COMMISSION OF THE EUROPEAN COMMUNITIES

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PROPOSAL FOR A COUNCIL REGULATION (EEC) CONCERNING COMMUNITY ACTIONS IN THE FIELD OF MICROELECTRONIC TECHNOLOGY

(presented by the Commission to the Council)

First Proposals for Community Actions in the Field of Microelectronics

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Explanation of Motives

1. Background

1.1. A key technology for European industry as a whole

The new microelectronic technology is of critical importance, not only for the industries based on new technologies of information, but for European industry as a whole. The dramatic fall in the cost of components means that some intelligent computing power can be placed in virtually every industrial product at extremely low cost. The competitiveness of virtually all European industries, from machine-tools to cars, from toys to telecommunications, is therefore going to depend more and more on the skill and effectiveness with which they apply the new technology.

The speed of change is such that time is of critical importance. The manufacturer of computer peripherals or of automobile components, whose knowledge of the state of the art of microelectronic technology is six months out of date, may find that his products are two years behind that of his competitors, when they hit the market place. Up to date knowledge moreover, is needed, not merely by a few, but by the general engineering culture of a society such as Europe's: by designers, production engineers, those who market technical products and those who apply them. The need will become ever more acute, as the size and density of circuits grows to embrace complete electronic systems. If today's pocket calculator consists of a single chip embodying a power comparable to that of the first computer, tomorrow's VLSI component, using "submicron" technology and offering up to 1 million bits of information on a single chip will embody today's large computer or a large telephone exchange. The integrated circuit, in other words, has not only spread horizontally to embrace an ever-widening range of markets, but vertically to take over a great deal of the design and production activity of its former systems

customers. This is why the designer of a computer or telephone exchange or automobile system must be able to design in the latest technology, or risk failure on world markets in the face of more advanced competitors.

1.2. Europe lags behind

Europe, today, lags behind in both the production and application of this key technology.

In 1978, it was estimated that the first commercial production in Europe of MOS-Technology (1) Integrated Circuits lagged some two to four years behind the United States for the various products concerned. There is no evidence of improvement since.
Today the Community is still 65% dependent on imports of integrated circuits and has a far higher dependence in the most advanced digital ICs. This is significant, not because of its impact on the trade balance (at EUA 270 Mio (2) in 79 the deficit is not negligeable) but because it reflects the relative backwardness of European industry and technology in this field and hence the threat to the competitivity of increasingly large sectors of European industry.

The scale of the growing world market for integrated circuits (with some $ 70 billion in the whole period 1980-84), the weakness of European production (under 10% of the total today) and the growing integration of this technology "downstream" with the electronics industry as a whole are elaborated in the Annex.

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(1) In 1978 more than 90% of all microprocessor and RAM'S sold in US (which together represented 30% of the total ICs market) were produced in the MOS (metal oxide silicon) technology.
(2) The following rate of exchange has been adopted throughout the text (June 80) 1 EUA = 1,4214 US $.

A number of steps have been taken, in response to the problem, but these are recognized not to be sufficient.
One measure has been to maintain a high import duty on IC's (1) in order to allow Community producers to develop their industrial muscle and become competitive from a sheltered position.
Apart from the burden it imposes on the users (electronic goods manufacturers) this defensive measure can only be effective if it is accompanied by active steps to catch up with the competition within the framework of a carefully designed strategy, implemented in good time.

Individual Member States have, during the past few years, increased national efforts to support microelectronics: between 1977 and 1979 new national programmes were prepared or established in France, UK and Italy, in addition to West Germany which had a programme since 1974. In all, these programmes were intended to provide support worth some EUA 360 million.

These plans are, however, fragmented. They are largely aimed at improving the competitiveness of existing companies on their national markets by means of technology transfer through direct licensing, acquisition or joint venture with American firms. In the short run such national plans may serve an essential purpose by preventing an unhealthy situation from deteriorating further, but they represent only half an answer. They do not guarantee in the medium to long term that European industry will have the critical new technologies and will know how to use them. They do not provide a strategy for catching up.

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(1) 17% - amongst the highest the Community applies, and more than twice as large as the average for industrial products (7%).

