



PRIME MINISTER

MICROPROCESSOR AWARENESS PROJECT (MAP)

1 We met on 16 July last year to discuss several aspects of micro-electronics, one of which was the Microprocessor Application Project (MAP). On this particular programme, you said you were still not fully convinced of the need to devote £55 million of public funds to speeding up the adoption of micro-electronics in UK industry and asked me to let you have a review of what had so far been achieved before commitments passed £25 million.

... 2 The attached paper by officials, recalls the background (paragraphs 1-10); reviews progress to date (paragraphs 11-16); assesses the impact of MAP (paragraphs 17-22); suggests how in the second phase there should be changes of emphasis in the light of experience (e.g increased concentration on small and medium sized firms), and that we should seek to use MAP to bring in private sector funds (paragraphs 23-31); and finally recommends that MAP should continue up to the £55 million already announced. There is a one page summary of the main points.

3 My own experience of visiting firms in the UK and my recent visit to the US confirm the main conclusion that, although there has been a marked improvement, too many UK companies still have not grasped sufficiently the critical importance of micro-electronics to their own operations and are not taking adequate steps to adopt it. Our competitors on the other hand are proceeding much more

/quickly ...



quickly, some with substantial assistance from public funds. It will be some time before our macro-economic policy succeeds in creating the climate to encourage and reward innovation and risk-taking. Meanwhile we should, I believe, maintain our help towards improvement. You will recall that at last November's NEDC meeting both the CBI and TUC were concerned at the slow takeup of micro-electronics and recognised the importance of our companies catching up.

4 One of the obstacles, particularly for the smaller firm, is the difficulty of obtaining risk finance on reasonable terms. A survey undertaken for the Department by MORI found that one in five companies had difficulty in raising finance for projects of this nature and it was a real problem for a third of smaller companies. I have myself held meetings with entrepreneurs and financiers which brought out this gap in the availability of finance for development projects. It seems that entrepreneurs just do not understand how to present their case while financiers do not have the technical expertise to appraise the technical feasibility and commercial potential of development proposals. It will take time to change these attitudes and there seems to be scope for using MAP to bridge the gap more quickly by, for example, making available to potential sources of finance (with the applicant's consent) the Department's technical appraisals of development projects which we propose to support. In such cases a relatively small MAP grant as evidence of the Department's endorsement of the merits of the project should serve to unlock private sector funds. I believe that this could be an important development in

/the ...



the next phase of MAP and could also help to alleviate the general problem of getting private sector finance into high technology projects.

5 It is of course possible to cite examples of companies which have gone ahead on their own initiative but in 1977 for every one of these there were nineteen doing nothing at all, and many of the latter are apparently still unaware of the challenge. Some large companies in fields where micro-electronics offers clear advantages (e.g in process control) are recognising the potential only slowly. The UK semi-conductor manufacturers have told the Department that their main markets are still overseas and that the UK takeup is noticeably lower than in the US, Germany and Japan (see paragraph 22 of the report).

6 I believe that failure to apply micro-electronics would contribute to further decline of UK manufacturing industry. I believe that MAP has made a considerable (and cost effective) contribution to improving the level of awareness of micro-electronics and encouraging its application. There is still a heavy demand for information and assistance. If we were seen to curtail the programme now I believe that industry would take it to mean that the Government has changed its mind about the importance of micro-electronics and most of the achievement to date would be lost. I hope that having read this report you will now agree that MAP should continue up to the previously announced limit of £55 million.

/7 ...



7 MAP heads the list of the Department's priorities for technological support to industry. Full provision for the balance of the £55 million has been made in the Department's PES bids.

8 I should of course be happy to discuss the report with you if you wish.

9 I am sending copies of this minute to the Chancellor of the Exchequer, to the Secretaries of State for Employment and Education, to Sir Robert Armstrong and to Mr Robin Ibbs.

kg

K J

14 July 1980

Department of Industry  
Ashdown House  
123 Victoria Street

incl PO

RESTRICTED

File

ds



10 DOWNING STREET

*From the Private Secretary*

21 July 1980

Microprocessor Application Project

The Prime Minister has read your Secretary of State's minute of 14 July, and is prepared to agree that commitments under the MAP should continue up to a maximum of £55 million in cash terms.

I am sending copies of this letter to John Wiggins (HM Treasury), Richard Dykes (Department of Employment), Peter Shaw (Department of Education and Science), David Wright (Cabinet Office) and Gerry Spence (CPRS).

I. P. LANKESTER

Ian Ellison, Esq.,  
Department of Industry.

RESTRICTED

ds

*cf Mr Hoskyns*



RESTRICTED

Prime Minister  
Are you prepared to  
agree continued spending  
on the MAP programme up  
to £55m as announced by  
the last Government? or do  
you want to discuss with  
Sir Keith? (In my view, the

Qa 05078

To: MR LANKESTER

From: J R IBBS

*Yes but not -  
£55m updated  
for inflation  
£55m in 1978 money*

MAP - which is to do with applications  
is of much higher priority than  
support ~~from~~ for microelectronics  
*below manufacture*

Microprocessor Awareness Project (MAP)

*Flag A*

1. Sir Keith Joseph wrote to the Prime Minister on 14 July seeking  
her agreement to spend up to the previously announced limit of £55m. on  
MAP.

