

EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

ECMA

MEMENTO 1991

# ECMA

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## MEMENTO 1991

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## Introduction

By 1959 the growing use of computers, built by several different manufacturers, showed the necessity for standardization in operational techniques, such as programming, and also input and output codes. Such standards would make it possible to use data prepared for, or even by, a computer made by one manufacturer to be used on a computer made by another with the minimum of alteration. Also it would avoid duplication of work in the preparation of, for example, programming languages by several manufacturers.

Though certain National bodies had, before 1960, started work on standards in this field, e.g. paper tape and codes, there did not appear to be collaboration between them, nor between the manufacturers themselves. Different countries may have different requirements, so that it may not be necessary to have the same standards everywhere, but the standards should at least be compatible.

With the object of co-ordinating such work, the Heads of the Companies of longest standing in Europe in the data processing field (Compagnie des Machines Bull, IBM World Trade Europe Corporation and International Computers and Tabulators Limited) sent a joint letter to all the known computer manufacturers within Europe, inviting these companies to send representatives to a meeting. This meeting was held on April 27, 1960, in Brussels; it was decided that an association of manufacturers should be formed which would be called European Computer Manufacturers Association, and a Committee was nominated to prepare the formation of the Association and to draw up By-Laws and Rules.

By December 1960 the form that the Association would take was fairly well defined and it had been decided that the headquarters should be in Geneva to be near the headquarters of the International Organization for Standardization and the International Electrotechnical Commission. In May 1961 the Association officially came into being and all those Companies which attended the original meeting became members.

Just prior to the official registration of ECMA, it was invited to be represented at a Round-Table Conference to be held in Geneva organized by ISO and IEC to discuss standardization in the general field of computers. This meeting resulted in the formation of TC97 and in the organization of its own Working Groups, and ECMA was asked to become a liaison member.

## Purpose

The aims of the Association will be clear from the following extract from the By-Laws:

To study and develop, in co-operation with the appropriate national and international organizations, as a scientific endeavour and in the general interest, methods and procedures in order to facilitate and standardize the use of data processing systems.

To promulgate various standards applicable to the functional design and use of data processing equipment.

The Association shall be a non-profit-making organization and shall devote itself to no commercial activity whatsoever.

## Membership

The Association shall consist of ordinary and associate members and such other classes of members as may be created by the ordinary members at a General Assembly.

Ordinary members shall be companies which in Europe develop, manufacture and market data processing machines or groups of machines used to process digital information for business, scientific, control or other similar purposes. Data processing machines used exclusively for military purposes shall not be considered to be included in the above machines.

## Promulgation of Standards

Promulgation of standards by the Association shall require approval by at least two-thirds of all the ordinary members.

It is not obligatory for members to follow any standard.

ECMA Standards (see page 86) are made available without restriction to all interested parties. Indeed, the proposals are also intended to be drafts to be considered by other organizations, e.g. ISO, IEC, CCITT and the National Standards Organizations.

## Officers

### Management

President  
**Mr. G. Haberzettl**  
(Siemens Nixdorf)

Vice-President  
**Mr. W. Brodbeck**  
(IBM)

Treasurer  
**Mr. D. Gann**  
(HP)

### Executives

Secretary General  
**Mr. D. Hekimi**  
Deputy Secretary General  
**Mr. J. van den Beld**  
Senior Technical Officer  
**Mr. L. Lauri**  
Technical Officer  
**Mr. C. Brockway**

## Office

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## Past Presidents

|           |                          |           |           |                       |            |
|-----------|--------------------------|-----------|-----------|-----------------------|------------|
| 1961-1962 | Mr. C. G. Holland-Martin | (ICT)     | 1976-1977 | Mr. W. Heimann        | (Siemens)  |
| 1963-1964 | Prof. Dr. J. Engelfriet  | (EL)      | 1978-1979 | Mr. M. H. Johnson     | (Ferranti) |
| 1965-1966 | Mr. M. R. Pedretti       | (IBM)     | 1980-1981 | Mr. J. van Eybergen   | (Philips)  |
| 1967-1968 | Dr. J. M. M. Pinkerton   | (ICL)     | 1982-1983 | Mr. H. Feissel        | (Cii HB)   |
| 1969-1970 | Mr. P. J. Davous         | (Bull)    | 1984-1985 | Mr. J. Scherpenhuizen | (Digital)  |
| 1971-1972 | Dr. K. Scheidhauer       | (AEG-Tfk) | 1986-1987 | Mr. C. Rossetti       | (STET)     |
| 1973-1974 | Dr. J. M. M. Pinkerton   | (ICL)     | 1988-1989 | Mr. J. Dubos          | (Bull)     |
| 1975      | Mr. J. van Eybergen      | (Philips) | 1990      | Mr. J. van den Beld   | (Philips)  |

## Ordinary Members

**ALCATEL NV,**  
33, rue Emeriau  
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**APPLE Computer International**  
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**Compaq Computer GmbH**  
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**Toshiba Europa (I.E.) GmbH**  
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## Associate Members

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### **Kao Corporation GmbH**

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### **Panasonic Deutschland GmbH**

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### **Racal Electronic plc**

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### **Storage Technology Corporation**

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### **Sun Microsystems Europe**

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### **3M Italia S.p.A.**

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I-81100 CASERTA,  
Italy

### **Xidex (UK) Ltd.**

Magnetic Media Operations  
BRYNMAWR, NP3 4YA  
United Kingdom

## Other Organizations

Participation in the technical work of ECMA is open to experts from organizations not qualifying for membership, e.g. national institutes or user organizations (Art. 7.2 of the Rules). Such experts are considered as full members of the Technical Committees and as such, will be exercising voting rights.

Presently the following experts are participating in the work of ECMA.

### **Mr. W. F. Bohn**

Universität Hannover  
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### **Mr. C. Bormann**

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### **Dr. U. Kelter**

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### **Mr. I. MacMillan**

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### **Mr. F. Richard**

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### **Dr. H. J. Schroeder**

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## General Assembly

### SCOPE :

The General Assembly is the highest authority of the Association. It controls the Association and appoints and controls its Management.

|               |                                      |                  |                                       |
|---------------|--------------------------------------|------------------|---------------------------------------|
| Alcatel       | Mr. G. Robin                         | NEC              | Mr. K. Suzuki                         |
| Anacomp-Xidex | Mr. G. Baumeister                    | Nokia            | Mr. K. Lång                           |
| Apple         | Mr. S. Ettles                        | Northern Telecom | Mr. K. Baughan                        |
| Ascom Hasler  | Dr. G. Mityko                        | Océ-Nederland    | Mr. M. C. Koning                      |
| AT&T          | Mr. H. V. Bertine                    | Olivetti         | Mr. J. Lomas                          |
| BASF          | Mr. P. Felleisen                     | Panasonic        | Mr. M. Kurashina                      |
| BT            | Dr. P. A. Trudgett                   | Philips          | Mr. H. C. de Ruyter van Steveninck    |
| Bull          | Mr. C. Hamon<br>alt. Mr. A. Le Maout | Prime            | Mr. T. Wallace                        |
| Compaq        | Mr. Ch. Gintz                        | Racal Milgo      | Mr. J. H. Boal                        |
| Data General  | Mrs. N. K. Araway                    | Rank Xerox       | Mr. T. Wentholt                       |
| Digital       | Mr. J. Scherpenhuizen                | RPS              | Mr. J. L. Jobart                      |
| Dowty         | Mr. J. Moughton                      | Siemens Nixdorf  | Mr. G. Habertzettl                    |
| DZU/NIMOS     | Mr. P. Popov                         | Sony             | Dr. D. J. Hildebrand                  |
| Ericsson      | Mr. B. O. Malmberg                   | Storage Tek      | Mr. S. D. Cheatham                    |
| Exabyte       | Mr. G. K. Fukumoto                   | Sun              | Mr. P. Musson                         |
| Ferranti      | Mr. J. S. Baldwin                    | Tandem           | Mr. J. W. Smith                       |
| GPT           | Mr. D. L. Thomas                     | Telenorma        | Mr. J. G. Schosnig                    |
| Hoechst       | Dr. H. Hülsing                       | Televerket       | Mr. S. Fransson                       |
| HP            | Mr. D. Gann                          | Thomson-CSF      | Mr. F. Levieux                        |
| IBM           | Mr. W. Brodbeck                      | 3M               | Dr. C. Bruschini                      |
| ICL           | Mr. B. G. Millis                     | Toshiba          | Mr. M. Sokat                          |
| JVC           | Mr. M. Kawatsu                       | Unisys           | Mr. R. S. Ferguson                    |
| Kao           | Mr. K. Kasutani                      | Wang             | Mr. J. B. Fenn<br>alt. Mr. J. L. Hill |
| Kodak         | Mr. P. R. Ashe                       |                  |                                       |
| Maxell        | Mr. M. Morita                        |                  |                                       |
| Mitsubishi    | Mr. T. Goto                          |                  |                                       |
| NCR           | Mr. S. Statt                         |                  |                                       |

## Co-Ordinating Committee

### SCOPE :

To draw up Terms of Reference for the Technical Committees and to co-ordinate their activities. To make recommendations regarding the formation or the disbandment of Technical Committees.

Chairman : Mr. J. Scherpenhuizen (Digital)  
MEMBERS : Mr. C. Hamon (Bull)  
Mr. B. O. Malmberg (Ericsson)  
Mr. G. Robin (Alcatel)  
Mr. S. Statt (NCR)  
Dr. P. Trudgett (British Telecom)

## Technical Committees

### Committees having accomplished their task

|                                       |       |
|---------------------------------------|-------|
| General Programming Languages         | TC 2  |
| Problem Analysis and Flow Charting    | TC 3  |
| Optical Character Recognition         | TC 4  |
| ALGOL                                 | TC 5  |
| COBOL                                 | TC 6  |
| Magnetic Ink Character Recognition    | TC 7  |
| FORTRAN                               | TC 8  |
| Data Transmission                     | TC 9  |
| PL/1                                  | TC 10 |
| Numerical Control                     | TC 11 |
| Keyboards                             | TC 13 |
| Paper Sizes                           | TC 14 |
| Labelling and File Structure          | TC 15 |
| Rigid Magnetic Disks                  | TC 16 |
| I/O Interface                         | TC 18 |
| BASIC                                 | TC 21 |
| Open Systems Interconnection          | TC 23 |
| Communications Protocols              | TC 24 |
| Data Networks                         | TC 25 |
| Ada                                   | TC 27 |
| Ergonomics of Work Stations           | TC 28 |
| SCSI Small Computer Systems Interface | TC 30 |

## Technical Committees

### Active committees

|                                                     |       |
|-----------------------------------------------------|-------|
| Codes                                               | TC 1  |
| Product Safety                                      | TC 12 |
| Magnetic Tapes and Tape Cartridges                  | TC 17 |
| Flexible Disk Cartridges                            | TC 19 |
| Electromagnetic Compatibility                       | TC 20 |
| Database                                            | TC 22 |
| Acoustics                                           | TC 26 |
| Document Architecture and Interchange               | TC 29 |
| Optical Disk Cartridges                             | TC 31 |
| Communication, Networks and Systems Interconnection | TC 32 |
| Portable Common Tool Environment                    | TC 33 |
| Office Devices                                      | TC 34 |
| User System Interface                               | TC 35 |

## TC 1 - Codes

### SCOPE :

Definition of common character sets (including alphabets, digits, punctuation marks, special symbols and control functions) and their coded representation suitable for input/output media, data transmission and text communication in order to facilitate interchange of information between DP equipment. To define the implementation of codes on media.