1.3. US and Japanese strategies

The approach of public policy in the United States and Japan has been very different. In March 1976 Japan launched a EUA 180 million worth project as a co-operative effort among five Japanese electronic firms(1) plus Nippon Telegraph and Telephone Public Corporation and the Electro-technical laboratories of MITI, the avowed goal for 1980 being to develop VLSI technology to beat IBM next generation computers.

The effect of this effort on world markets is already noticeable: Japanese firms now have some 40% of the world market for 16 K dynamic RAM's and are expected to have the largest share of world market for all semiconductor memories by the mid 1980s.

Leading European Data Processing equipment manufacturers(2) are at present (1980) considering Japan as their prime supplier for semiconductor memories. Thus, with smaller public resources than have been spent in Europe, Japan has effectively caught up (3).

The US Government has not remained idle either; apart from the massive investments in these technologies of some of the major US companies (4)

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(1) Fujitsi, Hitachi, Mitsubishi, NEC, Toshiba

(2) ICL, Nixdorf, Plessey (and more recently Olivetti and BPO) formed a joint company which also included the American firm CDC, to specify and purchase ICs jointly (STACK)). Japan is a major supplier to it.

(3) It is perhaps worth noting that during the latest multinational trade negotiations Japan agreed to progressively lower its duty on IC from 15% in 1979 (12% applied) down to 4.2% by January 1st 1987 and that by now Texas Instruments has already two fully-owned plants in Japan and is building a third one.

(4) Texas Instruments is said to have invested some US $ 50 Mio a year on R and D for VLSI between '76 and '79; IBM is also said not to fall short of the total Japanese expenditure for VLSI.

the American Department of Defence worked out and proposed in 1978 a six-year plan callled VHSI(1) which has been approved by the congress recently (end 1979). The total funding will be US $ 210 Mio (EUA 149 Mio) and US $ 30.4 Mio (EUA 21.6 Mio) have been made available for fiscal year 1980.

The aim of this programme are a ten-fold reduction in size, weight, power consumption and failure rate and a 100-fold increase in throughput with respect to present ICs; the effort will concentrate on developing improved chip architecture, providing commercial availability of sub-micron lithography and surrounding processing capabilities(2), and establishing production capability of VHSICs. More generally, apart from its defence objective, the Department of Defence expects the programme "to result in significant fallout to industry by providing new tools, such as advanced lithographic equipment, and advanced concepts to mount the submicron barrier and thus help to strengthen the industry's long term future".(3)

1.4. The Community: A strategy for 1985

These developments and considerations explain the concern expressed in the Council Resolution of September 1979 that the first task of the Community is to fill the gap left by national programmes and concentrate effort on "the development of the key new technologies and tools that will enable European industry to meet the competition of the most advanced products in 1985"; to achieve, in short the strategic leap forward in technological capability that is now necessary and possible.

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(1) VHSI: Very High Speed Integration to emphasize the special high speed processing requirements.

(2) It is interesting to note that these latter objectives are by and large the same as those identified by the Working Parties established to assist the Commission.

(3) Address by Larry Sumney, Manager of the VHSI programme attached to the Office of the Under-Secretary of Defence for Research and Engineering.

During the past four years the Commission has been consulting systematically with officials from the Member States, with the European component industry and with experts on the best means of achieving this. A unanimous agreement has been reached on the technical objectives that need to be achieved if European industry is to be competitive with its major competitors in 1985. It will need to be able to design, produce and apply "submicron" components, i.e. components with geometic features smaller than 1 micrometer, and master the whole range of technologies necessary to achieve this. A broad consensus has also been established on the areas in which action is required first to meet these goals.

The three proposals for action which follow are based on this consensus and reflect three of the main themes for action suggested in the Council Resolution.

2. Proposed Actions

2.1. Co-ordination of national programmes

The first major action proposed concerns the co-ordination of national programmes as a whole.