*72*

2. As you know, the CPRS has been involved with MAP since its  
inception. In our view the results so far have fully justified the  
expenditure of the first £22m. But much remains to be done. We are  
still 'under-achieving' in redesigning threatened products and processes.  
The take-up of training places remains unusually high. We very much  
hope, therefore, that the Prime Minister will agree to the continued  
funding of the programme.

*18/7*

3. I am sending a copy of this minute to Sir Robert Armstrong.

*SRJ*

17 July 1980

RESTRICTED

RESTRICTED  
COVERING COMMERCIAL IN CONFIDENCE  
REVIEW OF THE MICROPROCESSOR APPLICATION PROJECT: SUMMARY

MAP was launched in 1978 against a background of concern in informed quarters at the UK's slow rate of takeup of this all-pervasive technology compared with its major competitors. Its objectives were:

- i raise significantly the awareness of microelectronics at all levels in industry;
- ii stimulate retraining in microelectronics skills;
- iii help firms to establish the relevance of microelectronics to their own business;
- iv stimulate the application of microelectronics in firm's products and processes.

To have maximum impact, MAP was to be a crash programme with £55M committed and spent over a relatively short period in three main areas - A, awareness and training (to meet i and ii above), B consultancy support (iii) and C, project support (iv). Current commitment is just over £22M with proposals amounting to a further £11M under consideration (paragraphs 3-8).

2 MAJOR ACHIEVEMENTS TO DATE INCLUDE

- 130,000 - people attended MAP awareness seminars; (paragraph 10)
- 36,000 - extra places on short term training courses by 1980 (from 2,500 in 1978) (paragraph 11)
- 1,360 - studies of feasibility of applications underway, some already resulting in new development projects (paragraph 12)
- 286 - new developments underway ranging from agricultural engineering and mining machinery to consumer products, about half by small firms (paragraphs 13-15).

3 ASSESSMENT SO FAR - although our competitors are still ahead, often with substantial help from their Governments, MAP has made significant progress towards meeting its objectives. The level of awareness has improved, but about half of UK companies are still unaware of the potential of microelectronics. The improvement in awareness is not solely due to MAP, but it has made a substantial and cost effective contribution. Lack of suitably qualified manpower and of risk finance are still major problems (paragraphs 16-22).

4 THE FUTURE - To stop now would imply that the speedy adoption of microelectronics was no longer important. MAP should continue to £55M but with changes of emphasis eg to concentrate assistance on small, first time users and sectors with high potential but low take up and to stimulate private sector finance for development. Broad plans for the remaining £30M:-

Awareness (£2M) - (paragraph 24) to encourage self-help by companies and outside bodies based on material generated by MAP, adapted to needs of particular sectors. Support for specific events as necessary;

Training (£3M) - (paragraphs 25,26) to fill gaps in coverage (geographical and level) of short courses; make available MAP material for educational use - eg "teach the teacher" kits; schools computer competition

Consultancy (£6M)- (normally) support only one study per company (paragraph 27)

Project Support (£19M) - (paragraphs 28, 30) criteria modified to bias support towards smaller companies; stimulation of private sector sources of finance; encouragement of applications in sectors where potential seems high but takeup low

DRAFT

REVIEW OF THE MICROPROCESSOR APPLICATION PROJECT (MAP)

I BACKGROUND

1 MAP was launched in 1978 in response to widespread concern at the slow takeup of microelectronics here compared with our main industrial competitors. £55M was allocated to increase awareness of the potential of microelectronics for British industry and to encourage its application. After considering the scheme last July, the Prime Minister asked for a review of what had been achieved under the Scheme before commitments exceeded £25M.

2 Commitment has now reached £22M and projects involving a further £11M have been submitted for consideration, (but without firm commitment at this stage). To date MAP has made good progress towards meeting its objectives. More firms have recognised what microelectronics can do for them and are applying it in their business but there is still a long way to go before UK companies match their competitors. This paper describes progress so far, and recommends how the rest of the £55M should be allocated.

3 Microelectronics is expected to be the dominant technology for the immediate future. It is not, in itself, fundamentally different from



traditional electronics. But the huge reduction in size, and hence costs, and the increase in performance and reliability, so increase the range of applicability as to bring within the reach of all firms (including small and medium) techniques previously available only to large companies. However although there were exceptions (these mainly in the electronics sector - see list at Annex A) the evidence suggested that UK companies were being slow to recognise the opportunities. A Department of Industry survey in 1977 showed that only 5% of firms were aware of the potential of microelectronics; a further 45% were broadly aware but were not taking action; while 50% were not even aware.

