-14, L10-13. The two constraints probably could be formulated to have more resemblance to each other. Note, for example, that, while "function name" is used in the one, "procedures, function results" is used in the other.

P.6-3, L9-10. It is difficult to locate the constraints alluded to in the phrase " ..... only as an actual argument in certain procedure references". Is the phrase intended to refer to P.9-13, L26-27 and/or to some other places of the document? A few additional words may provide the clarification needed.

P.6-3, L17. "by the bounds" should read "by the declared bounds".

P.7-5, L46. "of x_1 and x_2" should read "of either x_1 or x_2 or both".

P.7-5, L50-51. It might be of value to add a sentence stating whether e.g. overloading of .EQ. implies overloading of ==.

P.7-7, L12-13. The semantic function of "max(p_1,p_2)" in the phrase "unspecifiable precision max(p_1,p_2) ....." appears to be questionable. For max(p_1,p_2) is a quantity and something unspecifiable is normally not quantifiable. Probably both occurences of "max(p_1,p_2)" should be deleted. It should be stated whether an unspecifiable precision and exponent range expression has a precision that is processor dependent or else is something totally undefined and therefore unusable.

P.7-9, L24. Does "same specification sequence" mean the sequence of the constituents of one and the same specification-part (R209)? The term "sequence" could be interpreted to have a larger encompassing range.

P.7-10, L23. "a subscript appears" probably should read "an array element appears".

P.7-10, L26-27. "a substring name" and "the substring expressions" probably should read "a substring" and "the substring range" respectively.

P.7-18, L9. "A" is probably preferable to "Any", the stress conveyed by "any" being unnecessary.

P.9-7. Add to Sec.9.3.4.5 : "This specifier may be omitted if the file is being connected for sequential access, in which case the default value is processor dependent". Note that in Fortran 77 RECL is not used for sequential access.

P.9-10, L42-43. The two constraints could be grouped together.

P.9-21, L2. "value of the maximal record length of the file" should read "value of the record length of the file if the file is connected for direct access and of the maximal record length of the file if the file is connected for sequential access".

P.9-21, L21-22. "If there is no connection" should read "If there is no connection or if the file is connected for direct access".

P.12-4, Sec.12.4. It might be of value to state whether an omitted actual argument could not alternatively be indicated by two consecutive commas.

P.12-5, Sec.12.4.1.1. Does the constraint stated by the phrase "except a character expression ....." on P.15-8, L19-22 of Fortran 77 remain effective in Fortran 8X? If so, it should be added here.

P.12-11, L8-9. Simply saying that there is an independent set of nonsaved data objects for each instance of an invoked subprogram does not seem to tell the reader precisely what are and what are not members of this set. More details should be given here, particularly in view of the fact that precise knowledge of this set is indispensable to writing recursive subprograms in Fortran 8X. (The set is complementary to the set referred to as "all other quantities" on L13. Cf. comment on that.)

P.12-11, L13. "All other entities, including saved data objects" should read, in order to be complete, "All other entities, which consist of objects that are accessed via use and host associations and objects that are saved".

P.12-11, Sec.12.5.2.5. Shouldn't anything of Sec.15.7.4 of Fortran 77 be carried over here? Can the execution flow of a function run through a contained ENTRY statement? If a function is recursive, can it call one of its contained ENTRYs?

P.12-13, L17-38. It appears that L17-19 is covered by P.12-12, L16-17 and therefore redundant. It seems to be of value to add here the material of Sec.15.9.3.6 of Fortran 77 (alternatively to replace L17-38).

P.14-8, L32-33. "cause an argument of the function or a variable in a module or in a common block to become defined" should read "cause an argument or a variable of the function to become defined". This is because there are other situations than "in a module or in a common block" that also apply.

P.14-9, L22-23. Both occurences of "a part of" should be deleted. "to become undefined" should read "to become undefined as an integer".

P.A-3 - P.A-6. The term "extended call" used in the figures is neither explained in the document nor commonly understood.

P.A-5, L3. Delete "(SD-3)" or else explain its meaning.