The proposal of the Commission, which takes the form of a draft Regulation spells out the minimum elementary commitments needed to accomplish it. The purpose of such co-ordination will be to try to establish a growing convergence between certain elements of these programmes and in particular those concerned with the development of future technologies. If the agreed objective - to develop a capability for design and production of competitive submicron technology circuits by 1985 - is to be achieved, national programmes will have to be aimed at this objective and support relevant projects concerning the use, application and investment in new processes. Moreover, a systematic search for areas for co-operation and co-ordination must go on particularly in the more critical and difficult areas which would justify pooling know-how and resources.

The precondition for this is the systematic mutual communication between Member States and the Commission of information about projects and activities being considered for implementation under their authority, within as well as outside the framework of national programmes. The Commission proposes to constitute a data bank with this information and to arrange for its systematic distribution to the interested Governments of Member States. Care will be taken to reconcile the two essential elements of effective mututal information and appropriate confidentiality.

The development of systematic co-ordination is furthermore advisable since all national aid schemes evidently have some potential for distorting competition within the Community, even though they may be broadly justified by the massive distortion of the world competitive scene through Government support to microelectronics outside Europe. The current British national aid scheme for electronic components has been approved by the Commission until the end of 1980.

No other national aid schemes, to apply beyond the end of 1980, have yet been approved by the Commission.

2.2. Research into new concepts for computer-aided design and test

The second major action proposed concerns the development within the Community of the basic conceptual knowledge and skills needed in the whole area of computer-aided design and test (CAD and CAT).

Submicron integrated circuits will be of such complexity that it will become increasingly difficult for a man or woman to intervene directly in the detailed process of design. It will be necessary for the entire process, starting from the initial system requirements down to their translation into geometric pattern on the silicon wafer to be carried out with the aid of powerful and complex computer systems.

The growing complexity will also require the production system to become increasingly automated, placing further requirements on the basic computer system which must control the whole process. Computer-aided testing, at the various stages of the production process, will likewise leap forward in complexity. It is no mean task to test the accuracy and reliability of components containing a million pieces of information; all this will require a major step forward in the basic conceptual work underlying future CAD and CAT systems, work that it still far from completion anywhere in the world.(1)

At the end of 1979 the Commission, on the advice of national officials, established an expert committee to define the work that needed to be done in this area of CAD and CAT. It identified four major areas where work was needed:

- chip architecture;
- device modeling;
- language and data structure;
- testing.

The work is expected to cost some EUA 20Mio in the four years 1981 to 1984. Studies are currently elaborating the details.The work appears to be generally of a character best carried out by universities or research institutes, a number of which exist in the Community with the capability to undertake it. To meet the objectives, however, it will be necessary for the work to be carried out with close industrial involvement and in a way which encourages a constant flow of ideas and work between the brightest individuals in industry and those in the research institutes concerned.

It is therefore proposed that public support to cover up to 50% of the cost of such research be provided to institutes in the Community which are prepared and able to undertake significant parts of the work, but on two conditions: the institutes concerned must be sponsored by a sufficient number of industrial companies (from various Community countries); this sponsorship must take the form of specific commitments

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(1)See footnote (1) page 9

by the companies to contribute resources to the work, either in the form of skilled manpower, or of money. Moreover, arrangements would be made for the systematic dissemination of this information between the various partners involved. In this way a number of centres of excellence(1) would be created each sponsored by and linked with a number of Community companies.

2.3. The infrastructure: Promoting a European equipment industry

The third proposal of the Commission, and the most urgent, concerns advanced equipment for the production of the coming generation of complex submicron integrated circuits. In addition to the CAD and CAT tools or software systems which mastermind the whole process of design, production and test, the key secrets of this technology lie in the sometimes immensely complex and refined equipment which make up the production process, and in the ability to use them. These equipments range from chemical processes, through sophisticated lithography and etching processes (by which, in future, a million entities will be marked into a single chip), on to the automation systems which control such processes and cut, combine and link up the chips, down to the testing equipment which must accept or reject them. The scale of the actual and potential market for this equipment (at least $ 5-6 billion in the whole period 1981-84) is elaborated in the Annex on economic factors.

At present the great bulk of this key supporting industry is based in the United States, with grave consequences for Europe. In the US, and increasingly in Japan, the unceasing innovative process in the component industry is constantly fed by dialogue and partnership with the specialist companies that develop and produce the new materials and equipment.