4 Meanwhile overseas competitors were quicker to market new products and improve their production processes - usually with encouragement and backing from their governments. The German and the French governments, for example, were launching substantial spending to encourage the use of microelectronics in industry particularly in small companies. UK companies were already under pressure; widespread adoption of microelectronics elsewhere posed a further threat to whole sectors (eg office machinery, manufacturing machinery, automobile components) which could find themselves marketing obsolete products or using out of date manufacturing processes and faced with making up the long lead times needed for new developments. The general impression was that UK companies were not looking closely at their competitors activities (and not just traditional competitors - eg electronic calculators compete with slide rules) and were being complacent about their ability to catch up. Since all nations were faced with this industrial

upheaval imposed by microelectronics, the challenge for British industry, much of it in need of modernisation anyway, was to embrace with enthusiasm this unique opportunity to catch up by updating its products and processes.

5 It was decided that a national programme of encouragement and stimulation was required. In addition to improving the general level of awareness of the potential (and threat) of microelectronics, the programme was to aim at alleviating other constraints - in particular a severe shortage of people adequately trained in the technology; the difficulty of identifying specific opportunities for using microelectronics by individual companies; the difficulty for UK companies, especially the small ones, of raising risk finance on reasonable terms for high technology projects, which seems to be much greater in this country than in others.

6 Against this background MAP was launched in July 1978 with an interim allocation of £15M. The Department of Industry envisaged a £70-80M programme while some other outside authorities and study groups felt even more was required eg £100M was suggested in ACARD's 1978 report "The Application of Semi-Conductors". However in December 1978 the Government announced that the allocation was to be raised to £55M for a programme with the objectives of:

- i raising significantly national awareness of the potential of microelectronics at all levels in UK industry;
- ii increasing substantially the supply of people retrained in microelectronic skills;
- iii helping firms establish the relevance of microelectronics to their business;
- iv improving the rate of application of microelectronics in firm's products and processes, particularly by first time users.

7 To have maximum impact the £55M was to be committed over a relatively short period - about three years - and spent over 5 or 6, in three main areas:-

A - Awareness and Training including

An awareness programme covering seminars, workshops, conferences and exhibitions and active stimulation of the media; it was estimated that 50,000 people needed to be addressed in some depth and at least five times that number more generally.

- On training, measures to increase rapidly the number of short course places of around 10 man-day duration aimed at providing initial retraining for engineers and technicians already in industry to complement the more formal educational/training role of DES and MSC which take some time to reorientate (because of devolved authority, the timing of the academic year etc).

B -Consultancy

Grants of £2,000 towards the cost of initial studies by an approved expert of the feasibility of applying microelectronics in particular firms

C- Project Support

Stimulation of the implementation by firms of particular applications by 25% grants (or exceptionally 50-50 shared contracts) as in other Science and Technology Act assistance schemes but with criteria adapted to microelectronics and smaller firms.

II PROGRESS SO FAR

General

8 So far £22M has been committed (or approved) and just under £11M is under consideration (but without commitment) this last being evidence of continuing heavy demand for the scheme.

	Committed	Approved but not yet committed	Under Consideration	Totals
MAP A	6.522	0.226	0.923	7.671
MAP B	2.562	0.332	0.152	3.046
MAP C	11.293	1.263	9.663	22.219
TOTALS	20.377	1.821	10.738	32.936

9 In order to mount the programme quickly and effectively, the maximum use has been made of existing facilities. The bulk of the awareness campaign work undertaken by the private sector and learned institutions was promoted by and supported financially by MAP. Similarly the training facilities are provided by existing private and public sector organisations and feasibility studies are undertaken by outside bodies in the private and public sector.

#### Awareness

10 The aim of the general awareness programme is to emphasise the pervasiveness and potential of microelectronics. The Department has itself mounted one day workshops attended by 2,000 directors of significant companies, while support in other forms (slides, films, brochures, speakers, financial assistance) has been given to over 1,000 events attended by 130,000 people. We have staged or supported exhibitions including two large events at the Design Engineering Show at the National Exhibition Centre; 11 at trades union national conferences; an ongoing trade show at the Microelectronics Centre London; an exhibition for MPs at the House of Commons; and a nine month exhibition for the general public at the Science Museum ( expected attendance over 2 million), the DoI contribution to which received a very favourable press.

#### Training

11 In the longer term this area is the responsibility of DES (general education) and MSC (retraining of mature people in industry) but both acknowledged in 1978 the urgent need to expand nationally the number of places on short courses, a need they could not meet in the required time. With their agreement MAP has helped to expand the number of places on short courses for retraining in microelectronics from 2,500 in 1978 to 36,000 by 1981. In a recent survey

take up of these courses was found to be 80% (compared with a normal expectation of 60% for mature student courses). MAP support meets half the costs of setting up the courses in public and private sector establishments: thereafter they are expected to be self sustaining with participants paid for by their companies. In addition £0.5M has been offered to the TUC towards a national training programme for some 65,000 shop floor workers to be organised through Colleges of Further Education (as are other TUC courses) to standards ensured by DES procedures. Assistance is also going to the Open University for courses in microelectronics applications for 5,000 managers, with a longer version for engineers to follow shortly.