P.C-7, L2. "on unit 10" should read "on a unit".

P.C-7, Row "RECL=". "if direct access, record length; else undefined" should read "if direct access, record length; else maximal record length".

(5m)

Epilogue

This paper is the result of a virtually single-pass reading of the document. Owing to time limitations, P.10-1 - P.10-17, P.13-5 - P.13-48 and P.C18ff of the document have been skipped. No claim is made of justifiability of all comments contained herein, although it is believed that most of them are correct. Not being competent enough, the present writer did not venture to examine global editorial aspects of the document, such as, for example, the balance (with repect to information contents) of the individual chapters, the necessity of providing more detailed informations in certain critical sections in order to benefit those readers having no knowledge of programming language definitions other than that of Fortran 77, the need of better cross-referencing, etc.

The main objective of the paper is to serve (indirectly) as a means of suggesting a collective grand effort by all WG5 members to render the document more complete, less error-prone, more informative and, above all, more easily understandable to the average reader (practicing Fortran programmers who are ambitious enough to fully master the language). Such an undertaking is admittedly fairly difficult but is on the other hand badly needed, now that Fortran 8X is (hopefully) closely approaching its destination. In this connection, the present writer takes the liberty to further suggest that all currently open major/minor issues of Fortran 8X, with corresponding efforts, be settled within the current year, since a further material prolongation of the standardisation process, while leading possibly to a better language, would inevitably reduce the total net benefit that the standard is going to provide to the Fortran community. He sincerely wishes therefore every success to the Liverpool meeting, which he is unfortunately unable to attend owing to matters unforeseen, and looks forward to the great pleasure of being able to put up the equality X=8 by the time of the Paris meeting next year.

Addendum

P.12-11, Sec.12.5.2.4. In order to avoid possible misunderstandings of uncareful readers of the document, it seems to be of value to clearly state the fact that in recursive calls of a subprogram the "nonsaved data objects" (L9) of an instance of the subprogram retain, upon re-entrance, the values they had when that instance was last left, while the same cannot be claimed of the "saved data objects" (L13) because these are common to all instances of the subprogram. We have here namely something that is in a sense paradoxical: in recursive calls of a subprogram the values of the "nonsaved data objects" are in fact "saved" while the values of the "saved data objects" are not "saved" but merely "passed" from one instance of the subprogram to the other.

(58)

An Explanation of the Draft Japanese Industrial Standard on "Programming Language FORTRAN with Extended Character Type"

Fortran Working Group of
Japanese National Committee for ISO/TC 97/SC 22

July 29th, 1987

Introduction

This document gives an explanation of a draft Japanese Industrial Standard that is to extend JIS X 3001–1982, the translation of ISO 1539 (Fortran 77), to have capability of processing multiple byte characters. The draft was prepared under a commission from JISC (Japanese Industrial Standards Committee) in 1985–86.

The draft was completed except the forms of *type-declaration statements*, *character constants* and *edit-descriptors* for the multiple byte character type. In order to have their forms harmonized with Fortran 8X's, the draft is still on pending to deliberate on JISC to be JIS standard. We believe that the facility of multiple byte character should be included in 8X and its specification should be same between ISO and JIS. So we would appreciate it if ISO and ANSI X3J3 adopt our proposal for the above forms in earlier stage.

To clarify the changes from JIS X 3001–1982, the draft refers to the sections or subsections of the original standard in unchanged sections/subsections. For a changed subsection no matter how small the change is, all sentences of the subsection is expressed, and the modified or inserted lines are marked by vertical bars at the side of paper. The form of the type-declaration statement for the multiple byte character type is not fixed through the draft and differs in part by part. In many parts it appears as NCHARACTER statement.

For the important sections, their brief translations into English is given below preceded by the section numbers of the draft, i.e. the numbers of ISO 1539.

1.1 Purpose

This draft is an extension of JIS X 3001–1982 (Programming Language FORTRAN) to specify the form of program using two kinds of character data and to give interpretation of it.

