



micro-electronics industries directly or indirectly on a substantial scale; whilst it is difficult to be sure that the figures are exactly comparable, it seems clear that the Japanese have allocated at least £500m to direct support of industry's research and development and investment in production facilities in micro-electronics; the West Germans currently have a 4-year support programme of DM 200m; the French one of FFR 500m. The American industry has in the past largely been supported by procurement through their defence and space programmes, though increasingly the US Government is moving into direct R & D support.

In the light of all this, and of the fundamental importance of micro-electronics to our industrial competitiveness, I have come reluctantly but firmly to the conclusion that we would be wrong to take the risk of leaving the industry from now on to fend for itself, but should continue with certain further support under MISIP for the next few years whilst our general economic policies start to take effect. But I believe that we can reduce the amount of support significantly below the £70m announced by our predecessors.

... The attached note reviewing the whole of MISIP explains that so far as concerns high volume "standard" components, £14m (out of an original allocation of £16m) is already committed, mainly to internationally mobile projects of multinationals - with in the majority of cases a significant element of UK design; this should result in investment of about £100m and production by 1983 of £350m a year. I do not therefore envisage further support in

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this area except perhaps if a particularly interesting internationally mobile project comes forward which would qualify for normal S.7 or S.8 support under our newly agreed, more rigorous, criteria.

A second area of MISF is support of the "infrastructure" industry, providing equipment used in the manufacture of micro-electronic devices and essential materials such as polycrystalline silicon, single crystal silicon, high purity liquid hydrogen (which can only be imported in very small quantities at a time) and gallium arsenide. Though important, this area is of lower priority than the actual micro-electronic devices ("standard" and "special") and little more than £0.5m (of an original allocation of £15m.) has been committed. It is here that we must seek the bulk of the saving.

This leaves "specials", where out of an original allocation of £33m, some £7½m is committed or nearly committed. The attached paper sets out in full the arguments why "standards" cannot always be used and we need an indigenous capability, British-owned if possible, for the design and manufacture of "specials", that is, circuits specially designed to meet a requirement of a particular customer.

I find the case persuasive. The techniques are going to need to be so pervasive and the cost of failure to be competitive will be so heavy that an insurance seems justified. So I do not think



it would be right to cut back so heavily on "specials" as in the case of "infrastructure" - not least because as Para. 16 of the attached paper shows, any significant reduction would fall on British firms whose profitability and liquidity are going to come under increasing pressure over the next few years.

Overall I am convinced that it would be rash to reduce the provision for MISP below about £45m deployed approximately as shown in paragraph 17 of the attached paper. But this is a bare minimum, and would cover little more than existing commitments and projects which the Department is already discussing with the companies concerned; it would leave only a very small margin for new "specials" projects coming forward, important infrastructure, or desirable internationally mobile projects, and I believe it would be right as the paper suggests to allow for such possibilities by setting the limit at, say, £55m instead of the bare £45m. I would undertake that the extra £10m would be called on only for exceptionally important projects, and would certainly plan to review progress and the continued need for the scheme every year, and whether it can be terminated and/or the financial provision be reduced - for example if it proves possible to make more use of the public procurement route, which as mentioned in my minute of 8 June is being studied by this Department. £55m would still be a reduction of more than 20% on the original target of £70m - for which, I must point out, full provision has been made in my Department's latest PES forecasts.



I hope that in the light of this you can agree to lift your ban on further commitments under MISP; this is now causing serious difficulty for firms such as Ferranti, whose investment and R & D programmes being worked up before the Election in the not unreasonable expectation of continued support, are now in limbo.

INMOS is proving difficult to resolve, and I shall report separately to you on this as soon as possible.

I am copying this minute to the Secretaries of State for Employment, Scotland and Wales, the Chief Secretary, Sir John Hunt and Sir Kenneth Berrill.

KJ

K J

19 September 1979

Department of Industry
Ashdown House
123 Victoria Street
London SW1



19 SEP 1979



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MICRO-ELECTRONICS INDUSTRY SUPPORT PROGRAMME (MISP)

The £70m provided for in public expenditure forecasts was intended to be deployed approximately as follows:-

- a) the manufacture of "standard" components in high volume (£16m allocated);
- b) the design and manufacture of components for specific sectors of the user industry and particular customers - "specials" (£33m allocated);
- c) the "infrastructure" industry which provides equipment used in the manufacture of micro-electronic devices, and essential materials (£15m allocated).

(The balance of £6m was not allocated, but held in reserve).

2 With regard to (a), £14m has already been committed - mainly to the projects of multi-national concerns which, without our support (much of it through S.7 regional assistance) would have gone to other countries. These projects should achieve investment of about £100m and production of about £350m a year by 1983. Further support is not therefore envisaged for the "standards" area, except perhaps if a particularly interesting internationally mobile project comes forward which would qualify for normal S.7 or S.8 support under our newly agreed, more rigorous criteria.