### PROGRAMME OF WORK :

1. Determination of common sets which shall take into account the European and international requirements for graphic characters, and control function representations in data handling and programming, in accordance with computer and auxiliary equipment characteristics.
2. Consideration shall be given in defining the coded character sets to permit possible expansion and contraction.
3. To participate in the work of CCITT and ISO/IEC/JTC1 to develop a standard character set and coding for text communication.
4. To assume responsibility for the maintenance of the ECMA standards prepared by TC1.
5. To maintain liaison with TC29.
6. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments on their proposals.

### OFFICERS :

Chairman : Mr. G. Bernard (Unisys)  
Vice-Chairman : Mr. S. G. Lindberg (IBM)

MEMBERS : Mr. C. Bathe (Siemens-Nixdorf)  
Mr. S. Bengui (HP)  
Dr. J. Bettels (Digital)  
Mrs. P. Binder (HP)  
Mr. W. F. Bohn (Uni Hannover)  
Mr. H. Dabbagh (HP)  
Mr. W. English (Sun)  
Mr. J. Friemelt (Siemens-Nixdorf)  
Mr. A. Goodman (Tandem)  
Mr. M. Ksar (HP)  
Mr. B. Leroy (Bull)

## TC 12 - Product Safety

### SCOPE :

To consider national and international safety regulations with a view to establishing appropriate safety standards for information technology equipment so that they are intrinsically safe and safe for operating and maintenance personnel.

### PROGRAMME OF WORK :

1. To survey existing national and international standards and recommendations concerned with safety requirements.
2. To study the safety requirements associated with power control and distribution and establish recommendations where appropriate.
3. To consider short circuit and overcurrent protection, earthing, voltage exposure limits, mechanical design, etc., and establish recommendations where appropriate.
4. To assume responsibility for the maintenance of ECMA standards prepared by TC12.
5. To establish and maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments on their proposals.

### OFFICERS :

Chairman : Mr. T. Wentholt (Rank Xerox)  
Vice-Chairman : Mr. E. Vanzetti (Olivetti)

### MEMBERS :

|                    |                |                       |                   |
|--------------------|----------------|-----------------------|-------------------|
| Mrs. N. K. Araway  | (Data General) | Mr. P. Nissinen       | (Nokia)           |
| Mr. K. B. Barrett  | (IBM)          | Mr. L. Olsson         | (Ericsson)        |
| Mr. J. L. Detrez   | (Wang)         | Mr. S. Ortmann        | (Compaq)          |
| Mrs. L. Eirich     | (Sun)          | Mr. D. Pearce         | (Racal Milgo)     |
| Mr. R. S. Ferguson | (Unisys)       | Mr. R. Petersen       | (HP)              |
| Mr. M. Fitzpatrick | (Compaq)       | Mr. J. Scherpenhuizen | (Digital)         |
| Mr. M. Giesler     | (Unisys)       | Dr. H. D. Schreiber   | (Philips)         |
| Mr. M. Gomez       | (Apple)        | Mr. E. Smith          | (ICL)             |
| Mr. C. Hagenbach   | (Bull)         | Mr. J. W. Smith       | (Tandem)          |
| Mr. M. Harris      | (Dowty)        | Mr. S. Statt          | (NCR)             |
| Mr. K. M. Harvey   | (Ferranti)     | Mr. M. Stephenson     | (Rank Xerox)      |
| Mr. A. Healy       | (Apple)        | Mr. R. J. Trigg       | (ICL)             |
| Mr. G. Hoffmann    | (HP)           | Mr. J. H. M. Verbeek  | (Océ-Nederland)   |
| Mr. B. Johnson     | (Digital)      | Mr. U. Voigt          | (Siemens-Nixdorf) |
| Mr. Y. Murakami    | (Mitsubishi)   |                       |                   |
| Mr. M. Nickel      | (3M)           | Mr. V. Voron          | (Apple)           |

## TC 17 - Magnetic Tapes and Tape Cartridges

### SCOPE :

To identify and standardize the minimum number of parameters necessary to ensure interchangeability of magnetic tapes and tape cartridges using appropriate methods of recording and taking account of existing standards.

### PROGRAMME OF WORK :

1. To develop one or more standards for 3,81 mm wide magnetic tape cartridges.
2. To develop a standard for 8 mm wide magnetic tape cartridges.
3. To monitor the revision of International Standards for magnetic tapes.
4. To assume responsibility for the maintenance of ECMA standards prepared by TC17.
5. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments on their proposals.

### OFFICERS :

Chairman : Mr. P. W. Watts (ICL)  
Vice-Chairman : Mr. R. C. Claber (StorageTek)

### MEMBERS :

|                    |                   |                  |                   |
|--------------------|-------------------|------------------|-------------------|
| Mr. G. Baumeister  | (Anacom-Xidex)    | Mr. M. Kawatsu   | (JVC)             |
| Mr. E. Bolle       | (RPS)             | Mr. T. Kobayashi | (Sony)            |
| Mr. P. Bramhall    | (HP)              | Mr. N. Komada    | (Sony)            |
| Dr. C. Bruschini   | (3M)              | Mr. H. Kubota    | (Toshiba)         |
| Mr. S. D. Cheatham | (StorageTek)      | Mr. R. Müller    | (Siemens-Nixdorf) |
| Mr. B. Dubois      | (Bull)            | Mr. K. Odaka     | (Sony)            |
| Mr. D. Faber       | (Siemens-Nixdorf) | Mr. P. Popov     | (DZU)             |
| Mr. P. Felleisen   | (BASF)            | Mr. H. Sato      | (Maxell)          |
| Mr. G. K. Fukumoto | (Exabyte)         | Mr. G. Thepaut   | (CNET)            |
| Mr. M. Ishigaki    | (Maxell)          | Mr. H. Vincent   | (IBM)             |
|                    |                   | Mr. A. De Vita   | (3M)              |

## TC 19 - Flexible Disk Cartridges

### SCOPE :

To identify and standardize the physical properties and the relevant track format of flexible disk cartridges for digital applications in order to ensure interchangeability.

### PROGRAMME OF WORK :

1. To identify the requirements of low-cost and compact digital data recording for data collection and data entry systems as well as for easy mailing and to review the extent to which existing designs possibly derived from existing standards in other areas, fulfil these requirements.
2. To specify the physical properties, recording method and track location of magnetic flexible disk cartridges in order to ensure interchangeability.
3. To specify the relevant track format and code representation for these disks to ensure interchangeability.
4. To assume responsibility for the maintenance of ECMA standards prepared by TC19.
5. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments to their proposals.

### OFFICERS :

Chairman: Mr. K. Bennison (ICL)  
Vice-Chairman: Mr. P. Felleisen (BASF)

### MEMBERS :

|                    |                 |                     |            |
|--------------------|-----------------|---------------------|------------|
| Mr. G. Baumeister  | (Anacomp-Xidex) | Mr. G. Llamas       | (RPS)      |
| Dr. C. Bruschini   | (3M)            | Mr. K. Pollock      | (Compaq)   |
| Mr. S. D. Cheatham | (StorageTek)    | Mr. P. Popov        | (DZU)      |
| Mr. C. R. Claber   | (StorageTek)    | Mr. H. Sato         | (Maxell)   |
| Mr. S. Holloway    | (Kao)           | Dr. H. J. Schroeder | (PTB)      |
| Mr. T. Kobayashi   | (Sony)          | Mr. G. Thepaut      | (CNET)     |
| Mr. N. Komada      | (Sony)          | Mr. C. G. Tolbert   | (Compaq)   |
| Mr. H. Kubota      | (Toshiba)       | Mr. G. Visigalli    | (Olivetti) |

## TC 20 - Electromagnetic Compatibility

### SCOPE :

To study the conditions necessary to guarantee reciprocal electromagnetic compatibility between information technology equipment and the external environment; to prepare corresponding standards and to contribute to international standardization.

### PROGRAMME OF WORK :

1. To survey existing international and national standards concerned with electromagnetic compatibility.
2. To establish measuring methods and limits for electromagnetic interference generated by information technology equipment.
3. To establish methods of assessment and suitable levels for the immunity of information technology equipment to electromagnetic interference.
4. To assume responsibility for the maintenance of ECMA standards prepared by TC20.
5. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments on their proposals.

### OFFICERS :

Chairman: Mr. A. J. Slater (BT)  
Vice-Chairman: Mr. D. E. C. Möhr (Siemens-Nixdorf)

### MEMBERS :

|                     |                   |                     |               |
|---------------------|-------------------|---------------------|---------------|
| Mr. J. Benham       | (Data General)    | Mr. Y. L'Ollivier   | (Bull)        |
| Mr. J.-E. Björklund | (Nokia)           | Mr. R. C. Marshall  | (Rank Xerox)  |
| Mr. P. Boers        | (Digital)         | Mr. S. McConkey     | (Compaq)      |
| Mr. M. Bole         | (Nokia)           | Mr. F. di Misa      | (Olivetti)    |
| Mr. S. Brody        | (Wang)            | Mr. C. Olliffe      | (Dowty)       |
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| Mr. M. Dowling      | (Data General)    | Mr. H. Ryser        | (Hasler)      |
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| Mr. Mr. Frey        | (Siemens-Nixdorf) | Dr. H. D. Schreiber | (Philips)     |
| Mr. R. Gehrmann     | (HP)              | Mr. A. J. Slater    | (BT)          |
| Mr. C. Hall         | (Racal Milgo)     | Mr. J. W. Smith     | (Tandem)      |
| Mr. H. R. Hofmann   | (AT&T)            | Mr. S. Statt        | (NCR)         |
| Mr. A. Honkala      | (Nokia)           | Mr. M. Tétreault    | (Digital)     |
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|                     |                   | Mr. T. Wentholt     | (Rank Xerox)  |
|                     |                   | Mr. P. Zahra        | (Sun)         |

## TC 22 - Database

### SCOPE :

To promote standardization of database management systems by contributing to national and international standardization or development organizations.