#### Consultancy (MAPCON)

12 There have been some 1,970 applications mostly from smaller firms for the £2000 grant towards consultancy advice for first time users of microelectronics and a steady stream of new applications is received at the rate of about 30 per week. To date 1,360 have been approved and of the 490 which have been completed, about 3/4 of companies have said they intend to follow up the results. Already 13% have resulted in applications for support for specific projects under Part C while evidence indicates that a similar number are proceeding without assistance - a trend which we shall obviously do our best to encourage. The distribution of the studies is about equal between products and processes.

#### Project Support

13 Support for projects aimed at implementing specific applications of microelectronics, is intended to reduce the above average risk, to a first time user when introducing new technology.

Each project is appraised individually as to technical merit and market prospects and the company must satisfy the Department that it is viable and has the resources (managerial, financial, technical, manufacturing and marketing) to carry the project through to commercial exploitation. Assistance is not given to projects which the company would undertake unaided. There must be some "additional" benefit, eg that the project would not otherwise proceed or would take much longer to complete or would be undertaken on a smaller scale without assistance.

14 Although MAP support reduces the cost and the risk, the company has to find 75% of the costs itself and the final judgement is theirs. This minimises the risk of uncommercial projects being put forward. Many companies welcome the independent technical assessment of their proposals. The fact that DoI is prepared to offer assistance may help a subsidiary convince a main board that a proposal is worth considering and has in some cases encouraged private sector sources, most of whom do not have access to adequate technical advice, to make funds available.

15 Applications are coming in at about 30 a month; about half are rejected. Of the 801 applications received by 31 May 1980 :-

	<u>Number</u>	<u>Project Cost*</u>	<u>MAP Support</u>
Approved	286	£48M	£12.5M
Under Consideration	132	£38M	£ 9.5M
Rejected	383	£51M	N/A

\*Direct cost of MAP-element of each project. Total project cost will usually be much higher, taking account of associated investment in all plant, buildings etc not eligible for MAP support.

This means that so far 286 additional applications of microelectronic techniques are underway involving total investment likely to be in excess of say £200M so far. Analysis of the 801 cases by type of company and product are at Annexes A and B. About 50% are from small companies -see examples at Annex C.

### III Assessment

16 Since MAP began, there has been a marked improvement in the general level of awareness. We would not seek to claim that MAP alone has been responsible but it has clearly played a substantial role and the interest generated by MAP activities has encouraged the private sector and the media to take up the message.

17 Among MAP's achievements to date are:

- 130,000 people have attended MAP awareness seminars,  
(reaction 74% good or excellent; 25% satisfactory;  
only one serious complaint);
- 36,000 new places on short term training courses by 1981  
compared with 2,500 in 1978
- 1,360 feasibility studies started, 490 completed some  
already resulting in new development projects, not  
all with support under Part C;
- 286 new developments underway, likely to generate say £200M of  
additional investment with revenue earnings of  
many times that figure.

This seems to us a substantial and cost effective contribution to encouraging the more rapid adoption of microelectronics in the UK.

18 To help assess the effectiveness of MAP we have supported organisations such as MORI and the Policy Studies Institute (PSI). The DoI survey of 1977 found only 5% of companies aware and active; 45% broadly aware but not active; and 50% not even aware of the pervasiveness and challenge of microelectronics. In December 1979 MORI reported on a survey carried out for the Department based on interviews with managers (often chairmen or managing directors) of over 750 significant UK companies. This was backed up by earlier group discussions with opinion leaders and also input from bankers and financial institutions. MORI reported that although the position was much improved among the 'aware' 50%, even now, around 50% still did not fully appreciate the importance of microelectronics and were not doing anything to adopt it. The main points of their report are summarised at Annex C: other important findings were lack of expertise - about 50% of companies do not have any electronics (much less microelectronics) expertise in middle or top management - and difficulties in raising finance - difficult for one in five companies and a major problem for over a third of the smaller companies.

19 The surveys underline the difficulty of putting over the message and instilling a sense of urgency. Following the MORI report we are trying to reach those companies still apparently unaware through a general mailing shot which includes an introductory booklet, advertises some of the courses and facilities supported through MAP and invites those interested to seek further information. Although there have inevitably been one or two adverse reactions, from the first 2,000 letters sent out we have had over 200 requests for further information some from companies which might have been expected to be better informed. About half a dozen companies have told us they



are already aware of the importance of microelectronics but thanked us for drawing attention to MAP's facilities.

20 Even though the general level of awareness has improved, the message from our sponsor divisions and regional offices is that companies tend not to appreciate the relevance of microelectronics to their own activities and this includes some large companies. There are many ways of sampling awareness, none of which would provide comprehensive results, but a useful indicator is perhaps to look at the 100 or so companies which were visited by the Prime Minister before the Election (and which might be expected to be "above average"). Only 17% are believed to be actually using microelectronics and 55% are apparently unaware of the potential. Of the 17% nearly three-quarters have received some form of assistance under the Science and Technology Act or Industry Act.