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(1) It is worth noting that a comparable pattern is developing in the US, where major universities, such as Caltech and Stanford are developing programmes on this theme sponsored by industrial companies.

The fragmented European environment has not encouraged the same development for such specialist equipment companies. Their paucity means that the European integrated circuit manufacturer is not involved in the same continuous process of new technology development and practice as the US and Japanese competition. Instead, production know-how and equipment has generally been licensed or purchased from the US when it has become available, i.e. years after US IC companies already have access to the technology, indeed when the development of a subsequent generation of machines is already under way. This is often too late for a European capability to be effective and profitable on either home or world markets.

As things are now, it is a high-risk business for a European component manufacturer to turn to a new European equipment manufacturer who has not yet found a place in the sun; on the other hand for European equipment innovators (where these exist) the most attractive course is to move his centre of production and development to the US, as some have done. This is the vicious circle which exists in Europe and needs to be broken. A good analogy for the situation of the European electronic component industry would be a European mechanical engineering industry which had no machine tool industry to support it.

The gravest effect of all this is on the general level of engineering capability and skill in Europe. In spite of the increasingly high capital investment required(1) the new component technology is above all still a skill-intensive rather than a capital intensive business. The knowledge and ability to take full advantage of the new technologies and be competitive in the market place is mainly embodied in people and can only be acquired by direct education and practical experience at the same time as the competitors.

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(1) "In the early 70s a US $ 2 Mio fabricating module could turn out some US $ 20 Mio worth of products, in 1979 an equivalent module is on the range of US $ 10 Mio price and can at best do US $ 30 Mio in products" (Electronics March 1979)

The wider purpose of any policy designed to promote a strong European capability in the supply and use of advanced IC components, and of the equipment and tools needed to make them must therefore be to raise the level of engineering skills in all the sections of the industry concerned to that of the United States and Japan.

2.3.1. Identification of objectives for Community action

In December 1976 a working party from the leading European component companies, set up at the invitation of the Commission and of national officials, reported on the technical objectives that should be set for a European leap forward in integrated circuit technology (by 1985). In July 1978 the Commission, supported by officials from Member States, invited these companies to establish a working party on equipment with the specific purpose of identifying which actions would be needed to ensure that the necessary equipment capability was available in Europe to enable the component industry to play its part in meeting these fundamental goals by 1985.

The group has analysed the equipment that would be needed to meet the objectives, identified those areas where there was a major gap in European capability, and established priorities for filling them. These priorities were established in June 1979, and brought up to date again in June 1980. They are spelt out in the technical annex to the draft Regulation; which lists all the equipments needed for the future process and selects a first short priority list for launching at the beginning of 1981.

In the meantime the Commission has established that there are companies in Europe with a general and specialist ability to develop such equipment by the dates required and a commercial will to do so provided certain steps can be taken by the public authorities and by industry acting together to support them and provide a more favourable environment than in the past.

2.3.2. Industrial requirements for meeting the goals

Discussions with industry and national officials have also clearly demonstrated the conditions which will have to be fulfilled to attain the objectives identified by the industrialists :

1) There is a need to accelerate the development of the key items of equipment in time to meet the target dates.

2) Accelerated development can only happen if there is a close collaboration, indeed synergy, between the prospective European users of the equipment and the equipment manufacturers. It is this creative relationship that has been the critical factor in the development of a flourishing equipment industry in the United States and Japan.

3) This process must have a Community dimension. The market for equipments is relatively small and highly specialized, and, at least for the larger items, expensive research and development does not pay unless there is some initial prospect of obtaining a substantial share of a Community-wide market. Moreover, the feedback needed by the equipment makers in the last stages of prototype development is inadequate if it comes only from one country or company, even the largest.
There has to be a feedback from a wider market place.

4) It is the unanimous view of industry, government officials and the Commission that support should not be given unless the project has a prospect of obtaining a viable competitive position in the world market place. European users are not interested in obtaining support for, or participating in the development of equipment that is not competitive with the best available. Nor can it be a viable policy to support projects without a solid commercial future.