3 In the case of the "infrastructure" industry ((c) in para 1) only about £0.5m has been committed so far and projects are under discussion involving a further £1.0m. It would be very desirable to be able to provide support to:

- a) a few carefully selected areas of infrastructure where the UK is technically advanced and MISP support could enable

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the industry to provide the micro-electronics manufacturers with competitive equipment and to get a share of valuable overseas markets;

b) safeguarding the supply of some of the materials on which the micro-electronics industry is critically dependent.

But this area is of a lower priority, and a substantial reduction in planned expenditure could, if necessary, be made here.

4 The third area is "specials": here the argument is complex and needs to be set out at some length. The designer of an equipment or product incorporating micro-electronics (be it the control system for a rolling mill, a printing press, the fuel system for a motor car, a word processor, a washing machine, a computer or an electronic toy) usually has the choice between basing his system on a combination of standard circuits available "off the shelf" or on a circuit designed to meet his specific requirements and manufactured solely for him. Whilst the range and use of standards is growing rapidly, and there are those who believe that eventually they will be used for virtually everything, except highly specialised and demanding applications such as defence, this is certainly not the case at present, when there are certain requirements which it is technically impossible to meet by any combination of standard circuits. Although the "special" is, of course, more expensive, it offers many advantages: it can be designed to cope with more demanding conditions; because it can incorporate all the necessary functions on a single silicon chip, it needs less space and less power; and it makes the product in which it is incorporated unique, thus offering what may be a critical advantage in the market place. And even where standards can be used, a special circuit will frequently be needed at the interface with the rest of the system.

5 There is a large body of informed opinion which believes that for the foreseeable future standards will not displace "specials"

/and ...



and that if British system and equipment manufacturers are to be competitive they must be able to have ready access to "specials", that is circuits specially designed to meet their individual requirements.

6 There can be no certainty in these matters; but to base our policy on the hope that this school of thought is wrong would be to take a very considerable risk.

7 If we accept that it would be a prudent insurance to make sure that this "specials" design and manufacturing capability is readily available to British users, the next question is why it has to be in the UK and why those customers who want them should not get their special circuits designed by, say, American firms. It seems to be almost universally accepted by those involved that this is impracticable: the design of a special circuit needs to be optimized by a process of iteration between the supplier's design team and that of the user, quite often involving meetings once a week or more in the design stage and thereafter prototype circuits being tried by the user and then returned to the supplier for modification and reprocessing. It seems plain that this would be difficult, if not impossible, to do economically and effectively if the user and the supplier are any great distance apart. It must be acknowledged that Sir Arnold Weinstock does not wholly accept these arguments; he asserts that his designers and engineers can work with "specials" firms in the US. But he is very much the odd man out on this, and professional opinion in the industry including that of his own people in GEC, is firmly against him.

8 There are positive advantages in this capability being British-owned: a British company is likely to be more committed to British customers than an offshoot of a foreign company; and since "special" micro-circuit designs are often commercially highly sensitive, users have reservations about entrusting their designs to multi-nationals. DOI has received many representations from British users about their need for "secure access" to a British



controlled design and manufacturing capability for "specials".

9 In the case of military requirements, the Ministry of Defence would be very concerned on security grounds if they did not similarly have access to a British capability: indeed if it were not otherwise available, they would probably find it necessary to bear the cost of creating it. However it is obviously much more economical to have a capability which can serve the much larger civil needs as well as those of defence.

10 In fact, such a capability already exists, principally in GEC, Plessey and Ferranti, all of whom, though operating on a relatively small scale, have a considerable technical competence. That of GEC at present works primarily for users within the GEC organisation; Plessey and Ferranti supply a range of outside users at home and abroad. Ferranti assert that their capability could not have been achieved without Government support; their Managing Director has recently written to the Secretary of State saying that without continued support they would inevitably have to revise their plans fundamentally and greatly reduce the planned scope of their R & D and investment programmes. Plessey are certainly in the same situation, and without continued support their highly regarded Caswell laboratories would run down, and become simply a limited facility to meet the needs of their own equipment business. Even GEC's activities are on a larger scale than they would have been without support from public funds.

11 The basic reason for this state of affairs is that in the present stage of UK users' awareness of the competitive advantages of using micro-electronics, and in an increasingly competitive international market, the business does not generate adequate profits to justify investment in costly research and development projects and production facilities on the scale necessary to be internationally competitive. Plessey, whose overall group profits have for years been inadequate estimate that in the absence of Government support they will have a negative cash-flow (on their semi-conductor business) of more than £13m over the next



four years; Ferranti (whose overall profitability is considerably better) would nevertheless have a negative cash flow over the same period of some £14m on a substantially smaller turnover in semi-conductors. GEC will certainly invest to the extent required by the needs of their own equipment business; but otherwise will generally only invest where they can see very high profits.