21 The main UK manufacturers of microelectronic components, which would be used in applications, have told us that they sell more of their output overseas than in the UK and that application of the technology in this country is markedly behind and growing at a slower rate than that of our competitors. This is so even for 'specials' where demand from UK users might be expected to exceed that from overseas firms with their own microelectronics supplies: this suggests that overseas countries are developing new applications so quickly that their own suppliers cannot meet the demand. Although UK consumption of microelectronic components has increased over the last year, the main users are in areas where there is already a high level of awareness - defence, telecommunications and consumer electronics. (Government promotion of teletext and viewdata is seen as a contributory factor here). In industry at large there has been little change; Germany and France are reported as using microelectronics more innovatively. Generally the message was that there are good ideas in the UK but 'the conversion into products is very slow' and the UK is still 'underachieving'. Our contacts with other large firms which themselves are aware tends to support this view.

## The Future

22 What would happen if MAP were stopped at the £25M commitment level? Has the general awareness improved to the point where UK industry can be left to get on with the task of adopting microelectronics? It is impossible to produce conclusive answers to these questions; the stories of successful applications which attract publicity can mask the general lack of appreciation of the importance and relevance of microelectronics. There will undoubtedly be some companies who have proceeded alone but as indicated in the previous few paragraphs they are the exception rather than the rule. There is still a heavy demand for MAP activity (see paragraph 8 above) but there is evidence, e.g. in follow up to consultancy studies, that some companies are willing to proceed without help once they are confident of their ability to do so.

23 In our view if the Government were not to allow MAP to run the full course of £55M, it would be interpreted as meaning that it was not after all important for UK industry to make its special effort to adopt microelectronics. It is not enough to improve general awareness; there is still a need to ensure that companies relate microelectronics to their own activities and take the necessary action. The constraints are many- shortages of trained manpower remain and the difficulty of raising risk finance, particularly for small to medium sized companies - as well as market weakness, lack of profits/cash flow and general lack of confidence- factors which are not peculiar to users of microelectronics but which are a powerful disincentive to any investment in modernisation and new technology. Our proposals for tailoring the second phase of MAP to meet these circumstances are set out overleaf.

#### IV Phase 2 Proposals

##### Awareness (£2M)

24 In phase 1 the aim was to put over the message to as wide an audience as possible to alert them to the challenge and encourage them to think about the relevance of microelectronics to their own products and processes. Follow up action will need to be more specific - tailored to the needs of sectors or even individual companies - at the engineering and operational levels. Since it is not possible to mount events which go into individual areas in sufficient depth across the whole range of industry, the emphasis will be on self help by companies backed up by supply of material generated by MAP and by others willing to make material generally available for use by other companies (or other bodies organising seminars) to use in-house. We shall also take up opportunities to support specific events (through the media, films, books, seminars, exhibitions etc) as necessary

##### Training (£3M)

25 The demand from industry for people trained to all levels in microelectronics is very heavy and growing. Although a large proportion of industry is hoping it will be able to hire ready trained people, most realise that the only real solution is to train their existing people as well. Phase 2 will aim to fill the gaps in the coverage of training courses (ie improving the geographical spread and encouraging more advanced courses) and monitoring closely the support MAP is giving to the Open University and to the TUC. We are also currently negotiating with the BBC educational services to link MAP into an important microelectronics project scheduled for screening in October 1981. Without this support it is unlikely that the BBC could accommodate this important series of projects within its reduced educational budget.

26 In planning phase 1 activities we had assumed that parallel action would in due course be taken by DES in schools and MSC through the Industrial Training Boards. However this has not happened on the scale envisaged MAP cannot make good all the shortfall but we shall be considering how far it would be appropriate to bridge the gap. In particular in consultation with DES we would hope to meet some of the need for supporting hardware and software, for example in supplying training kits, "teach the teacher" courses, software modules for educational use; and we have already organised a computer competition for schools.

#### Consultancy (£6M)

27 There is a steady and substantial demand for consultancy grants. This activity seems to be a very cost effective way of encouraging firms to consider the specific application of microelectronics and it has been well received by industry. An incidental benefit is that MAPCON is helping to bridge the gap which exists between small to medium sized companies and universities, many of which act as MAPCON consultants. Once contact is established, they recognise that other expertise is available. We therefore intend to continue to provide this service but to tighten the criteria so that individual companies do not normally receive support for more than one study.

Project Support (£19M)

28 Most of the applications for support under Part C have been from companies who were already awake to the potential of microelectronics but had hesitated to apply it. More recently we have begun to see proposals which have resulted from earlier parts of the Scheme (eg consultancies) and this tendency is expected to increase substantially. There is welcome evidence that some companies are willing to proceed on their own once they have acquired the knowledge and confidence but we see support for development projects as a continuing need for the next few years if British industry is to hold, let alone improve its position vis a vis its competitors. It may be reasonable to assume that once a large company has recognised the opportunities, it will be in a position to take steps to improve its products and processes. In future therefore we intend to bias project support towards smaller companies by:

- i removing the lower limit of £10,000 on eligible project costs;
- ii introducing accelerated appraisal procedures for projects under £25,000;
- iii imposing a normal upper limit of £500,000 on project costs.