5) The process will not work if it is confined to one industrial item of equipment or project. Users and equipment developers have to be assured that there will be a programme of activity designed to achieve higher levels of performance than could otherwise be attained and including

all the relevant equipments not readily available in Europe in time; there must, in short, be a strategy with a clear goal, to which all participants can raise their sights.

6) At the heart of the problem is a question of credibility. The high risk of the activity of developing in Europe the key equipment needed has to be reduced by the demonstration that a number of major European users are prepared to commit themselves to sharing in the R&D work of prototype development, offering a prospect of a market later on. At the same time the risk for the users of committing themselves to this process has to be reduced by some degree of public support.

7) The above desirata can only be achieved if the financial cost of the series of actions proposed to promote a European capability in the various equipments required, is shared between industry and the public authorities.

To ensure that a prospective equipment manufacturer is seriously ready and able to attack world markets, he must be committed to invest substantial resources himself. Moreover, the user companies must believe sufficiently in the potential of the equipment proposed to be ready to invest their own resources. At the same time, if the two are to risk moving away from their present excessive dependence on American markets and supplies, public financial support is necessary. In financial terms any actions must therefore involve a partnership of effort between equipment manufacturers, user companies and the public authorities.

One form of public contribution to this partnership which the Commission has considered a possibility is that of fiscal incentives or tax reductions. The Commission believes that such incentives can in the future play a significant part in the stimulation of investment and innovation in key high technology industries such as microelectronics and is therefore continuing to study the question. However, the complexity of the

subject, the variations in the different national environments, and the need to give specific help quickly to the developments of equipments for the purposes defined above mean that such an approach is inappropriate to the launching of projects in the short run.

2.4. Summary of proposals

(1) To implement all these objectives the Commission therefore proposes that direct public financial support will be available, from January 1981, to support up to 50 % of the cost of R&D projects aimed at the manufacture of submicron technology components by 1985 and including, in particular, development of prototype equipments aimed at the required performance objectives. Such support can include in particular up to 50 % of the cost of the lease or purchase of the prototypes by users and engineering work to be carried out by them and by equipment suppliers to tune up the equipment to the required levels.

Support of this kind would only be guaranteed if users from a number of Community companies are committed to use the prototypes from a particular manufacturer and to invest their resources in the necessary engineering work. A minimum number of user companies will be required to make this commitment if a project is to be eligible. This number will need to vary according to the type of equipment concerned and will be settled type by type.

(2) The Commission has considered carefully whether the public financial contribution to any actions proposed should come from the Community or member governments. Ideally it would be simpler to fund them through the Community budget; identical contracts with identical conditions could then be offered to each of the prospective companies involved; synchronization of projects could follow automatically on a Community-wide basis and the actions could be arranged as a coherent ensemble. There would be no danger of distorting competition in the Community.

A strategic series of actions of this kind might indeed seem to some to be an ideal example of diversification of the Community budget towards industrial development.The actions proposed, however, are extremely urgent, and in 1981 the Community budget will be rigorously limited by the resources available.
Moreover, an adequate infrastructure would have to be established however to look after projects of this scope; this would require some time to perfect.
At the same time the size of the resources being put into national programmes means that it must be possible to find adequate resources for such actions within these schemes, or, where there is no national support scheme for microelectronics, to adapt some other existing financial arrangement to make the resources available. The use of national resources would also mean that national infrastructures, contractual procedures and so on could be used at once without loss of time.

The Commission therefore proposes that the necessary public support funds be provided in the main by national finance co-ordinated in the framework of a commitment which ensures that the funds are made available when an action fulfils the agreed criteria, and that companies in different Community countries are treated fairly and on a comparable basis.

A possible Community financial contribution is however envisaged, once users from at least three Community countries are participating; in this case the Governments of Member States concerned could be reimbursed up to half the cost of the support they are providing.

The financial mechanism proposed is thus a compromise designed to combine the advantages of using national resources and mechanisms quickly, with the coherence provided by a Community framework and a Community reimbursement of part of the cost when the project has a true Community dimension.