### PROGRAMME OF WORK :

1. To maintain a view of the requirements and priorities for standards in the database area.
2. To submit proposals on specifications and draft standards for database control languages and programming languages interfaces.
3. To cooperate with standardization bodies with a view to ensuring that European requirements are taken into account in the database field.
4. To study the requirements for access to remote and distributed databases.
5. To maintain liaison with other committees defining or using data descriptions.
6. To take part in the work of, and to contribute to, the work on databases of ISO/IEC JTC1/SC21.
7. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments on their proposals.

### OFFICERS :

Chairman: Mr. V. S. Modha (BT)

Vice-Chairman: —

MEMBERS : Mr. A. P. G. Brown (ICL)  
Mr. H. J. Figge (Siemens-Nixdorf)  
Mrs. V. Horsnell (Digital)  
Mr. T. Rogers (Sun)  
Dr. W. Schöniger (Unisys)  
Mr. R. Weber (Siemens-Nixdorf)

## TC 26 - Acoustics

### SCOPE :

To recommend standards for determining the noise outputs of different categories of individual items of information technology equipment intended for use in defined working environments; standards for determining total noise levels in the said working environments, these standards to include corresponding methods of measurement; preferred methods of predicting total levels if units of known noise output are installed together.

### PROGRAMME OF WORK :

1. To categorize the acoustical environments in which information technology equipment is required to work.
2. To survey the various recommendations and requirements for the acoustical environments of these areas.
3. To make recommendations for standard methods of measuring and specifying the noise output of equipment, taking into account the work of ISO/TC43.
4. To consider any special requirements that may arise during non-standard operation, e.g. servicing.
5. To consider what information should be supplied by the manufacturer to facilitate optimum installation and to make recommendations.
6. To follow developments affecting acoustical environment in places of work.
7. To assume responsibility for the maintenance of ECMA standards prepared by TC26.
8. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments on their proposals.

### OFFICERS :

Chairman: Mr. D. Baines (ICL)

Vice-Chairman: Mr. K. K. Wöhrle (IBM)

### MEMBERS :

|                      |                   |                    |                |
|----------------------|-------------------|--------------------|----------------|
| Mr. D. Boddie        | (Compaq)          | Mr. G. Leroi       | (Bull)         |
| Mr. J. J. Dempksi    | (Wang)            | Mr. S. Muggleworth | (Rank Xerox)   |
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| Mr. M. Giesler       | (Unisys)          | Mr. J. Osborn      | (Sun)          |
| Mr. R. D. Hellweg    | (Digital)         | Mr. H. Oswald      | (NCR)          |
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| Mr. E. Klotz         | (Siemens-Nixdorf) | Mr. F. Strobbia    | (Olivetti)     |
|                      |                   | Mr. D. Wertz       | (Philips)      |

## TC 29 - Document Architecture and Interchange

### SCOPE :

To develop standards in the field of preparation, processing, and interchange of documents.

### PROGRAMME OF WORK :

1. To develop standards for the structure of documents in formatted and processible forms, containing character-coded text, facsimile-coded images, data, tables, graphics and audio information.
2. To maintain and enhance Standard ECMA-101, Office Document Architecture.
3. To monitor and contribute to the work of ISO/IEC/JTC1/SC18 in the fields of user requirements, terminology, text description and processing languages, and character font description and registration.
4. To maintain liaison with TC1 and TC32.
5. To maintain liaison with the appropriate committees within ISO/IEC/JTC1 and CCITT.
6. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments on their proposals.

### OFFICERS :

Chairman : Mr. I. R. Campbell-Grant (ICL)  
Vice-Chairman : Mr. J. G. Williams (Rank Xerox)

### MEMBERS :

|                  |                   |                     |                   |
|------------------|-------------------|---------------------|-------------------|
| Mrs. A. Balacco  | (Olivetti)        | Mr. T. Kuki         | (Mitsubishi)      |
| Mr. C. Bathe     | (Siemens-Nixdorf) | Mr. Y. Kwong        | (Philips)         |
|                  |                   | Mrs. K. Lange       | (Siemens-Nixdorf) |
| Mr. C. Bormann   | (Uni Berlin)      |                     |                   |
| Mr. M. Bramhall  | (Digital)         | Mr. F. Levine       | (Sun)             |
| Mr. R. Carella   | (Olivetti)        | Mr. R. Lint         | (Digital)         |
| Mr. M. J. Coon   | (ICL)             | Mr. D. McCabe       | (Digital)         |
| Mr. C. Crépeau   | (Bull)            | Mr. T. Oeser        | (Siemens-Nixdorf) |
| Mr. B. Cross     | (BT)              |                     |                   |
| Mr. F. Dijkstra  | (Océ-Nederland)   | Mr. Y.-T. Siu       | (BT)              |
| Mr. J. Friedrich | (Apple)           | Mr. G. Soberg       | (Alcatel)         |
| Mr. P. Kaijser   | (Siemens-Nixdorf) | Mr. H. van de Velde | (Wang)            |

## TC 31 - Optical Disk Cartridges

### SCOPE :

To identify and develop the minimum number of standards necessary for data interchange by means of optical disk cartridges.

### PROGRAMME OF WORK :

1. To identify and develop the sets of standards needed to cover grooved and non-grooved disks.
2. To develop a standard for a case common to both types of disks.
3. To develop standards for re-writable optical disk cartridges of 90 mm and 130 mm.
4. To assume responsibility for the maintenance of ECMA standards prepared by TC31.
5. To monitor technological developments in the field of optical disk cartridges.
6. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments to their proposals.

### OFFICERS :

Chairman : Mr. C. R. Claber (Storage Tek)  
Vice-Chairman : Mr. M. Deese (Sony)

### MEMBERS :

|                      |                |                          |                   |
|----------------------|----------------|--------------------------|-------------------|
| Dr. Y. Aoki          | (Sony)         | Mr. R. Malissin          | (Thomson-CSF)     |
| Mr. P. R. Ashe       | (Kodak)        | Mr. H. Malmqvist         | (Nokia)           |
| Mr. K. Bamba         | (Mitsubishi)   | Mr. S. Matsuo            | (Mitsubishi)      |
| Mr. G. Baumeister    | (Anacom-Xidex) | Mr. H. Sato              | (Maxell)          |
|                      |                | Dr. K. Tanaka            | (Mitsubishi)      |
| Mr. K. Bennison      | (ICL)          | Mr. G. Thepaut           | (CNET)            |
| Mr. J. C. Devoy      | (Philips)      | Mr. C. G. Tolbert        | (Compaq)          |
| Dr. M. H. Florjancic | (Alcatel)      | Dr. J. A. T. Verhoeven   | (Philips)         |
| Mr. T. Holst         | (Ericsson)     | Dr. P. G. P. Weijenbergh | (Philips)         |
| Mr. J. E. Kulakowski | (IBM)          | Mr. E. J. Wolkener       | (Siemens-Nixdorf) |
| Mr. A. Le Maout      | (Bull)         |                          |                   |

## TC 32 - Communication, Networks and Systems Interconnection

### SCOPE :

To take the overall responsibility for the ISO Reference Model for Open Systems Interconnection (OSI) within ECMA. To develop service and protocol standards for the seven layers of the Reference Model and for Distributed Applications.

To study services and protocol standards in relation to CCITT or PTT-defined services. To prepare co-ordinated viewpoints of interest to ECMA and their users. To standardize selected facilities within these services for selected applications. To develop interface standards for the connection of information technology equipment (ITE) to Private Switched Networks (PSN).

### PROGRAMME OF WORK :

1. To be responsible for, and co-ordinate, the work of the Task Groups within TC32. To approve drafts prepared by the Task Groups for submission to the General Assembly and deal with all matters requiring voting within TC32.
2. To maintain an ECMA view of the ISO OSI Reference Model and to contribute to its maintenance and extension.
3. To develop service and protocol standards for all layers of the Reference Model.
4. To develop a set of OSI management and security standards.
5. To study the scope, definitions and standardization possibilities of local communication systems (e.g. LAN, PCSN); to develop standards where a need is identified.
6. To study the functional requirements of the upper four layers of the Reference Model for CCITT-defined Telematic services, with the exception of those considered by TC29, further to study the relationship between these services and the Reference Model.
7. To develop a set of standards for message interchange protocols in order to provide message interchange services defined in co-operation with TC29, taking into account the work in CCITT.
8. To study CCITT-defined Integrated Services Digital Networks (ISDN).
9. To maintain liaison with ISO, IEC, CCITT and CEPT.
10. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments on their proposals.

## TC 32 - Communication, Networks and Systems Interconnection

### OFFICERS :

Chairman : Mr. M. Trought (GPT)

Vice-Chairman : Mr. P. von Studnitz (Philips)

MEMBERS :

|                      |                    |
|----------------------|--------------------|
| Mr. H. Abramowicz    | (Ericsson)         |
| Mr. K. Bamba         | (Mitsubishi)       |
| Mr. M. G. Barratt    | (Ferranti)         |
| Mr. J. H. Boal       | (Racal Milgo)      |
| Mr. J. B. Brenner    | (ICL)              |
| Mr. T. Bunch         | (Compaq)           |
| Mr. R. Coates        | (Compaq)           |
| Mr. C. Cornet        | (HP)               |
| Mr. B. R. Day        | (Northern Telecom) |
| Mr. N. Di Iorio      | (AT&T)             |
| Mr. L. Etesse        | (Alcatel)          |
| Mr. M. Fujisaki      | (NEC)              |
| Mr. L. Geerts        | (Wang)             |
| Mr. U. Hartmann      | (Siemens-Nixdorf)  |
| Mr. V. Hayes         | (NCR)              |
| Dr. D. J. Hildebrand | (Sony)             |
| Mr. P. Hofmann       | (IBM)              |
| Mr. P. A. Jenkins    | (BT)               |
| Dr. P. E. Jones      | (Digital)          |
| Mr. A. Kessler       | (Telenorma)        |
| Mr. M. C. Koning     | (Océ-Nederland)    |
| Mr. R. Koxholt       | (Siemens-Nixdorf)  |
| Mr. J. Kruys         | (NCR)              |
| Mr. A. Le Maout      | (Bull)             |
| Dr. G. Mityko        | (Hasler)           |
| Mr. M. Pontacq       | (Bull)             |
| Mr. G. Robin         | (Alcatel)          |
| Mr. R. Roden         | (Digital)          |
| Mr. W. Schulte       | (IBM)              |
| Mr. K. Söllner       | (Siemens-Nixdorf)  |
| Mr. E. Völzke        | (Siemens-Nixdorf)  |
| Mr. T. Wallace       | (Prime)            |
| Mr. G. Whitehead     | (Sun)              |
| Mr. C. S. W. Wood    | (Unisys)           |

## TC 32/TG 2 - Distributed Interactive Processing

### SCOPE

Standardization in the field of Distributed Interactive Processing.