The extension described in this draft is limited to introduce a new data type to be called "2nd kind of character type" and to append the language specification accompanying it. The character type that is provided in JIS X 3001–1982 is called as "1st kind of character type" in this draft, and the gathering of both 1st and 2nd kind of character types may simply be called as "character type."

2.13 Storage

A character storage unit is either a *1st kind of character storage unit* or a *2nd kind of character storage unit.*

This draft does not specify neither a relationship between a numerical storage unit and a character storage unit, nor a relationship between a 1st kind of character storage unit and a 2nd kind of character storage unit.

4.8 Character Type

A datum of 1st kind of character type is a string of 1st kind of characters, and a datum of 2nd kind of character type is a string of 2nd kind of characters. The characters of a string as a character datum should be of the same kind of character type, i.e. either the 1st kind of characters or the 2nd kind of characters.

4.8.1 Character Constant

A character constant is either a 1st kind of character constant or a 2nd kind of character constant. ..... The form of a 2nd kind of character constant is an NC, followed by a delimiting apostrophe, followed by a nonempty string of 2nd kind of characters, followed by a delimiting apostrophe. The string of the 2nd kind of characters may consist of any 2nd kind of characters capable of representation in the processor.

6.2.2 Form and Interpretation of Character Expressions

A character expression and the operands of a character expression must identify values of type character. Operands of a concatenation operator should both be of 1st kind of character type or both be of 2nd kind of character type. The type of the result of a concatenation operation is the same as the type of operands.

6.3.4 Character Relational Expression

Operands of a character relational operator should both be of 1st kind of character type or both be of 2nd kind of character type.

8.4.2 CHARACTER and NCHARACTER Type-Statements

The form of a CHARACTER or an NCHARACTER type-statement is:

typ [* *len*[,]] *nam*[,*nam*]...

where *typ* is either CHARACTER or NCHARACTER.

CHARACTER specifies the 1st kind of character type, and NCHARACTER specifies the 2nd kind of character type.

12.1.1 Formatted Record

A formatted record consists of a sequence of characters that are capable of representation in the processor. The length of a formatted records is measured in characters and depends primarily on the number of characters put into the record when it is written. However, the strings of 2nd kind of characters are measured in 1st kind of characters when they are included in a formatted

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record. The way to convert the number of 2nd kind of characters into the number of 1st kind of characters may depend on the processor.

Remark: A record may consists of both 1st and 2nd kinds of characters.

12.2.5.2 Internal File Restrictions

(3) The character variables, character array elements, character arrays and substrings of an internal file must be of the 1st kind of character type.

13.2.1 Edit Descriptors

An edit descriptor is either a repeatable edit descriptor or a nonrepeatable edit descriptor.

The forms of a repeatable edit descriptor are:

⋮
A
A*w*
N
N*w*

The forms of a nonrepeatable edit descriptor are:

'$h_1h_2\cdots h_n$' (Apostrophe edit descriptor)
nH$h_1h_2\cdots h_n$' (H edit descriptor)
NC'$a_1a_2\cdots a_n$' (NC edit descriptor)
⋮

where

h is one of the 1st kind of characters capable of representation by the processor

a is one of the 2nd kind of characters capable of representation by the processor