3) The Commission has also considered carefully the most appropriate form for its proposals bearing in mind both the objective that has to be achieved and the words of the Council Resolution which invited it to propose "Actions" to meet the intended goals.

The Commission, advised by industry, has already identified the overall range of equipment which will be needed and a first list of priority actions. Other items, however, for which support is required, will have to be specified in detail over the next three years by users in the light of technological development. What is needed therefore is a Council agreement to launch the initial actions already identified and create a framework for further necessary actions in the future.

In view of the contributions that will have to be made by national funds and support schemes, the appropriate form for such a Council decision would appear to be a Regulation.

4) Management of the scheme : The use of national finance will make it possible to make use of national contractual mechanisms for placing contracts with companies involved in the scheme, and will reduce the requirements for central management.

However, a certain number of tasks will have to be carried out jointly:

(a) ensuring that the various nationally financed supports, though different in form, provide equivalent assistance to the companies concerned;

(b) establishing the minimum "threshold"; i.e. the minimum number of user companies required to commit themselves to purchase a particular type of equipment in order to trigger the availability of support in Member States;

(c) taking the final decision to provide Community support for a particular project for equipment development, once the eligibility criteria have been fulfilled;

(d) taking the decision to invite industry to make proposals on types of equipment not included in the initial priority package.

The Commission proposes that these decisions should be taken by the Commission after consultation of a co-ordination Committee. In the case of the decisions under points c) and d) above, the opinion of the Committee will have to be expressed by qualified majority. If the Commission fails to obtain a qualified majority opinion in favour of its proposed decision, it defers its application for not more than two months and puts it to the Council: the Council, again acting by qualified majority, may take a different decision within two months.

2.5. Costs and Benefits to the Community

The latest evaluations of the working parties that have advised the Commission indicate that the financial support which would be required from public funds for the whole strategic action to stand realistic chances of success ought to be at least EUA 100 Mio (some US $ 140 Mio) over four years (81-84), of which some 20 million EUA would be for CAD/CAT and 80 million EUA for equipment.

If this could contribute to raising Europe's share of world production of integrated circuits from the present 6% to say 12% by 84/85 (still far below its share of world consumption which will be in the range of 25%) this would represent an increase of total turnover during the five years of some US $ 2.5 to 3 billion. At the same time, Europe could reasonably expect to have enlarged its share of the world sales of equipment for integrated circuits manufacturing to $ 1 billion over the same five-year period, out of world sales of some $ 5-6 billion, and significantly affected the competitiveness of a wide range of European industries incorporating electronics in their products.

The proposals put forward by the Commission involve a significant innovation in Community policy; a partnership of effort by Governments, industry and the Community costing a significant amount and having to respect rigorous industrial timescales.

The prize of success if no less than to place European industry as a whole among the leaders in the electronic age.

Economic Factors (1)

1. World consumption and production of integrated circuits

The following data about the sectors more directly concerned with the proposed action programme (ICs and equipments to manufacture them) provide a picture of the dimension of the problems involved. The world market for integrated cirsuits grew by 38% between 1978 and 1979 and is expected to grow by some 24% in 79/80. The corresponding average rate of growth for Western Europe in 1979/80 is expected to be some 16% with a peak of 23% for France.

On the basis of these growth rates the western world market for ICs is expected to be between 8 and 10 US $ billion in 1980 with a further US $ 1.5 billion in the rest of the world and this figure is expected nearly to double by around 1983/84 giving a total accumulated world consumption of some US $ 70 billion over the considered period; with Europe accounting for some 20 to 25% of it.

Europe on the other hand is responsible for less than 10% of world IC production and US companies for some 70%.

In the very long term, the production of ICs by US companies for both open and captive markets is expected to grow by an average of 22%, on an annual compounded basis.

Tables 1 and 2 below shows the world production and consumption of integrated circuits classified by the location of the head quarters of manufacturers (2).

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(1) Sources : Electronics; ICE-Status Report; Mackintosh; Original Interviews.

(2) Signetics is considered US-based, ITT is considered European, Electronics Arrays is considered Japanese, Eastern Bloc is included in Row, Captive is included where not specified.