12 Other Governments in addition to providing support for the development and manufacture of "standards" are supporting their "specials" industries for the benefit of the users: the French for example are concentrating on a single firm for "specials" to which they have allocated FFR 200m, considerably more than we envisage for Plessey, Ferranti or GEC. If in the absence of support, our existing capability is not maintained and developed it will not be able to meet the growing needs of a wide range of UK industries with the result that sooner or later the latter will fail to be internationally competitive; some may seek to set up an in-house processing capability (this is happening in some cases already because the capability is inadequate). But this is wasteful of resources particularly of scarce engineering manpower, and in any case is not likely to be a long-term solution. For as the technology world-wide advances into higher and higher levels of integration, the scale of investment needed, particularly in extremely advanced and expensive production machinery, is rapidly escalating and it is unlikely that the user companies would for long be able to keep up with the game. So they would finish up with relatively low technology, inefficient, in-house operations, and equally fail to be competitive.

13 If it is accepted that the capability is needed and that it will not be adequate in the absence of Government support, is there any better means of support than direct grants?

14 The use of public procurement is one possibility; much of the support given to the US industry (the world leader) has come by this route (though increasingly the US Government is moving

/into ...



into direct grant support of R & D), through their defence and space programmes; their huge computer industry has also contributed powerfully to the development of micro-electronics, it in turn being powered to a considerable extent by the demands of space and defence. A certain amount of development of British micro-electronic technology is already funded by MOD, and DOI will explore with them whether we are getting the maximum benefit from this, or whether there is scope for improving the transfer of technology from military to civil applications. But we must accept that our defence programme is not on a scale which could exert a comparable influence on the industry to that of the US. There are, however other areas where the public sector uses, or could use, products incorporating micro-electronics such as telecommunications, office equipment (including Prestel), and transport, and as reported in the Secretary of State's minute of 8 June, DOI is preparing proposals for a more constructive use of public procurement - in micro-electronics and other areas. But it will certainly take time to make significant progress, not least while there is pressure on public expenditure and purchasers are likely to concentrate on buying the cheapest and "safest" product to meet their requirements and to be reluctant to use their funds to support R & D of unproven products. And of course there is a vast range of products to which micro-electronics need to be applied if they are to be competitive and for which there is no public sector requirement. Nevertheless we shall pursue this line actively in collaboration with purchasing departments.

15 For the next few years, however, there is no satisfactory alternative to a continuation of support by means of 25% grants under the Micro-electronics Industry Support Programme. The majority will go into R & D projects, but part also into production equipment (R & D and production are very closely interlinked in this technology; the development of new circuits involves making them on the same plant as is used for eventual production, and the development of new production techniques makes possible the design of more advanced circuits). So if we are to preserve and develop our capability for "specials" it is not practicable to



cut back so substantially as in the case of infrastructure (para 3 above).

16 The following table shows the position on "specials" at the moment:

MISP support for "specials"
(£m)

<u>Company</u>	<u>Committed</u>	<u>Near-Committed</u>	<u>Under discussion</u>
Ferranti	0.742	6.2	5.0 *
Siliconix	-	0.69	-
Mullard	-	-	0.34 *
GEC	-	-	4.0
Plessey	-	-	11.1 *
	0.742	6.89	
		7.872	20.44
		28.072	

* What is under discussion is a programme of projects, mainly research and development, numbering 100 or more for each company.

We do not believe that we can achieve the objective of achieving the necessary capability of "specials" for less than the £28.072m above. Any significant reduction would fall on the British firms and contrast strongly with the fact that the greater part of the support so far committed under MISP has gone to foreign multi-nationals) - and that sum would only cover the projects of which we already know and would leave nothing in hand for any new ones which might come forward over the next year or two, however important or promising.

17 Overall, we believe the bare minimum required for the whole programme is £45m, deployed approximately as shown in the table below, which also shows for comparison what was previously planned and the amounts so far committed and nearly committed:-

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8

	<u>Original Allocation</u>	<u>Committed or Nearly committed</u>	<u>Minimum Provision</u>
Standards	16	14.32	14.32
Specials	33	7.63	28.072
Infrastructure	15	0.55	0.55
Reserve	6	-	2.0
	<u>70</u>	<u>22.5</u>	<u>44.942</u>

The small reserve above would be available for desirable internationally mobile standards projects (one may come forward from Hitachi) and/or additional important infrastructure projects (in addition to one committed project, we have three others under discussion which would involve support of £0.98m), or new "specials" projects.

18 The reserve above is minimal; it might not even suffice to cover a single desirable internationally mobile project which would qualify independently of MISF under the normal (revised) rules for S.7 or S.8 assistance. To tie ourselves down so tightly would be very restrictive, particularly since the MISF is supposed to run for a further 4 years. It would be more prudent to set the limit at, say, £55m instead of £45m., a reduction of £15m on the original target of £70m - for which full provision has been made in the Department's latest PES forecasts. The extra £10m would be called on only for exceptionally important projects.

Department of Industry

18 September 1979