### PROGRAMME OF WORK :

1. To develop standards for the Support Environment for Open Distributed Processing (SE-ODP).
2. To maintain ECMA Standards and Technical Reports in the field of Open Distributed Processing (ODP) and Remote Procedure Call (RPC).
3. To liaise with, and contribute to, ISO/IEC JTC1 on matters pertaining to ODP and RPC, and, in particular, to the development of the Reference Model of Open Distributed Processing (RM-ODP).
4. To give special priority to liaison with, and contribution to, ISO/IEC JTC1/5C21 WG5 in order to support ISO in its work on Transaction Processing (TP).
5. To liaise with other ECMA TCs and other TGs of TC32 on matters pertaining to ODP, TP and RPC.
6. To maintain an ECMA view of architecture and identified standards above the transport service of the ISO OSI Reference Model, and to contribute to their maintenance and extensions. This includes, but is not limited to, ALS, ACSE, CCR and ROSE. To maintain an ECMA view on Presentation and Session Layer matters.

CONVENOR: Mr. J. B. Brenner (ICL)

### MEMBERS :

|                    |                   |                   |                   |
|--------------------|-------------------|-------------------|-------------------|
| Mr. G. Almgren     | (Televerket)      | Mr. A. Galis      | (Dowty)           |
| Mr. R. Banks       | (ICL)             | Dr. K. Geihs      | (IBM)             |
| Mr. H. Barbot      | (Bull)            | Mr. S. T. F. Goss | (ICL)             |
| Mr. D. Benson      | (Ferranti)        | Mr. E. Jarry      | (Bull)            |
| Mr. O. Carparelli  | (HP)              | Dr. G. Lacoste    | (IBM)             |
| Mr. M. Chereque    | (Bull)            | Mr. J. Legh-Smith | (BT)              |
| Mr. M. A. Corfman  | (Digital)         | Dr. P. V. Meller  | (HP)              |
| Mr. M. Drisin      | (Nokia)           | Mr. H. J. Müller  | (Siemens-Nixdorf) |
| Dr. D. Fauth       | (Siemens-Nixdorf) | Dr. D. Robinson   | (Digital)         |
| Dr. A. M. Fletcher | (BT)              | Dr. H. Schmutz    | (IBM)             |
| Mrs. L. Frampton   | (Digital)         | Mr. G. Whitehead  | (Sun)             |

## TC 32/TG 6 - Private Telecommunication Networks

### SCOPE :

To develop standards for Private Telecommunication Networks (PTN).

### PROGRAMME OF WORK :

1. To develop interface standards for the connection of terminals, computers, LAN and Wide Area Networks (WAN) to a PTN, utilizing, and remaining compatible with, existing standards and recommendations, as far as possible.
2. To develop standards for intra-PTN interfaces, thereby supporting harmonized telecommunication services on multi-vendor PTN, and to align these services as far as possible with the public ISDN telecommunication services.
3. To study, in liaison with TG10, the architecture of PTN in relation to :
  - connection of terminal equipment (TE) ;
  - interconnection with LAN ;
  - interconnection with private and public WAN.
4. To study the systems management aspects of PTN.
5. To monitor and to contribute to the work of other international and European bodies studying matters related to PTN (e.g. ISDN and LAN developments).
6. To co-ordinate the liaison with CCITT and ETSI in the field of ISDN interfaces and services.
7. To co-ordinate the liaison with JTC1 in the field of PTN.

## TC 32/TG 6 - Private Telecommunication Networks

CONVENOR: Mr. E. Völzke (Siemens-Nixdorf)

### MEMBERS:

|                      |                    |                          |                   |
|----------------------|--------------------|--------------------------|-------------------|
| Dr. G. P. Barnicoat  | (Ericsson)         | Dr. M. Kneidinger        | (Alcatel)         |
| Mr. M. D. Bexon      | (BT)               | Mr. R. Koxholt           | (Siemens-Nixdorf) |
| Mr. K. Caves         | (ICL)              | Mr. M. Lahti             | (Televerket)      |
| Mr. T. Conlon        | (Racal Milgo)      | Mr. B. K. Larsen         | (Alcatel)         |
| Mr. C. Cornet        | (HP)               | Mr. H. Larsson           | (Ericsson)        |
| Mr. T. Curran        | (Ericsson)         | Mr. K. R. Lenihan        | (BT)              |
| Mr. P. Dagoulis      | (Northern Telecom) | Mr. J. P. Marcellin      | (IBM)             |
| Mr. I. A. Donaldson  | (Northern Telecom) | Mr. D. Modzelewski       | (Digital)         |
| Mr. R. Edling        | (Ericsson)         | Mrs. J. S. Nyquist       | (AT&T)            |
| Mr. J. R. Elwell     | (GPT)              | Mr. R. E. Price          | (Ferranti)        |
| Dr. H. Evers         | (Siemens-Nixdorf)  | Mr. G. Ralston           | (HP)              |
| Mr. H. J. Frizlen    | (Ericsson)         | Mr. A. Ramaherijaona     | (Telenorma)       |
| Mr. A. K. Gupta      | (AT&T)             | Mr. F. Richard           | (SI3T)            |
| Mr. L. M. Hall       | (Philips)          | Mr. G. Robin             | (Alcatel)         |
| Mr. M. Helbing       | (Siemens-Nixdorf)  | Mr. E. Sandberg          | (Ericsson)        |
| Mr. E. L. van't Hoff | (Philips)          | Mrs. A. Schlösser        | (Telenorma)       |
| Mr. E. Horvath       | (Siemens-Nixdorf)  | Mr. W. Schulte           | (IBM)             |
| Miss L. Hübbert      | (Televerket)       | Mr. M. Seitz             | (Alcatel)         |
| Mr. D. Jackson       | (Sun)              | Mr. A. R. Severson       | (AT&T)            |
| Mr. P. Jardin        | (Digital)          | Mr. J. D. Smith          | (GPT)             |
| Mr. K. P. Jones      | (GPT)              | Mrs. W. Sussman          | (Alcatel)         |
| Mr. O. Karlsson      | (Ericsson)         | Mr. H. Theis             | (Telenorma)       |
| Miss L. J. Klau      | (AT&T)             | Mr. P. G. Turner         | (ICL)             |
| Mr. S. M. Klerer     | (AT&T)             | Mr. R. A. S. Willemstein | (Philips)         |
| Mr. C. M. Klik       | (Philips)          | Mr. H. Wozny             | (Alcatel)         |
| Dipl. Ing.           |                    | Mr. D. Wulf              | (Siemens-Nixdorf) |
|                      |                    | Mr. A. Wynn              | (IBM)             |

## TC 32/TG 9 - Security in Open Systems

### SCOPE:

To develop a framework for the provision of logical (as opposed to physical) security in an Open System environment including relevant Management functions.

To develop standards for security-related services and protocols or protocol elements as required for this environment.

### PROGRAMME OF WORK:

1. To maintain Technical Report ECMA TR/46 on Security Framework.
2. To maintain the Standard ECMA-138 on DATA Elements and Service Definition.
3. To develop standards for Supportive Security Applications and protocols or protocol elements as required in a distributed application environment. This work will include considerations of quality of security and related characteristics of cryptographic facilities. Priority will be given to requirements of the Distributed Offices Applications environment.
4. To liaise, within ECMA TC32, with :
  - TG2 regarding aspects of Distributed Interactive Processing ;
  - TG6 and TG10, regarding the provision of security facilities at the lower layers of the OSI model.
5. To liaise, within ECMA, with :
  - TC22, regarding the security of Data Base Systems ;
  - TC29, regarding the security aspects of documents.
6. To liaise with the relevant working groups in ISO/IEC JTC1/SC18, SC21 and SC25, as well as CCITT regarding security in Open Systems and the promotion of security standards developed by TC32 where appropriate liaison arrangements do not exist.
7. To advise TC32 on work items with regard to security.

## TC 32/TG 9 - Security in Open Systems

|           |                  |                   |
|-----------|------------------|-------------------|
| CONVENOR: | Mr. J. Kruids    | (NCR)             |
| MEMBERS:  | Mr. E. Baize     | (Bull)            |
|           | Mr. A. Balfour   | (BT)              |
|           | Mr. P. Bellot    | (IBM)             |
|           | Mr. R. Cole      | (HP)              |
|           | Mr. S. Donovan   | (Racal Milgo)     |
|           | Mr. S. Hellberg  | (Televerket)      |
|           | Mr. P. Kaijser   | (Siemens-Nixdorf) |
|           | Mr. Y. Klein     | (Bull)            |
|           | Mr. D. Monahan   | (Digital)         |
|           | Mr. T. A. Parker | (ICL)             |
|           | Mr. D. Pinkas    | (Bull)            |
|           | Mr. Ch. Siuda    | (Hasler)          |
|           | Mr. A. Skomedal  | (Alcatel)         |
|           | Mrs. B. Ulbrich  | (Sun)             |

## TC 32/TG 10 - Lower Four Layers and Local Area Networks

### SCOPE:

To study and standardize architectural and implementation matters related to the lower four layers of the ISO OSI Reference Model, with special emphasis on Local Area Networks (LAN).

### PROGRAMME OF WORK:

1. To study the architectural principles for the lower four layers of the OSI Reference Model, with special emphasis on:
  - the requirements related to the integration of private and public networks, including LAN and PTN;
  - the relationship of ISDN and LAN concepts with the OSI Reference Model;
  - the relationship of non-data services with the OSI Reference Model;
  - the requirements related to the integration of new services in LAN;and to report the results to other standardization bodies.
2. To develop protocols for the exchange of routing information.
3. To study and classify LAN, including transmission media, topology, signal transmission methods, and access methods.
4. To identify the requirements for management within the lower four layers of the OSI Reference Model, in accordance with the global OSI management architecture.
5. To ensure compatibility, by study and contributions, with the developments in ISO, IEC, CCITT and IEEE 802.
6. To liaise with TG6 on PSN, and to provide guidance to their development work.
7. To liaise with TG12 and TC20 on matters of safety and electromagnetic interference, respectively.