Table I : Production of Integrated Cirsuits (ICs)

Millions of dollars

Location	1978	1979	1980 *	1981 *	1982 *
USA					
for OPEN MARKETS	3,238	4,620	5,636	7,330	8,792
for CAPTIVE MARKETS	1,344	1,940	2,580	3,400	4,080
TOTAL USA	4,582	6,560	8,216	10,730	12,872
WEST EUROPE	453	570	680	750	825
JAPAN	1,195	1,470	1,850	2,220	2,660
REST OF WORLD	482	673	728	943	1,127
TOTAL	6,712	9,273	11,474	14,643	17,484

* : Estimates.

Table 2 : Consumption of Integrated Circuits (ICs)

Millions of dollars

Location	1978	1979	1980 *	1981 *	1982 *
USA	3,720	4,740	5,330	6,360	7,450
WEST EUROPE	1,180	1,700	2,290	3,190	4,030
JAPAN	1,150	1,560	2,140	2,630	3,310
REST OF THE WORLD	700	950	1,500	2,040	2,500
TOTAL	6,760	8,950	11,260	14,220	17,290

* : Estimates.

Leading manufacturers of integrated curcuits from the US, Japan and Europe : Production in 1978

Table 3

USA	
COMPANY	PRODUCTION VALUE ($ M)
TEXAS INSTRUMENTS	610
MOTOROLA	365
NATIONAL	310
INTEL	300
FAIRCHILD	285
SIGNETICS	205
MOSTEK	130
AMD	130
RCA	130
HARRIS	86
TOTAL	2556

Table 4

JAPAN	
COMPANY	PRODUCTION VALUE ($ M)
NEC	280
HITACHI	200
TOSHIBA	180
MITSUBISHI	90
MATSUSHITA	85
FUJITSU	80
TOKYO SANYO	60
SHARP	40
OKI	25
SONY	20
TOTAL	1060

Table 5

WEST EUROPE	
COMPANY	PRODUCTION VALUE ($ M)
PHILIPS	160
SIEMENS	80
ITT	75
SGS-ATES	55
THOMSON-CSF	30
PLESSEY	20
FERRANTI	12
TOTAL	432

2. The growth of the captive market

The supply of ICs to "captive" markets within integrated companies has grown dramatically in the US over the last few years and, as table 2 shows, it is expected to reach nearly 50% of the total IC production by 1982 to 1983.

Apart from the more obvious concern about security of supply other factors than purely economic ones must have dictated, in the vast majority of cases, the choices to make rather than to buy. Among these the increasing "systemic" (1) content of modern integrated circuits and the consequent desire to protect in house systems know-how and ingenuity has certainly played a major role.

The figures underline, in short, that an increasingly large number of companies are going to depend directly on the internal availability of new electronic technology for their competitiveness in the market place. More and more companies making electronic end-products, in short, will become manufacturers and designers of ICs and will depend on the acquisition of advanced materials and equipment of the kind which form the substance of the Commission's proposals. In Europe for example, this means that not only tradiional IC manufacturers but system companies like ICL or CII-HB are now strongly interested in acquiring such equipment. This trend will go on, bringing in an ever-wider range of user companies.

3. The growing demand for IC manufacturing equipment

The market for IC manufacturing equipment in the western world in 1978 was US $ 766 M and is expected to reach some $ 1050 M in 1982 (in 1978 $) with the following broad breakdown :

(1) Complex ICs, embody a range of potential applicationss in view of which their design has been optimized, they therefore heavily condition the design philosophy of the end products.

Table 6 : World Market for Equipment

	($ M) 1978	1982 (est.)
Microlithographic equipement	130	330
Other wafer printing equipment	105	28
Wafer processing	152	200
Test equipment	221	290
Device assembly	113	150
Wafer making	45	52

Broad estimates, that in the light of the steadily increasing investment to sales ratio can be considered conservative, indicate a world market of some US $ 1.3 to 1.5. Mio (in 1978 $) in 1984; this would give a total world sales figure over the next 4 to 5 years of some US $ 5 to 6 billion. The market might be much larger however since the capital equipment investments required for manufacturing is already increasing at a rate of 20 to 25% a year and recent authoritative forecasts suggest that it will continue to do so for several years, a faster growth that the estimate above.