< Example Program >

```
000010        1     C
000020        2     C     日本語機能のテスト
000030        3     C
000040        4           NCHARACTER AAA*10 , BBB*5 , CCC*5 , FUNC*5 , ARY(5)
000050        5     C
000060        6           DATA AAA / NC'日本語機能のテスト' /
000070        7           DATA ARY / NC'ら',NC'り',NC'る',NC'れ',NC'ろ' /
000080        8     C
000090        9           WRITE ( 6 ,'( 1H ,N / )' ) AAA
000100       10     C
000110       11           CCC= NC'あいうえお'
000120       12           WRITE ( 6 ,'( 1H ,N )' ) CCC
000130       13     C
000140       14           AAA = NC'か'//NC'き'//NC'く'//NC'け'//NC'こ'
000150       15           WRITE ( 6 ,'( 1H ,N )' ) AAA
000160       16     C
000170       17           WRITE ( 6 ,'( 1H ,N )' ) NC'さしすせそ'
000180       18     C
000190       19           WRITE ( 6 , 100 )
000200       20       100 FORMAT ( 1H ,NC'たちつてと' )
000210       21     C
000220       22           WRITE ( 6 ,'( 1H ,N)' ) FUNC()
000230       23     C
000240       24           CALL SUB(BBB)
000250       25           WRITE ( 6 ,'( 1H ,N )' ) BBB
000260       26     C
000270       27           CALL ENT(BBB,NC'ま')
000280       28           WRITE ( 6 ,'( 1H ,N )' ) BBB
000290       29     C
000300       30           CALL ENT(BBB,NC'や')
000310       31           WRITE ( 6 ,'( 1H ,N )' ) BBB
000320       32     C
000330       33           WRITE ( 6 ,'( 1H ,5N1 )' ) ARY
000340       34     C
000350       35           CCC(1:1)=NC'わ'
000360       36           WRITE ( 6 ,'( 1H ,N5 / 1H ,N2 )' ) CCC,NC'ん'
000370       37     C
000380       38           STOP
000390       39           END

000400        1           FUNCTION FUNC()
000410        2     C
000420        3           NCHARACTER FUNC*(*)
000430        4     C
000440        5           FUNC=NC'なにぬねの'
000450        6     C
000460        7           RETURN
000470        8           END

000480        1           SUBROUTINE SUB(XXX)
000490        2     C
000500        3           NCHARACTER*(*) XXX,YYY
000510        4     C
000520        5           XXX=NC'はひふへほ'
000530        6     C
000540        7           RETURN
000550        8     C
000560        9           ENTRY ENT(XXX,YYY)
000570       10     C
000580       11           IF (YYY.EQ.NC'ま') THEN
000590       12              XXX=NC'まみむめも'
000600       13           ELSE
000610       14              XXX=NC'やいゆえよ'
000620       15           END IF
000630       16     C
000640       17           RETURN
000650       18           END
```

< Result >

日本語機能のテスト

あいうえお
かきくけこ
さしすせそ
たちつてと
なにぬねの
はひふへほ
まみむめも
やいゆえよ
らりるれろ
わいうえお
をん

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Summary of Meeting of

ISO/TC97/SC22/WG5

August 3-7, 1987

University of Liverpool

Tutorial on Kanji support in Fortran

References: Distribution items: 15 (JCA-15), 25 (JHM-02), 45 (JCW-3), 47, 49, 55 (105(16)CDB-5), 58

The references above cover most of the background information needed to understand the various aspects of Kanji support. Here, I give an outline of the major relevant topics, and a summary of the potential X3J3 actions.

I. Data Representations
- A) Kanji characters
  - 1) Words rather than sounds
  - 2) Several subsets defined
    - a) Katakana
    - b) Hirigana
    - c) ~3000 character minimal set code (Level 1)
    - d) ~7000 character expanded set (Level 2)
    - e) Chinese basic set - 6763 characters
    - f) ~10000 IBM PC set
    - g) ~50000 IBM 370 set
  - 3) Widely literate population, ~100 million Japanese
    About 8,000 Kanji in wide usage
  - 4) Representative of several far eastern languages, esp. Chinese (1 billion)
  - 5) Romanji - Roman letter version of words - phonetic
    Mostly used OUTSIDE Japan - TOK-YO
- B) Mapping to Binary
  - 1) All must use at least 16 bits per Kanji character; DEC calls any such set, T2
    - a) Twice as much storage for each character
    - b) 1/2 storage capacity & transmission bandwidth
    - c) Each Kanji conveys more meaning than each ASCII character, so aggregate bandwidth probably equivalent to ASCII messages
    - d) Multiple sets in current use
      - i) JIS standard
      - ii) IBM 370 set
      - iii) IBM PC set - interesting - only 10,000 Kanji - each character is 1 byte of shift code & 1 byte of specifier
    - e) ISO standard under development - "Two-Octet"
      Different definitions for different languages - Japanese, Korean, Chinese etc.
  - 2) Why not go to 4 bytes/character and solve all problems? 4 ?
    DEC calls T4 Nobody working on.