## TC 32/TG 10 - Lower Four Layers and Local Area Networks

|           |                    |                    |
|-----------|--------------------|--------------------|
| CONVENOR: | Mr. J. H. Boal     |                    |
| MEMBERS:  | Mr. H. Abramowicz  | (Ericsson)         |
|           | Mr. S. O. Åkerlund | (Ericsson)         |
|           | Mr. K. Bamba       | (Mitsubishi)       |
|           | Mr. A. Berent      | (Racal Milgo)      |
|           | Mrs. H. Bevis      | (BT)               |
|           | Mr. C. Cornet      | (HP)               |
|           | Mr. B. R. Day      | (Northern Telecom) |
|           | Mr. N. Di Iorio    | (AT&T)             |
|           | Dr. A. V. Flatman  | (ICL)              |
|           | Mrs. I. Fromm      | (Siemens-Nixdorf)  |
|           | Mr. P. Hardie      | (GPT)              |
|           | Mr. V. Hayes       | (NCR)              |
|           | Mr. G. Lecucq      | (Alcatel)          |
|           | Mr. J. Moughton    | (Dowty)            |
|           | Dr. A. Nakassis    | (NIST)             |
|           | Mr. J. Reinius     | (Ericsson)         |
|           | Mr. J. Rembisch    | (Televerket)       |
|           | Mr. C. Rheinart    | (IBM)              |
|           | Mr. M. Sylvest     | (Dowty)            |
|           | Mr. P. G. Turner   | (ICL)              |
|           | Mr. S. V. Varanasi | (AT&T)             |
|           | Mr. T. Wallace     | (Prime)            |

## TC 32-TG 11 - Computer-Supported Telephony Applications (CSTA)

### SCOPE:

To develop an architectural framework and the requirements on, and the use of, services and network control protocols allowing computing and switching networks to cooperate in support of functionally integrated applications. To develop OSI Application Layer protocols for the execution of transactions between computing and switching applications. The work is focusing initially on bi-directional operations between computer and private telephony networks. The work will, however, take into account the requirements of other telecommunication services, within both the private and public telecommunication domains.

### PROGRAMME OF WORK:

1. To study the relevant aspects of CSTA, with special emphasis on:
  - application descriptions and scenarios;
  - the functional requirements for integrated telephony;
  - the protocol architecture appropriate for the defined scenarios;
  - the implications for system security and integrity;
  - the functional requirements for integrated data access, accounting, data input/output and other applications;
  - the management of CSTA objects.
2. To produce a Technical Report outlining the architecture (based on the OSI Reference Model) and principal services of CSTA, and identifying the functional entities and protocols.
3. To produce one or more standards specifying the services, functional entities and protocols required to enable CSTA operation in a variety of OSI environments.
4. To liaise with the following TC32 Task Groups in order to ensure compatibility of standards and adequate consideration of all issues:
  - TG2 (ODP, TP and upper layer architectures);
  - TG6 (PTN scenarios and services);
  - TG9 (Security issues);
  - TG10 (Lower layer architectures and non-data modelling).
5. To identify and liaise with external standards organizations studying similar topics including groups working within ECSA-ANSI T1S1.

## TC 32/TG 11 - Computer Supported Telephony Applications (CSTA)

CONVENOR: —

|          |                    |                    |
|----------|--------------------|--------------------|
| MEMBERS: | Mr. B. Almoussa    | (Bull)             |
|          | Mr. T. A. Anschutz | (AT&T)             |
|          | Mr. H. J. Bergmann | (Alcatel)          |
|          | Mr. M. D. Bexon    | (BT)               |
|          | Mr. M. Bornhoft    | (Northern Telecom) |
|          | Mr. O. Carparelli  | (HP)               |
|          | Mr. T. Conlon      | (Racal Milgo)      |
|          | Mr. C. Cornet      | (HP)               |
|          | Mr. J. Cowell      | (GPT)              |
|          | Mr. R. Daan        | (Philips)          |
|          | Mr. B. L. Dallas   | (BT)               |
|          | Mr. J. L. Detrez   | (Wang)             |
|          | Mrs. Yu Di         | (Northern Telecom) |
|          | Mr. C. Didcock     | (Digital)          |
|          | Mr. H. Elgandy     | (BT)               |
|          | Dr. H. Evers       | (Siemens-Nixdorf)  |
|          | Mr. J. Gerrity     | (Ferranti)         |
|          | Mr. B. Hjulström   | (Televerket)       |
|          | Mr. D. Jackson     | (Sun)              |
|          | Mr. S. Koulouras   | (HP)               |
|          | Mr. H. Lovera      | (IBM)              |
|          | Mr. I. MacMillan   | (T1S1)             |
|          | Mr. T. Miller      | (Siemens-Nixdorf)  |
|          | Mr. R. E. Price    | (Ferranti)         |
|          | Mr. V. Raju        | (BT)               |
|          | Mr. R. Reddig      | (Alcatel)          |
|          | Mr. R. Roden       | (Digital)          |
|          | Mr. K. Söllner     | (Siemens-Nixdorf)  |
|          | Mr. B. Stenlund    | (Ericsson)         |
|          | Mr. K. Tanaka      | (Mitsubishi)       |
|          | Mr. R. Taylor      | (Ferranti)         |
|          | Mr. W. R. Wheeler  | (IBM)              |
|          | Mrs. T. Wuerfel    | (Siemens-Nixdorf)  |

## TC 33 - Portable Common Tool Environment (PCTE)

SCOPE:

To standardize a common tool interface implementable on a wide range of operating environments, to ensure a suitable foundation for portable, interoperable tools and tool sets for computer-assisted systems engineering.

PROGRAMME OF WORK:

1. To develop an interface standard ECMA PCTE, starting from PCTE+ Issue 3, while taking into account the requirements and specification efforts already underway as noted in item 7 below.
2. To define a reference model for computer-assisted systems engineering environments that will support the incremental definition and evolution of interface standards.
3. To position ECMA PCTE within that reference model.
4. To identify and position complementary standards and standard activities relevant to the reference mode, and to maintain liaison with those standards organizations responsible for their maintenance.
5. To present ECMA PCTE standards as an abstract specification with separate language bindings.
6. To maintain liaison with TC22 and TC32-TG2.
7. To maintain liaison with the PCTE Interface Management Board (PIMB), with DG XIII of the Commission of the European Community, with the PCTE+ programme of Technical Area 13 (TA-13) of the Independent European Programme Group (IEPG), and with the German PCTE Initiative (GPI).
8. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments to their proposals.

Chairman: Mr. M. W. Morron (Northern Telecom)

Vice-Chairman: Dr. R. Crispin (HP)

MEMBERS:

|                      |                   |                    |                |
|----------------------|-------------------|--------------------|----------------|
| Mr. H. Achkar        | (SEMA)            | Mr. R. Minot       | (Bull)         |
| Mr. R. N. M. Blom    | (Océ-Nederland)   | Mr. M. Moreau      | (BIM)          |
| Mr. I. Campbell      | (Thomson-CSF)     | Mr. C. J. Nolan    | (Digital)      |
| Mr. H. F. Davis      | (ICL)             | Mr. R. M. Rankin   | (RSRE)         |
| Mr. S. J. Dawes      | (ICL)             | Mr. V. Russi       | (Olivetti)     |
| Dr. W. Faltenbacher  | (Siemens-Nixdorf) | Mr. G. Sagols      | (IBM)          |
| Mr. M. N. Gibbons    | (BT)              | Mr. J. D. Smart    | (SEMA)         |
| Dr. D. J. Hildebrand | (Sony)            | Mr. C. H. Smedema  | (Philips)      |
| Dr. U. Kelter        | (Uni Hagen)       | Mrs. R. Sozzi      | (Olivetti)     |
| Mr. G. R. Lewis      | (Sun)             | Mr. G. Walker      | (Alcatel)      |
| Mr. M. Lichtenhein   | (SFGL)            | Prof. Dr. H. Weber | (Uni Dortmund) |
| Mr. A. Lundkvist     | (Televerket)      | Mr. J. de Weerd    | (Wang)         |
| Mr. T. G. L. Lyons   | (SS)              | Mr. W. Wong        | (NIST)         |

## TC 34 - Office Devices

### SCOPE:

To identify and standardize the basic characteristics, excluding interfaces, of office devices (such as printers and copiers). To specify standard performance tests, to specify the use of already standardized supplies (such as stationery, spools, etc.), and, where needed, to develop standards for such supplies.

### PROGRAMME OF WORK:

1. To specify the basic characteristics of, and performance test methods for, printers.
2. To specify the basic characteristics of, and performance test methods for, copiers.
3. To investigate print quality aspects.
4. To investigate existing international standards for supplies. To specify their use, where applicable. To develop standards where needed.
5. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments on their proposals.

|                |                   |                      |
|----------------|-------------------|----------------------|
| Chairman:      | Mr. C. Pipia      | (Bull)               |
| Vice-Chairman: | Mrs. P. Binder    | (HP)                 |
| MEMBERS:       | Mr. C. Baumjohann | (Siemens-Nixdorf)    |
|                | Mr. P. Hofmann    | (IBM)                |
|                | Mr. F. Olivet     | (ICL/Fujitsu España) |
|                | Mr. R. Owen       | (Rank Xerox)         |
|                | Mr. H. Rudolff    | (Philips)            |
|                | Mr. H. Streicher  | (Kodak)              |
|                | Mr. R. E. Tindall | (ICL)                |

## TC 35 - User System Interface

### SCOPE:

To develop an architectural reference model for the user system interface on the basis of which required standards can be identified.

### PROGRAMME OF WORK:

1. To examine currently available user system interfaces and the relevant work already in progress in other standardization bodies.
2. To consider the ergonomic and engineering aspects of user system interfaces.
3. To develop an architectural reference model that sets forth the basic elements and functions of user system interfaces.
4. To identify required standards to be developed in the light of the reference model.
5. To maintain liaison with other standards organizations in order to present ECMA proposals to them and to make comments on their proposals.

|                |                      |                      |
|----------------|----------------------|----------------------|
| Chairman:      | Dr. S. Heine         | (IBM)                |
| Vice-Chairman: | Mr. K. Agaki         | (Wang)               |
| MEMBERS:       | Mr. T. Abrahamsen    | (Digital)            |
|                | Mr. R. Aparicio      | (ICL/Fujitsu España) |
|                | Mr. M. Atyeo         | (BT)                 |
|                | Mrs. A. C. Blomkvist | (Nokia)              |
|                | Dr. L. Brown         | (Sun)                |
|                | Mr. P. Buckley       | (BT)                 |
|                | Mr. M. Dupont        | (Wang)               |
|                | Mr. A. Gilliet       | (Bull)               |
|                | Mr. D. Jones         | (Rank Xerox)         |
|                | Mr. M. J. Mathews    | (HP)                 |
|                | Mr. D. Mitchell      | (IBM)                |
|                | Mr. E. Patterman     | (Sun)                |
|                | Dr. L.-G. Scheidt    | (Sony)               |
|                | Dr. C. Schmittgen    | (Sony)               |
|                | Mr. M. Sokat         | (Toshiba)            |
|                | Mr. R. J. Thomas     | (Ferranti)           |

## List of Representatives

**NOT FOR PUBLIC RELEASE**

*Kindly note that the Ecma memento pages containing the contact details of the representatives have been intentionally removed.*

## By-Laws of the Association

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### Art. 1 CONSTITUTION AND HEAD OFFICE

- 1.1 An association to be known as "European Computer Manufacturers Association", abbreviated ECMA, has been constituted according to these By-Laws and Articles 60 et seq. of the Swiss Civil Code.
- 1.2 The Headquarters of the Association is in Geneva.