Capital equipment depreciations of up to $ 50 per wafer are expected to be required to achieve submicron processing capability, which is the objective of the Community policy, as opposed to today's $ 10 per wafer.

As example of today's costs (in the US), a typical production module for processing 4" wafer MOS chips (capable of processing up to 500 wafers per eight hours shift) would require some US $ 11 Mio of investments in fabricating and testing equipment alone (70% of the total capital investment) plus some US $ 12 Mio a year to run it.

COMMISSION OF THE EUROPEAN COMMUNITIES

ADDENDUM
- Reasons
- Financial record

COM(80) 421 final/2

Brussels, 10th October 1980

PROPOSAL FOR A COUNCIL REGULATION (EEC)
CONCERNING COMMUNITY ACTIONS IN THE FIELD OF
MICROELECTRONIC TECHNOLOGY

(presented by the Commission to the Council)

Proposal for a

Council Regulation concerning Community actions in the field of microelectronic technology

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 253 thereof,

Having regard to the proposal from the Commission,

Having regard to the Opinion of the European Parliament (1),

Having ragard to the Opinion of the Economic and Social Committee (2),

Whereas microelectronic technology is essential to the development and competitiveness of Community industry as a whole, at a time when the European economy must increasingly provide high added value goods and services; whereas, however, Europe lags behind in this technology and the scale and nature of the effort needed to catch up with competitors by 1985 require a Community approach which must include public financial support for a collaborative effort by whereas the Council Resolution of 11 September 1979 (3) invites the Commission to explore methods of coordinating national policies and to submit to the Council specific projects at Community level with a view to promoting micro-electronic technology;

HAS ADOPTED THE FOLLOWING REGULATION :

Article 1

Coordination at Community level of the activities to be undertaken in the Member States to help attain the Community objectives concerning microelectronic technology, and the implementation of joint projects to supplement and reinforce these activities shall be carried out under the conditions set out in this Regulation.

TITLE 1

Information and Consultation

Article 2

A system for information and consultation concerning initiatives aimed at promoting the diffusion and the development of microelectronic technology and its application is hereby established between the Member States and the Commission

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(1)

(2)

(3) OJ No C 231, 13.9.1979, p. 1

FINANCIAL RECORD

1. Relevant budget item

3703 Community operations connected with the development of telematics and microelectronic technology.

2. Legal basis

Article 235 Council Resolution of 11 September 1979 (OJ no C 231 of 13 September 1980).

3. Description of the project

The aim of the proposed project is to improve the capacity of the European microelectronic component industry so as to make it competitive with its American and Japanese rivals by 1985. The proposed approach is to support the development of a European production plant industry and of computer-aided design methods used by manufacturers of integrated circuits. Support will be provided from national government funds which may in some cases be partially reimbursed from Community funds. The recipients will be manufacturers of the circuits themselves and institutes, firms and universities developing computer-assisted design programs.

4. Justification of the project

The European microelectronic circuit industry has considerable leeway to make up in a field which will be of enormous importance for the competitiveness of industry in general in the years ahead.

5. Financial implications of the project in respect of intervention appropriations

5.1 The project covers the period 1981 to 1985. Reimbursements from Community funds could be spread over the years 1982 to 1985.

5.2 The budget for the whole project is estimated at 100 MEUA, of which a maximum of 50% (50 MEUA) would be payable from the Community budget, the remainder coming from national budgets and the industry.

5.3 Community financing would cover repayments of up to 50% of the government expenditure incurred in the Member States in supporting the projects under the programme. Until the Council has taken a decision on the proposals, it is difficult to quantify these repayments. It can merely be stated that the ceiling will be 50 MEUA spread over the 1982 to 1985 budgets.

6. Financial implications on staff and normal operating appropriations

Staff necessary for the management of the project : 1 A 5/4, 1 A 7/6 and 1 B, from 1 January 1981.

7. Financing of intervention expenditure

Financing from appropriations entered in item 3703 from 1982.