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I. B) 3) Mixed ASCII and Kanji in the same string
  a) Shift Method A|A|A|SI|K|K|K|K|SO|A|A|A...
  b) Mixed Code - clever - IBM PC A|A|A|KS|K|KS|K|A|A|A...
  c) Much more efficient for storage and transmission
    than pure, fixed width codes
  d) Generally less convenient for processing than fixed width codes
    Cannot reliably substring w/o forward scan
    Cannot count print positions without aligning strings
    (Except in PC code! The KS|K characters are 2 print positions wide! # of bytes = # of positions Also allows double width ASCII)

II. Language Processing of Kanji data — without Kanji in source
  A) No existing programming language is particularly well suited to processing any T2, T4, or mixed code. Thus the attempt to retrofit support onto existing popular languages. Desirable to use well known languages, COBOL, FORTRAN, to take advantage of existing processors and expertise.
  B) Use of existing Text types for processing Kanji data
    Fortran CHARACTER — possible but inconvenient
      1) Lengths are always wrong
      2) With mixed codes - chance of cutting a Kanji in half and getting gibberish
        Substrings impossible without scanning
      3) Any "Kanji Module" must use this as a basis
      4) No opportunity for optimization
  C) New type "NCHARACTER name, ..." (national, nippon)
      1) Each position is two bytes
      2) New format code Nw - reads or writes w Kanji characters
      3) Widely implemented in Japan today
      4) JEIDA
      5) Can't store shift or mixed codes, pure T2 only
      6) Otherwise very like CHARACTER - arguments, substring, functions //
      7) Possibility for optimization and hardware support
      8) Different encodings in same variable if programmer keeps track
        - Flexible but requires programmer to work - typed variant records would help
      9) Example application "street address" field in account record of Japanese bank

II. D) New set of intrinsic types "CHARACTER (KIND=n) name, ..."
1) ASCII=1, KANJI=2 - is the intent - like "Generalized Real"
2) Like NCHARACTER, essentially, but superficially more extensible
To define a new type - define a new "kind" value
3) Idea is that any given "kind" will map only one encoding
4) Multiple encodings available in a single program - but awkward to use
Translation is the only envisioned application that uses this feature
5) Still doesn't handle mixed codes
6) Japanese Delegation proposal for representing Kanji

III. Kanji in Source - Big Step!
A) Requires definitions of Kanji codes as Fortran source components (T2 possible Mixed in use)
B) Motivation - Gives programmers the ability to write standard conforming programs, meaningful to them, without learning English
C) Components:
1) Kanji literals - defacto: NC 'kanji' - when mixed code source available
" " " " " " " "
When using CHARACTER 'kanji'
2) Kanji comments - to allow programmers to understand programs in their own language
3) Kanji variable names - same reason
4) Not Kanji keywords! Makes programs very unportable!
D) Several current implementations - Most have 1&2, some COBOLs have 3
E) Methods
1) I/O Driver translates - several problems - accidental quotes
2) Real compiler support - not too hard, actually

IV. X3J3 Actions
A) Nothing - pros & cons
1) No worse than [illegible] innovation & defacto standardization
2) Delay will allow ISO standardization of Two Octet - standard code to use in source
3) Portability will suffer
B) Kanji Module - can be done using F8X
1) Can encapsulate minimal ease-of-use veneer over raw Fortran 8X
2) Obviously helps data processing problem only - not Kanji in source
3) Is it worthwhile? Not competitive. Native Kanji easier than MODULE/USE!
C) Standardize NCHARACTER (not Japanese recommendation)
1) Best choice as defacto standard
2) Existing usage depends on specific encodings - mixed codes in source, T2 in data
3) Not extensible - T4 needs another new type

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~~IV~~. D) Standardize "CHARACTER*(kind=n)"