29 As shown in the MORI report and as recounted to the Secretary of State and officials at first hand, a major problem is that of tapping private sources of finance, both for start ups and for development projects. We have already held discussions with a number of institutions (eg ICFC/TBC, Midland Montague, Barclays, Development Capital Ltd, Post Office Pension Fund). We have established that

there is a communication gap. The small entrepreneurs do not know how to present their project in the right form while financiers lack access to adequate technical assessments at the development stage but need something more commercially orientated than a university could provide. DoI commitment to a project through the provision of a modest grant following a technical assessment adds confidence and it seems that arrangements for joint appraisals and hence joint funding, with the company's consent, could be a means of bridging the gap. This would be a lead into private sector backing for the much more costly manufacturing phase which MAP does not cover and with which private sector financiers are more familiar. We intend to pursue the scope for co-operation as speedily as possible. This could provide useful experience for dealing with the general problem of involving private sector finance in high technology projects. We shall also be prepared, in new start ups, to take greater risks in a limited number of cases ( not exceeding £1M in total).

30 We are examining the scope for extending the sectoral approach envisaged for the awareness programme to Part C to encourage the application of microelectronics in sectors where there appear to be good opportunities but where the rate of adoption has been low. One such sector where this has already been done with good results is food processing and work on identifying a few more sectors is in hand. In addition we shall use (limited) MAP funds to underpin applications work in important ancillary technologies essential to the application of microelectronics (e.g.sensors, transducers and design aids), and in support of the new policy on public purchasing to seek out opportunities for developments in industry aimed at meeting specific requirements likely to arise in the public sector for advanced microelectronic applications.

V Conclusion

31 The first phase of MAP has already made significant progress towards meeting the objectives set in 1978.

32 To stop now would be to cut short a programme previously accorded high priority just as it is making a real impact . We could not conceal a cutback which would entail a sudden halt to new commitments and the reaction across industry and nationally would be considerable, suggesting that the Government no longer attaches importance to the adoption microelectronics and the result would almost certainly be that UK industry falls further behind its international competitors.

33 We therefore recommend that the £55M allocation should be confirmed and that MAP should run its full course with some redirection as proposed in paragraphs 22-30 above to consolidate and improve on its achievement in raising awareness and securing the widespread adoption of microelectronics by UK companies.

LAl  
30 June 1980



## CHARACTERISTICS OF COMPANIES APPLYING FOR MAP PART C SUPPORT

## Company size

Turnover in £M	%
0 to 1	40
1 to 2	15
2 to 10	20
10 to 100	19
over 100	6

Proportion with previous microelectronics experience 53%

Proportion using a sub-contractor for microelectronics or software support 39%

Is the project

a) novel	68%
b) enabling the company to enter new markets	44%
c) defensive against competition	45%





## BREAKDOWN OF MAP APPLICATIONS BY PRODUCT TYPE MAY 1980

		%
Computer related products	48	6
Microelectronics design support	16	2
Data loggers	39	5
Machine tool related	66	8
Motor control	49	6
Process controllers including food/drink	99	12
Production aids	55	7
Automatic test equipment	10	1
Weighing and packing systems	36	5
Agricultural implements and equipment	5	1
Office mechanisation	41	5
Lift system	4	1
Educational equipment	8	1
Hospital/Medical equipment	16	2
Energy related products	19	2
Instrumentation	106	13
Communications	53	7
Transport	36	5
Vending and Amusement machines	10	1
Security and safety	17	2
Consumer	19	2
Retail related	15	2
Broadcasting	5	1
Hotel equipment	2	0
Other	27	3
	801	100

## 1. EDWARD WILSON &amp; SON LTD - DEVELOPMENT OF A HIDE GRADING MACHINE

Turnover: £1.5M

Project size: £112K (DoI contribution - £20K)

This long established Merseyside firm, supplying tanning machinery, passed into the hands of a younger generation of the Wilson family, who are looking to arrest the gentle decline of the family business by applying microelectronics to its existing products. With DoI support the company is developing a hide grading machine, a prototype of which attracted considerable interest at the World Leather Trade Exhibition in Paris last September. The company is confidently expecting to convert provisional orders into firm business when production commences in August this year.

The problem facing the tanning industry is that during 1978 the price of rawhide rose by over 50% while the average price of the dressed leather only rose 35%. The position has deteriorated since then and tanners' margins are being further squeezed. Assistance is simultaneously assisting the revitalisation of a long established company and helping the tanning industry remain competitive, by improving the selection of quality hides which can command premium prices.

## 2. RDS AGRICULTURE LTD - CROP SPRAYER CONTROL

Turnover: £91K

Project size £83K (DoI contribution - £21K)

A small company of only 35 employees launched a microprocessor-based agricultural sprayer monitor on the UK market at the end of 1979. This product which had been developed with assistance under MAP gives the operator a direct measurement and display of liquid fertilisers deposited per unit area. It is built on a custom-built microprocessor chip from Intel and over 50 units have already been sold. There are some 10,000 sprayers in the UK which could use this monitor and the company estimates the worldwide potential for this product as well in excess of the £3M over 5 years. By sub-contracting the actual manufacture, while retaining selling with RDS Agriculture, this project led to increased employment in a neighbouring firm.