### Art. 2 PURPOSE

- 2.1 The purpose of the Association is :
  - 2.1.1 To study and develop, in cooperation with the appropriate national and international organizations, as a scientific endeavour and in the general interest, methods and procedures in order to facilitate and standardize the use of data processing systems.
  - 2.1.2 To promulgate various standards applicable to the functional design and use of data processing equipment.
- 2.2 The Association shall be a non-profit-making organization and shall devote itself to no commercial activity whatsoever.

### Art. 3 MEMBERSHIP

- 3.1 The Association shall consist of ordinary members and such other classes of members as may be created by the ordinary members at a General Assembly.
- 3.2 The ordinary members shall fulfil the qualifications set forth under Articles 3.3 and 3.4 of the present By-Laws, and be accepted according to Article 4.
- 3.3 Ordinary members shall be companies which develop, manufacture and market in Europe data processing machines or groups of machines used to process digital information for business, scientific, control or other similar purposes. Data processing machines used exclusively for military purposes shall not be considered to be included in the above machines.

- 3.4 These machines or groups of machines shall have all four of the following characteristics:
- Means for automatic entry of input data.
  - Means for comparing and manipulating logically and arithmetically, data entered through such input means.
  - Means for automatically carrying out a program controlling all arithmetic, internal data transfer and data output functions of the various machine units comprising the system.
  - Means for automatically altering or modifying the program in accordance both with information received as input and from internal manipulation.
- 3.5 A proposed ordinary member will not be accepted if it holds at least 50 per cent of the capital of an existing ordinary member nor if at least 50 per cent of its capital is held by an existing ordinary member.
- 3.6 No two or more companies, at least 50 per cent of whose capital is held by the same company, which is not a member itself, may be ordinary members but must be represented by one company only.
- 3.7 Applications for ordinary membership will not be accepted unless the proposed member develops, manufactures and markets some major data processing equipment which is not basically a copy of that of an existing ordinary member.
- 3.8 Additional classes of members which may be established according to Article 3.1 shall have such qualifications and be entitled to such rights and privileges and have such obligations as shall be determined at a General Assembly by a majority of two thirds of all the ordinary members.
- 3.9 Associate Members
- 3.9.1 A company may be admitted as associate member which has interest and experience in Europe in matters related to one or more of the TCs of the Association. No company qualifying for ordinary membership can be elected associate member.
  - 3.9.2 A prospective associate member shall declare the TCs in whose work it proposes to take part.
  - 3.9.3 The restrictions of Articles 3.5 and 3.6 of the By-Laws shall apply to associate members.
  - 3.9.4 Associate members shall be admitted by a majority of all the ordinary members.

- 3.9.5 An associate member is entitled fully to participate in the work of the authorized committees and receive all relevant papers. In addition, it may be authorized to participate in the work of such other committees as may be decided in General Assembly.
- 3.9.6 Art. 4.1 of the Rules applies to associate members. Representatives of the associate members shall have the right to take part in the discussions at the General Assembly relevant to the TCs in which they participate. However, they have no vote in the General Assembly.
- 3.9.7 Associate membership shall be terminated in the cases listed in Art. 5.1; Art. 5.2 to 5.5 also apply.
- 3.9.8 The membership fee for associate members is one half of the fee for ordinary members. Rule 8 applies to associate members.

#### Art. 4 ACCEPTANCE OF NEW MEMBERS

- 4.1 Application for membership shall be made to the Secretariat.
- 4.2 Decisions on compliance with conditions shall be made by a two-thirds majority of all the ordinary members.
- 4.3 When it has been decided that the conditions are complied with, the applicant shall be admitted to the relevant class of membership.

#### Art. 5 TERMINATION OF ORDINARY MEMBERSHIP

- 5.1 Ordinary membership shall be terminated in the following cases:
  - Withdrawal upon written notice given to the Secretary General, to take effect on receipt.
  - The company ceasing to exist.
  - The conditions for membership set forth in Articles 3.5 and 3.6 of the present By-Laws no longer being complied with.
  - In the opinion of two-thirds of all the ordinary members the conditions set forth in Articles 3.3, 3.4 and 3.7 no longer being complied with.
  - By expulsion for violation of By-Laws and Rules or for any other conduct prejudicial to the interest and correct functioning of the Association.
- 5.2 No member may be expelled for failure to adhere to one or several agreed standards.

- 5.3 Any proposal to expel a member must be backed by at least one-fifth of all the ordinary members. The proposal to expel must be on the agenda for the General Assembly at which it is to be discussed so as to give the member the opportunity to present its case.
- 5.4 A two-thirds majority of all the ordinary members is necessary to expel a member. Such expulsion will become effective 15 days after notification by registered mail.
- 5.5 Notwithstanding Article 4.3 a member which has been expelled can only be re-admitted on a two-thirds majority of all ordinary members.

#### Art. 6 STRUCTURE

- 6.1 The Association shall consist of:
- The General Assembly.
  - The Management.
  - The Co-ordinating Committee.
- 6.2 The General Assembly of the ordinary members shall be the highest authority of the Association. It shall control the Association and appoint and control its Management.
- 6.3 The Management shall consist of a President and a Vice-President. The Management shall be discharged by the President or, if circumstances require, by the Vice-President.
- 6.4 The President and the Vice-President shall be individuals elected for one year by the ordinary members at a General Assembly. Only representatives of ordinary members can be nominated. The President and the Vice-President can be re-elected any number of times provided that neither serves more than two consecutive years.
- 6.5 The President shall, through his signature, commit the Association in any business or transaction directly connected with the purpose of the Association.
- 6.6 There shall be a Treasurer whose duty shall be determined by the General Assembly. The Rules set out in 6.4 shall apply to this office, except that there shall be no limit in the number of consecutive years in office.
- 6.7 The Co-ordinating Committee shall comprise 6 members and make recommendations to the General Assembly regarding the formation, activities, reorganization or dissolution of Technical Working Committees.

#### Art. 7 GENERAL ASSEMBLY

- 7.1 The President will each year call at least two ordinary General Assemblies of the ordinary members. Written notice of the time and

place of the Assembly shall be given at least thirty days before the date of the Assembly. The Agenda and supporting documents for the Assembly shall be circulated at least fifteen days before the Assembly.

- 7.2 Unless otherwise restricted by these By-Laws or the Rules of the Association, any action required or permitted to be taken at an Assembly may be taken without a meeting, provided that no ordinary member opposes such a procedure within 20 days from the mailing date.
- 7.3 Special General Assemblies for any purpose or purposes unless otherwise prescribed by these By-Laws or the Rules of the Association may be called by the President, and shall be called by him, at the request in writing of at least one-fifth of all the ordinary members. Such request shall state the purpose or purposes of the proposed assembly. The business transacted at any special assembly shall be limited to the purposes stated in the notice.
- 7.4 Written notice of Special General Assemblies stating the time, place and object thereof, shall be given to each ordinary member at least twenty days before the date of the Assembly and shall include the agenda and supporting documents for the Assembly.
- 7.5 A majority of all the ordinary members must be present or represented by proxy at any General Assembly, in order to constitute a quorum for transaction of the business except as otherwise provided by these By-Laws or the Rules of the Association.
- 7.6 Unless otherwise prescribed by these By-Laws or the Rules of the Association, the vote of the majority of all the ordinary members shall decide any question.

#### Art. 8 PROMULGATION OF STANDARDS AND TECHNICAL REPORTS

- 8.1 Promulgation of such documents by the Association shall require approval by at least two-thirds of all the ordinary members.
- 8.2 Proposed drafts shall be circulated by the Secretary General at least three months in advance of the General Assembly at which they will be voted upon.
- 8.3 It is not obligatory for members to follow any standard.
- 8.4 All documents when approved shall be made available to all interested parties without restriction.

#### Art. 9 AD HOC COMMITTEES

- 9.1 The General Assembly may delegate authority for specific purposes to ad hoc committees. The tasks, terms of reference and membership

of these committees will be adopted if a majority of all the ordinary members assent.

- 9.2 Unless otherwise decided at the time of its appointment each ad hoc committee may co-opt additional members should it so desire.
- 9.3 No ad hoc committee may meet for more than one year without being reappointed.

#### Art. 10 SECRETARIAT

- 10.1 There shall be a permanent Secretariat of the Association responsible to the General Assembly.
- 10.2 A Secretary General shall be appointed by the General Assembly and shall be responsible for the operation of the Secretariat.

#### Art. 11 TECHNICAL WORKING COMMITTEES

- 11.1 Technical working committees will be formed by the Secretary General when so decided at a General Assembly.
- 11.2 Any ordinary member may participate in any technical working committee.

#### Art. 12 FISCAL YEAR

- 12.1 The fiscal year shall commence on January 1 and end on December 31.

#### Art. 13 FINANCE

- 13.1 The annual budget of the Association shall be approved by at least two-thirds of the ordinary members present or represented at an ordinary General Assembly.
- 13.2 The Association shall be financed by an equal levy on all ordinary members and half this levy on all associate members. The fees are set by the ordinary members during an ordinary General Assembly and based on the current year budget. Such fees shall be used to finance the activity of the Association and its administrative expenses and shall not be returnable.
- 13.3 The Secretary General will be responsible for expenditures within the budget.
- 13.4 The President may authorize expenditures outside the budget to an amount not exceeding 10 per cent of the corresponding item in the current year budget. Any expense above this must be approved by the ordinary members.

#### Art. 14 DISSOLUTION

- 14.1 In the event of the dissolution of the Association, its assets are first used to discharge its liabilities. Any balance of liability shall be borne by the members in proportion to their annual fees. Any surplus funds remaining after the liabilities have been discharged will be distributed to those which are members at the date of dissolution in proportion to their total contributions to the Association.

#### Art. 15 AMENDMENTS

- 15.1 The By-Laws and any Rules that may be adopted by the General Assembly can only be modified at an ordinary or special General Assembly. The proposed amendments must be included in the agenda and notified to the members according to the provisions of Articles 7.1 and 7.4.
- 15.2 Amendments shall require two-thirds approval of all the ordinary members.

#### Art. 16 LITIGATION

- 16.1 Any dispute arising during the life of the Association or during its dissolution either between the members of the Association and its Management or between the members and the Association or between the members themselves as a consequence of the Association's activity shall be decided upon by the Courts of the Canton of Geneva. Swiss law is applicable in all cases.

## Rules of the Association

### 1. LANGUAGE

- 1.1 The English language, as written in the United Kingdom, will be the official language of the Association.

### 2. SYSTEM OF MEASUREMENTS

- 2.1 The metric system of measurements will be used.

### 3. MINIMUM PERIOD OF MEMBERSHIP.

- 3.1 There is no minimum period of membership.