1) Current Japanese Delegation recommendation
2) Current proposal doesn't address Kanji in source
3) Not obviously better than NCHARACTER - extensibility is only marginally better; applicability is the same
4) Standardization of kinds beyond ASCII & Kanji?
5) Potentially extensible to T4 without much syntax change
6) Doesn't deal with mixed codes any better than NCHARACTER

E) Development beyond NCHARACTER or "Kind=n" methods

1) A type for mixed codes in data?
2) More general than previous attempts?
3) Could solve some problems permanently
4) Difficult and hard to manage - X3J3 has little expertise
5) Most of current X3J3 has no vested interest in standardizing Kanji
6) Potentially dependent on ISO 2-octet for source character set

12 August, 1987 105(4) MBM-1

To: X3J3

From: Editorial Committee

Subject: Edits to S8

It has been proposed that Lloyd maintain a file of all the edits to S8 which originate from members of X3J3. These can be processed efficiently by the Editorial Committee, and accepted by X3J3 in a single block. The following list is the result of collecting together a few known corrections, and of making a thorough examination of two 'randomly' selected pages.

	Page	Line	
1.	ii	32-33	Delete sentence beginning on ~~that~~ line 32.
2.	5-1	39	Set 'char-length' in italics.

4. 6-2 27+ Add: 'Constraint: If parent-structure is an array, the component must not be an array.'

35 Delete ', but not both'.

[N.B. This restriction is currently stated indirectly]

5. 6-10 20 Delete 'or arrays'; change 'the' to 'a'.

6. 7-8 24-26 Move the words 'a scalar integer expression whose primaries are' to appear after '(1)'.

24 to 32 replace "Integer" with "integer" and adjust capitol appropriately

7-8 31-32 = idem =

7. 7-8 46 ~~Delete~~ } replace "precisim" with "effective-precision"
7-9 6 ~~Delete~~ }

8. 8-~~2~~ 1 Replace 'include' by 'are'.
8-1 6 Replace 'may be' by 'are'.
8-1 3 Replace 'may be used to alter' by 'determine'.

9. 8-5 32 Delete second 'default'.
35 Delete 'default'.

10. 8-8 24 Add 'body' after 'The loop'
25 repeat above except ~~make~~ "The loop") "the loop"
11. 8-8 47 to 8-9 13 Set in ~~deprecated~~ font. Obsolescent
12. 12-2 38 Replace '.' by '(functions only)'.

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TO: X3J3

FROM: Leo ter Haar

SUBJECT: Usage of exponent letter for definition of real type

YAPGREL

Yet another proposal to get rid of Exponent letter

1. Keep (almost) the same syntax of the exponent_letter_statement but give it a wider functionality, more specifically.

   Replace the EXPONENT LETTER statement by a precision_letter_statement of the form

   PRECISION LETTER precision_selector precision_letter

   precision_letter = letter
   Constraint: other than E, D or H

2. Replace precision selector in type_spec (R502) by (precision_letter)

   Hence the real and complex type specification will read

   REAL {(precision_letter)}
   COMPLEX{(precision_letter)}

Advantages

1. Precision and exponent range only indicated once, namely in the precision letter statement, hence less error prone to programmers!

2. We can get rid of asterisks in passed on precision.

NOTE:
```
REAL(E) = REAL
REAL(D) = DOUBLE PRECISION
REAL(H) = ???
```

Example: Write a precision in dependent function

```
f(x) = 1.3 if X<1.3
     = 1.7 if X>1.7
     = x otherwise
```

Solution

```
FUNCTION f(x)
PRECISION LETTER(EFFECTIVE_PRECISION(x),
  EFFECTIVE_EXPONENT_RANGE(x) P
REAL (P) f,x

f = MIN(1.7PO,MAX(x,1.3PO))
END
```

Consequence

PRECISION LETTER is part of interface!!