This is another example of a small company's ability to innovate when financial assistance is available.

## COMMERCIAL IN CONFIDENCE

### 3. MACWELL SYSTEMS LTD - AUTOMATIC FAULT FINDER IN DATA COMMUNICATIONS

Turnover: £130K

Project size: £25K (DoI contribution - £6K)

Macwell Systems Ltd is a very small company with an idea for using a microprocessor in detecting and diagnosing faults in data communications at the modem which connects data processing equipment to the Post Office's network. The product, Autotest, is simple to use and is a unique product - the first allowed by the Post Office to be connected across a modem.

When support was agreed, to reduce the development of Autotest from 12 to 6 months, Macwell had 3 staff and a turnover of £40k. Today it has 12 staff and the turnover has increased to £130K. Fifty Autotests have been sold; of these 30 have been exported to the US, where an order for a further 50 is expected.

Through the Autotest idea, Macwell won the Technical Development Capital's Innovator of the Year Award in 1979, worth £20K.

### 4. BROOKES & GATEHOUSE LTD - MARINE INSTRUMENT SYSTEM

Turnover: £1.6M

Project size: £120K (DoI contribution - £30K)

Brookes & Gatehouse, part of the Unitech Group, are leading manufacturers of quality electronic instruments for yachts and small commercial vessels. The firm proposed a novel and sophisticated instrumentation system covering echo sounding, water speed, wind speed and direction and heading where the instruments and displays could be placed in any position on the ship and interconnected through a ring main.

The system makes extensive use of microelectronics and introduces digital technology in the displays. The project, which is almost complete, will result in a totally new approach to small boat instrumentation, and has assisted the company to move into micro-electronics for the first time.

### 5. TRAFFIC SAFETY SYSTEMS LTD - VEHICLE SPEED METER

Turnover: £130K

Project size: £18K (DoI contribution - £4.5K)

Every police force in the country uses this company's version of the American Vascar device (Visual Average Speed Computer And Recorder) for checking motorists' speed. TSS Ltd have now re-engineered the device into a miniaturised hand held portable

COMMERCIAL IN CONFIDENCE

version incorporating a microprocessor chip (the Mostek F8). Since its launch in January this year over 40 units have already been sold to 16 police forces in the UK and further units are under evaluation in Germany and the US. The potential market for these devices worldwide is clearly most promising to show a tremendous return on the company and DoI contribution to the product's development costs.

This small London-based company with only 6 employees and a turnover of £130K pa has really taken on the world with this product, including the US where Vascar was invented.

6. TANN SYNCHRONOME LTD

Turnover: £2.6M

Project size: £296K (DoI contribution - £74K)

Tann-Synchronome Ltd is an old established company manufacturing factory clocks, access control systems and fire detection products. For the last 2 years they have been importing microprocessor based access control systems from the US, using coded magnetic cards to permit access.

The company decided that by designing and manufacturing its own system, including the sensors, it could make a potentially better product for a wider market - with the advantage of saving a considerable amount on its imports (£250K in 1979). However, funds for R & D in the company were committed to other parts of the business, particularly in fire and smoke sensors. Without help from MAP the access system development would have been delayed. This is the first entry of Tann-Synchronome into applying microelectronics itself. The early use of microelectronics in this project will have spin-offs in its other product ranges. The company estimates that this development will increase employment directly by 45 staff.

7. LEE STEEL STRIP LTD

Turnover: £14.5M

Project size: £112K (DoI contribution - £28K)

Lee is a private steel company which made a loss in 1979 and suffered from the effects of this year's steel strike. It is seeking to return to profitability by improving its manufacturing processes and the use of microprocessors within the process controllers is part of this. In this first known attempt by a private steel company to use microprocessors in the control of annealing and heat treatment, Lee aims not only to improve the quality of its products but to reduce costs, both in energy consumption and labour, the latter through natural wastage but in an area where the work environment is not particularly pleasant.

The Company has agreed to demonstrate the new system when it is completed next year to other companies in the industry, and we believe that this will encourage further applications of microelectronics in the private steel sector.

8. MJN INSTRUMENTS LTD

Turnover: Not yet trading

Project size: £50K (DoI contribution - £12.5K)

This company was formed in September 1979 to develop and exploit a fuel consumption meter for private cars. The main elements are a German fuel flow gauge, a car mileage sensor developed by MJN and a microprocessor. The objective is to produce a kit which can be installed by garages or by moderately proficient do-it-yourself car-owners. MJN has interested car accessory dealers such as Halfords who commented enthusiastically on the concept and initial design, but will not order until an engineered version is demonstrated.

We felt this was a valuable project in providing drivers with immediate information on fuel consumption. However it was clear that the company did not have the funds to pay for the whole of its share of the development, even with MAP support, nor were we satisfied on its arrangements to manufacture.