### 4. REPRESENTATION OF MEMBERS

- 4.1 Each member shall designate the name of one of its officers or executives who shall represent them in General Assemblies and who shall have full authority to commit the member on all matters concerning the Association. Members shall notify the Association of any changes in their representation.

### 5. GENERAL ASSEMBLIES

- 5.1 Representatives may invite additional individuals from their respective member company to participate in an advisory capacity at a General Assembly.
- 5.2 The members entitled to attend and vote at a General Assembly may be represented by a proxy. A written proxy shall be established indicating the item or items of the agenda to which it is restricted.
- 5.3 The President or in his absence the Vice-President shall preside at all General Assemblies. In absence of both, the members present or represented by proxy shall elect a Chairman for that particular meeting.

### 6. CO-ORDINATING COMMITTEE

- 6.1 An ad hoc Committee consisting of individuals elected by the General Assembly will be set up under the name of Co-ordinating Committee (CC), whose terms of reference will be as follows:
- 6.1.1 To prepare terms of reference for new Technical Working Committees in accordance with the rules for the formation of a Technical Working Committee.
- 6.1.2 To nominate a provisional Chairman and Vice-Chairman for each new Technical Working Committee.
- 6.1.3 To review from time to time the terms of reference given to Technical Working Committees.

- 6.1.4 To have every six month meetings with Chairmen of Technical Working Committees at which the progress of the TCs will be reviewed and co-ordinated.

- 6.2 The members and the Chairman of the Co-ordinating Committee shall be individuals elected for one year at a General Assembly by the ordinary members, they can be re-elected any number of times. Only representatives of ordinary members can be nominated.

### 7. TECHNICAL WORKING COMMITTEES

- 7.1 Formation of Technical Working Committees:

- 7.1.1 Technical Working Committees (TC) will be formed by the Secretary General (SG) when so decided at a General Assembly.

- 7.1.2 Any proposal for the setting up of a TC must give the suggested terms of reference, including the scope, and be sent to the SG.

- 7.1.3 The CC shall nominate a provisional Chairman and Vice-Chairman.

- 7.1.4 The SG shall then convene the first meeting of the TC.

- 7.2 Operating procedure of TC - Rules and recommendations for the Technical Committees:

- 7.2.1 Members of TCs are:

- representatives of ECMA member Companies,
- other participants invited by the SG at the request of the TC or of the Management.

- 7.2.2 Member Companies of ECMA are entitled to send one or more representatives to any TC. These representatives shall be employees of the member Companies.

- 7.2.3 Voting on any matter shall be by simple majority of TC members present at the meeting. Each member Company has only one vote. Several invited participants belonging to one organization, have only one vote between them.

- 7.2.4 One-time visitors can attend a meeting only at the special invitation of the SG at the request of the TC. They have no voting rights.

- 7.2.5 It is recommended that in the course of its ordinary work the TC should not use voting unless it is impossible to make progress without a vote.

- 7.2.6 The provisional Chairman and Vice-Chairman nominated by the CC shall act for an initial period which shall be not less than 6 months from the date of the first meeting and which shall include the first 3 meetings.

- 7.2.7 At the first meeting of the TC which takes place after the end of the initial period, a Chairman and Vice-Chairman shall be elected from among the member Company representatives.
- 7.2.8 The Chairman and Vice-Chairman, having been elected from among the member Company representatives, shall hold office for a term of 12 months. They shall be eligible for re-election, subject to a maximum consecutive term of office of 3 years.
- 7.2.9 Meetings of the TCs shall be conducted by the Chairman, according to the By-Laws and Rules of ECMA. An officer of the Secretariat shall act as Secretary at all TC meetings. The Vice-Chairman shall assist the Secretary and shall act for the Secretary if the latter is unable to attend.
- 7.2.10 Agenda for meetings of the TCs shall be prepared by the Chairman and an officer of the Secretariat taking into account suggestions made by members of the Committee. The agenda shall be circulated to all members 3 weeks before each meeting; at the opening of the meeting it can be modified if wanted and must be approved.
- 7.2.11 The SG shall be responsible for the preparation of minutes of the meetings.
- 7.2.12 The minutes shall be distributed by the SG within 3 weeks to all members of the TC, to the Chairmen of all TCs, to the official representatives of the member companies, and to the members of the CC.
- 7.2.13 The first item on the agenda of each TC shall be the amendment and approval of the minutes of the preceding meeting. The minutes, after approval, shall constitute the official record of the meeting of a TC.
- 7.2.14 Any suggestions for the amendment of terms of reference of TCs should be addressed to the SG for discussion between the TC Chairman and the CC.
- 7.2.15 The Chairman is responsible for the preparation of a semi-annual report for each TC. He will be assisted by the Vice-Chairman and an officer of the Secretariat in this task and the report will be submitted to the General Assembly. The report will contain a description of the results achieved to date and an outline of the work to be carried out during the next year.
- 7.2.16 This report will be circulated to all members of the TC for approval.

- 7.2.17 Any member of a TC has the right to ask for a minority report to be submitted if he so desires.
- 7.2.18 The work of all TCs will be discussed every 6 months at a meeting of the CC and the SG at which meetings the semi-annual report will be presented.
- 7.2.19 First priority in discussion at the meetings of the TCs must be given to items on the agenda.
- 7.2.20 Under no circumstances should any technical contribution be decided upon at a TC meeting unless it has been circulated to all Committee members at least 3 weeks before the meeting.
- 7.2.21 In the interest of economy and efficiency, alternate meetings will be held in Geneva.
- 7.3 Task Groups
- 7.3.1 Technical committees may form Task Groups for the accomplishment of specific tasks within the scope of the committee.
- 7.3.2 At least two members of the committee should agree to take an active part in the work of the Task Groups.
- 7.3.3 Terms of reference of the Task Group shall be included in the minutes of the meeting of the Technical Committee at which the Task Group has been formed.
- 7.3.4 Task Groups shall report at each meeting to the committee on their activities; these reports shall appear in the minutes of the committee.

## 8. MEMBERSHIP FEES

- 8.1. The membership fees shall be based on an estimate for the current year's operating expenses with adjustments for any deviation between the estimated and actual for the preceding years. Although the Association shall be non-profit-making, reserves may be accumulated if so decided by the General Assembly.
- 8.2 Any new member shall pay the full annual fee for the fiscal year in which it is admitted as member.
- 8.3 Every member on the date of the General Assembly which decides on the budget for the following fiscal year shall pay the full annual fee for that year.

- 8.4 Any withdrawing member shall pay a fee for the fiscal year following the year of withdrawal (Art. 5.1.a of the By-Laws). This fee shall be equal to the annual fee for the year of withdrawal. Representatives of a withdrawing member may continue to attend TC meetings and to receive all technical papers during the full fiscal year following the year of withdrawal.

#### 9. OPERATING EXPENSES

- 9.1 Operating expenses of the Association shall consist of salaries, travel and office expenses of the Secretariat and publication costs.
- 9.2 Expenses of members including those connected with ad hoc and Technical Working Committees are not part of the operating expenses of the Association.
- 9.3 The Secretary General of ECMA is responsible to the Treasurer for the operating expenses of the Association.
- 9.4 The General Accounting of the Secretariat will be reviewed once a year by an Auditor appointed by the Treasurer and approved by the General Assembly.

## Code of Conduct in Patent Matters

### 1. POLICY

General Declaration :

**The General Assembly of ECMA shall not approve recommendations of Standards which are covered by patents when such patents will not be licensed by their owners on a reasonable and non-discriminatory basis.**

- 1.1 In case the proposed Standard is covered by issued patents of ECMA members only :  
Members of the General Assembly are asked to state the Company licensing policy with respect to these patents.
- 1.2 In case the proposed Standard is covered by issued patents by non ECMA members: A written statement from the patentee is required, according to which he is prepared to grant licences on a reasonable, non-discriminatory basis.  
The General Assembly and/or the Management shall decide in this case which steps must be undertaken in order to obtain such a statement.
- 1.3 In case the proposed Standard is covered by patent applications of ECMA members (which is not known, neither during the work of the TC nor at the time of the vote in the General Assembly) :
- 1.3.1 Each member of the TCs and/or of the General Assembly of ECMA will determine whether any proposed standard may be covered by any patent for which his company has a pending application, if such a patent application exists, his continued participation to the relevant committee will imply that such a patent, when obtained later, will be made available from his company for licensing on a reasonable, non-discriminatory basis.
- 1.3.2 Each member of the TCs and/or of the General Assembly of ECMA will determine whether any proposed standard may be covered by any patent for which his company has a pending application ; if such a patent application exists, the favourable vote of the Company to the General Assembly will imply that such a patent, when obtained later, will be made available from his company for licensing on a reasonable, non-discriminatory basis.
- 1.4 In case the proposed Standard is covered by patent applications of third parties (which is not known during the work of the TC nor at the time of the vote in the General Assembly) :  
In this case practically nothing can be done at the time of the vote. When afterwards said patents are issued, it should be tried to obtain reasonable, non-discriminatory licences. If this proves to be impossible, the standard will have to be cancelled.

## 2. PROCEDURE

- 2.1 The questions related to protective rights are in the competence of the General Assembly of ECMA and should not be discussed at the TC level.
- 2.2 Each draft standard shall be submitted three months ahead of a General Assembly, by registered mail. All members are required to state within two months whether they claim any issued protective rights covering the subject matter of the proposed standard and/or have knowledge of such rights of third parties.
- 2.3 Replies to this request will be circulated in due time before the General Assembly.
- 2.4 When an answer is not received from a Company, the General Assembly may proceed to a vote on the assumption that this Company will act in accordance with the General Declaration, that is to license possible relevant issued patents on a reasonable and non-discriminatory basis.

Adopted at the General Assemblies of 29th March 1963, 2nd June 1966 and 15th December 1988.

## The Meaning of Conformance to Standards

The General Assembly of ECMA on June 16, 1983 approved Technical Report TR/18, setting out the Association's views on the meaning of conformance to computer standards. By clarifying what is meant by conformance and what can and cannot be expected to follow from it, ECMA hopes that suppliers, users and the public alike will benefit. In view of the importance of this subject, its technical committees will in future seek to follow the broad recommendations of the report.

However, Member Companies of the Association reserve for themselves individually expression of views on the complex legal and commercial issues arising in many countries relating to certification of conformance.

## Publications

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Free copies of all documents listed below are available upon request. Documents not listed have been withdrawn, **copies are no more available**.