Alternative Solution

```
FUNCTION f(X)
PRECISION LETTER (*,*)P
REAL(P) f,X
etc.
```

Derived type

I have some difficulties with derived type. Exponent letter used as dummy parameter name looks very straightforward e.g.

```
TYPE MATRIX (my_exp_letter,order)
   REAL(my_exp_letter) A (order,order)
END TYPE MATRIX
```

An advantage of this approach is that there is no need for the constraints as mentioned in 4.6.

but what would the following mean?

```
TYPE MATRIX (order)
   PRECISION LETTER (10,50)M
   REAL (M) A (order,order)
END TYPE MATRIX
```

What is the scope of M?

End proposal.

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Comments on Fortran 8X Kanji proposal

1. Attention of the Fortran Experts is drawn to some International Standards which must be considered when determining the means of identification of character sets. (In particular, ad hoc references to a'Kanji Standard are a big mistake.) Standards of importance are:

a) the "International Register of Coded Characters Sets to be used with Escape Sequences", established under ISO 2375 and administered by ECMA, provides a registration of all internationally known character sets (including Kanji , Chinese, Urdu, etc); this forms the base reference which should be used in the "KIND =" statement for identifying both printing characters and control codes, together with their internationally agreed encodings;

NOTE - A typical application requirement would encompass a number of register entries to form the definition of a FORTRAN datatype.

b) ISO 8824 and ISO 8825 "Abstract Syntax Notation One" (ASN.1) which provides a means of referencing useful collections of register entries by a single numerical code (the so-called "Universal tag" for the character set).

2. The problems to be faced by Fortran (e.g. what is the invocation, designation, and shift state at the start of each CHARACTER variable, are escape sequences allowed within the variable, do length counts represent printing characters or do they include escape and shift sequences, etc) are the same as those faced by ASN.1 in handling character sets, and cross-discussion is important.

3. It is important to distinguish clearly between the means of specifying the character set requirements of a programme and the requirements placed on a Standard-conforming implementation to support particular character sets. In this connection, the meaning of "support" for a character set needs very careful consideration (ISO 8632 has some text here which is worth review).

4. This broadening of Fortran to formally encompass other character sets is welcomed, but the area is a difficult one, and existing International Standards and the experiences of others need taking full account of.

Professor J Larmouth
Director
IT Institute

```
WRITE(6, '( 1H ,' // NCHAR_FMT // ')') BBB

CALL ENT (BBB, NCHAR (1)(START_ESCAPE_VAL, 'Æ',
     STOP_ESCAPE_VAL))

WRITE <as above> BBB

<same as 2 previous lines>

WRITE (6, '( 1H ,5' // NCHAR_FMT // ' )') ARY

CALL ASSIGN_NCHAR_TO_NC_SUBSTR &  ! omitted from module
   CCC, 1, 1, 'Ł')

WRITE (6, '(1H ,' // NCHAR_FMT // '1H , ' // &
   NCHAR_FMT // ')' ) CCC , NCHAR(2) (START_ESC,
     'ĳŁ', STOP_ESCAPE_VAL)

STOP
END
```