Contacts were made by the Department, with the knowledge and consent of the company, to find alternative sources of finance. As a result the Penta Group, which has existing interests in the retail motor trade and has a subsidiary already applying microelectronics to the flow control of liquids, acquired a share in MJN and is supporting this venture. The backer was found through the Department's knowledge of industry but would not have participated without some government financial involvement.

The development is now proceeding on schedule and is likely to be commercially successful.

9. PRESTIGE GROUP LTD

Turnover: £35M

Project size: £458K (DoI contribution - £115K)

The Prestige Group manufactures a wide range of domestic products and is one of Europe's principal manufacturers of pressure cookers. However, 1979 was a bad trading year for the company and the existing products have not been selling well. Prestige has therefore been looking at a new product, perhaps embodying a novel approach in the kitchen.

## COMMERCIAL IN CONFIDENCE

In collaboration with Patscentre, a research consultancy, Prestige conceived the Electronic Cooking Centre which will cook under pressure without venting steam, and also slow cook, steam, deep fry and roast. Pressure, temperature and cooking time are the variables controlled, through a range of punched cards, which contain the printed recipe and can be inserted into the Cooking Centre to programme the type of cooking required.

This is the first time that Prestige has used microelectronics, and without MAP support it is likely that the project would be delayed by at least a year or may not go ahead at all. If successful it will provide a significant alternative capital investment for the home as an alternative to microwave ovens, most of which are Japanese.

COMMERCIAL IN CONFIDENCE

Some Important Extracts from the MORI ReportA1.1 Knowledge of Microelectronics Technology (UK Managers)

		<u>Awareness Seminar/Course</u>	
		<u>Have attended</u>	<u>Not Attended</u>
Great deal	...	9%	4%
Fair Amount	...	45%	23%
A Little	...	40%	44%
Next to Nothing	...	5%	28%

+ + + + + + + +

A1.2 Seminar/Course Attendance

<u>Category of Firm</u>	<u>Seminars Attended</u>		
	<u>At least one DO NOT WORKER OR MAN SEMINAR</u>	<u>None</u>	
'Times 1000'	...	63%	37%
250 + employees	...	51%	49%
Up to 250 employees	...	39%	61%

+ + + + + + + +

A1.3 Source of Knowledge

		<u>Seminars Attended</u>	
		<u>None</u>	<u>One +</u>
	<u>Total</u>		
Press/Technical Articles	...	31%	41%
Seminars/Courses..	...	25%	7%
Colleagues at work	...	7%	7%
Case Studies/Other Companies.	...	6%	6%
* TV/Radio	...	2%	2%
** Manufacturers/Suppliers	...	2%	2%

Table demonstrates the excellent relative performance of the Seminar/Course, also the surprisingly bad rating of \* TV/Radio in spite of the undoubted impact of such excellent films as the BBC/TV "Chips are Down".

Note also the poor showing of the \*\* microelectronics industry itself. Clearly, it is no use expecting that potential users will 'receive the word' from the latter source.

+ + + + + + + +

A1.4 Microelectronics Expertise in UK Companies

<u>Number of Engineers with experience in the firm</u>	<u>Percentage of Companies</u>		
	<u>Current Status</u>	<u>Hoping to Recruit</u>	<u>Intending to Retrain</u>
None	48%	53%	74%
1 - 5	33%	39%	13%
Over 50	2%	3%	2%

Table demonstrates the paucity of microelectronics expertise residing in firms, also the probably misplaced hope that many will be able to buy in the necessary skills. Demonstrates the need for massive re-training facilities.

+ + + + + + + + +

A1.5 Proportion of Companies which have applied microelectronics to their product or process - October 1979  
(Excluding data handling, computing, stock control, etc.)

<u>Area of Activity</u>	<u>Percentage of Companies</u>	
	<u>Already</u>	<u>Planned</u>
Manufacturing/production process ...	33%	29%
Quality Control/Testing ...	26%	21%
Design ...	20%	16%
In product ...	15%	34%

Table indicates a significant improvement over the Department's composite (5%) 1977/78 picture but needs to be treated with caution because it does not demonstrate adequately the depth to which companies are applying the technology - much in fact remains to be done.

+ + + + + + + + +

A1.6 Companies admitting to loss of market share through a slowness in microelectronics application.

Lost share already ...	4%
Expectation, further ...	8%

Half those who had already lost market share had lost to overseas competition.

+ + + + + + + + +



A1.7 Perceived UK Speed to Take-Up

Too fast	...	2%
About right	...	24%
Too slow	...	57%

+ + + + + + + +

A1.8 Perceived Need for Government Involvement

Awareness Programme		60%
Training	...	65%
Feasibility Studies		52%
Project Support..		40% *

\* This figure might be expected to increase as more firms become aware of microelectronics and reach the application stage.

+ + + + + + + +

A1.9 Finance

Finance for application is a problem for about one in five of the larger companies and is a major problem for more than a third of the smaller companies.

+ + + + + + + +