### ECMA Standards (Blue cover)

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| <b>ECMA-3</b> – CMC7 Printed Image Specification, 2nd Edition                                                                       | (Sept. 1966) |
| <b>ECMA-4</b> – Flow Charts, 2nd Edition                                                                                            | (Sept. 1966) |
| <b>ECMA-6</b> – 7-Bit Coded Character Set, 5th Edition                                                                              | (March 1985) |
| <b>ECMA-8</b> – Nominal Character Dimensions of the Numeric OCR-A Font, 2nd Edition                                                 | (Jan. 1977)  |
| <b>ECMA-10</b> – Data Interchange on Punched Tape, 2nd Edition                                                                      | (July 1970)  |
| <b>ECMA-11</b> – Alphanumeric Character Set OCR-B for Optical Recognition, 3rd Edition                                              | (March 1976) |
| <b>ECMA-13</b> – File Structure and Labelling of Magnetic Tapes for Information Interchange, 4th Edition                            | (Dec. 1985)  |
| <b>ECMA-15</b> – Printing Specifications for Optical Character Recognition, 2nd Edition                                             | (Aug. 1975)  |
| <b>ECMA-17</b> – Graphic Representation of the Control Characters of the ECMA 7-Bit Coded Character Set for Information Interchange | (Nov. 1968)  |
| <b>ECMA-18</b> – Printing Line Position on Single Line Documents, 2nd Edition                                                       | (Jan. 1977)  |
| <b>ECMA-21</b> – Character Positioning on OCR Journal Tape                                                                          | (June 1969)  |
| <b>ECMA-30</b> – OCR-B Subsets for Numeric Applications, 2nd Edition                                                                | (March 1976) |
| <b>ECMA-34</b> – Data Interchanges on 3,81 mm Magnetic Tape Cassette (32 bps, Phase Encoded), 3rd Edition                           | (Sept. 1976) |
| <b>ECMA-35</b> – Code Extension Techniques, 4th Edition                                                                             | (March 1985) |

- ECMA-38** – Mechanical, Physical and Magnetic Characteristics of Interchangeable Single Disk Cartridges (Top Loaded) (Sept. 1973)
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- ECMA-43** – 8-Bit Code-Structure and Rules, 2nd Edition (Dec. 1985)
- ECMA-44** – Implementation of the ECMA 7-Bit and 8-Bit Coded Character Sets on Punched Cards (Sept. 1975)
- ECMA-45** – Data Interchange on Magnetic 12-Disk Packs (100 Mbytes) (Sept. 1975)
- ECMA-46** – Data Interchange on 6,30 mm Magnetic Tape Cartridge (63 bpm, Phase Encoded) (March 1976)
- ECMA-48** – Control Functions for Coded Character Sets, 4th Edition (Dec. 1986)
- ECMA-51** – Implementation of the Numeric OCR-A Font with 9x9 Matrix Printers (Jan. 1977)
- ECMA-53** – Representation of Source Program for Program Interchange – APL, COBOL, FORTRAN, Minimal BASIC and PL/1 (Jan. 1978)
- ECMA-54** – Data Interchange on 200 mm Flexible Disk Cartridges using Two-Frequency Recording at 13262 ftprad on One Side, 2nd Edition (Jan. 1982)
- ECMA-55** – Minimal BASIC (Jan. 1978)
- ECMA-56** – Self-Loading Cartridges for 12,7 mm Wide Magnetic Tapes (Sept. 1978)
- ECMA-59** – Data Interchange on 200 mm Flexible Disk Cartridges using Two-Frequency Recording at 13262 ftprad on Both Sides (Aug. 1979)

- ECMA-62** – Data Interchange on 12,7 mm 9-Track Magnetic Tape – 32 ftpmm, NRZ1, 32 cpmm – 126 ftpmm, Phase Encoding, 63 cpmm – 356 ftpmm, NRZ1, 246 cpmm GCR, 2nd Edition (March 1985)
- ECMA-64** – Magnetic Disk for Data Storage Devices, 160 000 Flux Transitions per Track, 356 mm Diameter, 2nd Edition (Sept. 1982)
- ECMA-65** – Magnetic Disk for Data Storage Devices, 107 500 Flux Transitions per Track, 266 mm and 356 mm Diameter (Sept. 1980)
- ECMA-66** – Data Interchange on 130 mm Flexible Disk Cartridges Using Two-Frequency Recording at 7958 ftprad On One Side (Sept. 1980)
- ECMA-68** – Reels for 12,7 mm Wide Magnetic Tapes (Sizes 16, 18 and 22) (Jan. 1981)
- ECMA-69** – Data Interchange on 200 mm Flexible Disk Cartridges Using MFM Recording at 13262 ftprad On Both Sides (Jan. 1981)
- ECMA-70** – Data Interchange on 130 mm Flexible Disk Cartridges Using MFM Recording at 7958 ftprad on 40 Tracks on Each Side, 2nd Edition (June 1986)
- ECMA-71** – HDLC-Selected Procedures (Jan. 1981)
- ECMA-73** – Magnetic Disk for Data Storage Devices 95840 Flux Transitions per Track 200 mm Outer Diameter 63,5 mm Inner Diameter, 2nd Edition (Sept. 1982)
- ECMA-74** – Measurement of Airborne Noise Emitted by Computers and Business Equipment, 2nd Edition (Dec. 1987)
- ECMA-76** – Magnetic Disk For Data Storage Devices, 158 000 Flux Transitions per Track, 210 mm Outer Diameter, 100 mm Inner Diameter (Sept. 1982)
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- ECMA-78** – Data Interchange on 130 mm Flexible Disk Cartridges Using MFM Recording at 7958 ftprad on 80 Tracks on Each Side, 2nd Edition (June 1986)
- ECMA-79** – Data Interchange on 6,30 mm Magnetic Tape Cartridge Using IMFM Recording at 252 ftpmm, 2nd Edition (Sept. 1985)
- ECMA-80** – Local Area Networks (CSMA/CD Base-band) – Coaxial Cable System, 2nd Edition (March 1984)
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- ECMA-85** – Virtual File Protocol (Sept. 1982)
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- ECMA-89** – Local Area Networks – Token Ring Technique, 2nd Edition (March 1985)
- ECMA-91** – Flexible Disk Cartridges – File Structure and Labelling for Information Interchange (March 1984)
- ECMA-92** – Connectionless Internetwork Protocol (March 1984)
- ECMA-94** – 8-Bit Single-Byte Coded Graphic Character Set – Latin Alphabets No. 1 to No. 4, 2nd Edition (June 1986)

- ECMA-96** – Syntax of Graphical Data for Multiple-Workstation Interface (GDS) (Sept. 1985)
- ECMA-97** – Local Area Networks – Safety Requirements (Sept. 1985)
- ECMA-98** – Data Interchange on 6,30 mm Magnetic Tape Cartridge using NRZ1 Recording at 394 ftpmm – Streaming Mode (Sept. 1985)
- ECMA-99** – Data Interchange on 130 mm Flexible Disk Cartridges using MFM Recording at 13262 ftprad on both sides 3,8 Tracks per mm (Sept. 1985)
- ECMA-100** – Data Interchange on 90 mm Flexible Disk Cartridges using MFM Recording at 7958 ftprad on 80 Tracks on Both Sides, 2nd Edition (Dec. 1988)
- ECMA-101** – Open Document Architecture (ODA) and Interchange Format, 2nd Edition (Dec. 1988)
- ECMA-102** – Rate Adaptation for the Support of Synchronous and Asynchronous Equipment using the V. Series Type Interface on a PCSN, 2nd Edition (July 1987)
- ECMA-103** – Physical Layer at the Basic Access Interface between Data Processing Equipment and Private Switching Networks, 2nd Edition (Dec. 1987)
- ECMA-104** – Physical Layer at the Primary Rate Access Interface between Data Processing Equipment and Private Switching Networks (Sept. 1985)
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- ECMA-106** – Layer 3 Protocol for Signalling over the D-Channel of the S-Interfaces between Data Processing Equipment and Private Switching Networks (Sept. 1985)
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- ECMA-125** – 90 mm Flexible Disk Cartridges Using MFM Recording at 15916 ftrpad on 80 Tracks on Each Side (Dec. 1987)
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| <b>ECMA-143</b> – Layer 3 Protocol for Signalling between Exchanges of Private Telecommunication Networks for the Control of Circuit-Switched Calls | (June 1990) |
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| <b>ECMA-146</b> – 3,81 mm Wide Magnetic Tape Cartridge for Information Interchange – Helical Scan Recording – DATA/DAT Format                       | (Dec. 1990) |
| <b>ECMA-147</b> – 90 mm Flexible Disk Cartridges for Information Interchange, 4 Mbytes                                                              | (Dec. 1990) |
| <b>ECMA-148</b> – Identification Supplementary Services in Private Telecommunication Networks – Specification, Functional Model, Information Flows  | (Dec. 1990) |
| <b>ECMA-149</b> – Portable Common Tool Environment (PCTE) – Abstract Specification                                                                  | (Dec. 1990) |

## Technical Reports (White cover)

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| <b>ECMA/TR 3</b> – Continuous Sprocket-Punched Stationery Part II (Physical Properties, Fastenings, Packaging and Storage)  | (March 1972) |
| <b>ECMA/TR 7</b> – Continuous Sprocket-Punched Stationery Part I (Recommended Sizes)                                        | (Dec. 1973)  |
| <b>ECMA/TR 8</b> – Recommended OCR Paper Specification, 2nd Edition                                                         | (Jan. 1977)  |
| <b>ECMA/TR 11</b> – Guidelines for Magnetic Tape Handling and Storage                                                       | (Jan. 1981)  |
| <b>ECMA/TR 13</b> – Network Layer Principles                                                                                | (Sept. 1982) |
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| <b>ECMA/TR 17</b> – Permission to Connect – PTT Requirements for Obtaining Approval to Connect Apparatus to the Network     | (Sept. 1983) |
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| <b>ECMA/TR 26</b> – Planning and Installation Guide for CSMA/CD 10 MBit/s Baseband Local Area Network, 2nd Edition            | (June 1990)  |
| <b>ECMA/TR 27</b> – Method for the Prediction of Installation Noise Levels                                                    | (March 1985) |
| <b>ECMA/TR 28</b> – Safety Verification (Save) Report ECMA-57/IEC 435                                                         | (Sept. 1985) |
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| <b>ECMA/TR 34</b> – Maintenance at the Interface Between Data Processing Equipment and Private Switching Network              | (June 1986)  |
| <b>ECMA/TR 35</b> – Particular Safety Requirements for Equipment to be Connected to Telecommunication Networks                | (Dec. 1986)  |
| <b>ECMA/TR 36</b> – Guidelines on Additional Parameters Recommended for Procurement Specifications for 12,7 mm Magnetic Tapes | (Dec. 1986)  |
| <b>ECMA/TR 37</b> – Framework for OSI Management                                                                              | (Dec. 1986)  |
| <b>ECMA/TR 38</b> – End System Routing                                                                                        | (Dec. 1986)  |
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| <b>ECMA/TR 40</b> – Electrostatic Discharge Immunity Testing of Information Technology Equipment                              | (July 1987)  |
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| <b>ECMA/TR 44</b> – An Architectural Framework for Private Networks, 2nd Edition                                              | (Dec. 1989)  |
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