<<< Fragments >>>

substring :

```
AAA = BBB(2:3)    ! NCHARACTER
AAA = NCHAR_SUBSTR(BBB, 2, 3)   ! NCHAR
```

IF statement - use overload of .EQ., not written

```
IF (YYY .EQ. NC'Æ') THEN! NCHARACTER
IF (YYY .EQ. NCHAR(1)(START_ESCAPE_VAL, &
     'Æ', STOP_ESCAPE_VAL)) THEN  ! NCHAR
```

```
      TYPE (NCHAR (10)) :: AAA
      TYPE (NCHAR (5)) :: BBB, CCC, FUNC
      TYPE (NCHAR(1)) :: ARY(5)
C
      DATA AAA / NCHAR(START_ESCAPE_VAL, &
     1 '日本――――', STOP_ESCAPE_VAL) /

      DATA ARY / &
          NCHAR(1)(START_ESCAPE_VAL, 'あ', STOP_ESCAPE_VAL), &
          NCHAR(1)(START_ESCAPE_VAL, 'い', STOP_ESCAPE_VAL), &
          NCHAR(1)(START_ESAPE_VAL, 'う', STOP_ESCAPE_VAL), &
          NCHAR(1)(START_ESCAPE_VAL, 'え', STOP_ESCAPE_VAL), &
          NCHAR(1)(START_ESCAPE_VAL, 'お', STOP_ESCAPE_VAL) /

      WRITE (6, '(1H, ' // NCHAR_FMT // '/)') AAA

      CCC = 'かきくけこ'
      WRITE (6, '(1H, ' // NCHAR_FMT // '/)') CCC
      WRITE  <as above> CCC
      AAA = 'さし' // '主' // 'く' // 'すす' // 'そ'
      WRITE (6, '(1H, ' // NCHAR_FMT // '/)') AAA
      WRITE <as above> AAA
      WRITE (6, '(1H, ' // NCHAR_FMT // '/)') &
            NCHAR(START_ESCAPE_VAL, 'おしすせそ', STOP_ESCAPE_VAL)

      WRITE (6, 100)
100   FORMAT (1H, 'たちつてと')
      WRITE (6, '(1H, ' // NCHAR_FMT // '/)') FUNC()
```

Bit Processing

Requirements

- provide efficient masking for array operations
- provide bit array processing

Options

- reinstate the BIT data type from appendix F
- parameterize LOGICAL to allow single bit objects
- provide a BIT module (not discussed here)
- other (e.g., a true bit string data type)

Reinstate BIT Data Type

Advantages

- facility well-defined, details already worked out
- extensible to a bit string facility (e.g., analogous to CHAR)
- allows <, > comparison

Disadvantages

- some work to integrate into SB
  (e.g., BIT not allowed in DATA statement)
- functionality is essentially redundant to LOGICAL
- LOGICAL operators duplicated with different spellings
- LOGICAL/BIT same paradigm as REAL/DOUBLEPRECISION and CHARACTER/NCHARACTER

Parameterize LOGICAL

Advantages

- minimizes undesirable redundancy
- provides all of the required functionality
- very easy to integrate into SB
  7 changes in section 13
  15 changes in rest of SB
- same paradigm as REAL with specified precision
  CHARACTER with specified kind

Disadvantages

- <, > comparison, if needed, must be defined
- multiple type parameter values may be "overkill"

Principal Features of Parameterised LOGICAL

① LOGICAL [kind-selector] LOGICAL(1) B1, B2
- default logical
- logical with specified type parameter

② LOGICAL with specified type parameter is non storage associated, with processor dependent storage units (may be 1 bit) - only default logical may appear in a storage association context.

③ Processor must support default logical and at least specified type parameter of 1.

④ Logical objects having different type parameter values may be arbitrarily mixed in assignment and expressions.

⑤ value true denoted by .TRUE., B'1', B"1"

value false denoted by .FALSE, B'0', B"0"

.TRUE., .FALSE. have default logical type parameter value
B'1', B'0' (and B"1", B"0") have type parameter value 1

```
B3 = .FALSE.
B3(K,:) = B2 .and. B'1'
```

⑥ disallow * type parameter value
(restriction, could be removed in future if there is need)

⑦ I/O uses L edit descriptor:

- allowed on input: T, F, .TRUE., .FALSE., 1, 0, B'1', B'0', B"1", B"0
- output generated: T or F for default logical
  1 or 0 for logical with specified type

Features, continued

- Intrinsic functions:

LOGICAL(L, MOLD)	Convert between logicals (like LBIT & BITL)
INTEGER_TO_LOGICAL(I, SIZE, RL)	Convert integer to logical array (BITLR & BITRL)
LOGICAL_TO_INTEGER(L, RL)	Convert logical array to integer (IBITLR & IBITRL)
KIND(L)	Kind type parameter value inquiry
MAXLOGICALS(I)	Maximum logical array length for conversion (MAXBITS)

Logical B
Logical(1) C

CALL SUB(B)
SUB(C)

Straw Vote: Should this appear as a proposal at meeting 106?