



2-8-i

- Function
- Structure
- Ref.

BILL JOHNSON - PRESENTATION FOR FEBRUARY 20TH

BILL KEATING

# GENERAL SOFTWARE STRATEGY

## MAJOR GOAL:

AGGRESSIVELY MOVE INTO AND BE SUCCESSFUL IN

### DISTRIBUTED PROCESSING

## OTHER ASPECTS - SUBGOALS:

- o EMPHASIZE:
  - o 32 BIT CORPORATE STRATEGY
  - o HUMAN INTERFACES (USEABILITY, APPROACHABILITY, LEARNABILITY, INSTALLABILITY)
  - o PRODUCTIVITY & QUALITY
- o IMPROVE WEAKNESSES
  - o DATA MANAGEMENT/TRANSACTION PROCESSING
- o ESTABLISH NEW CAPABILITIES
  - o OFFICE/APPLICATIONS
- o AS ALWAYS
  - o SUPPORT HARDWARE
  - o KEEP STRONG IN REAL TIME/TECHNICAL COMP/  
INTERACTIVE SPACES



## SOFTWARE TECHNICAL STRATEGY

### THRUST

- o GOOD PRODUCTS (SELECTION, COHERENCE, MIN REDUNDANCY)
- o QUALITY IN WHAT WE DO - LEADERSHIP REP BY 1985
- o USER CONVENIENCE - LEADERSHIP REP.
- o SUCCESSFUL UMBRELLA PROGRAMS  
OFIS, DP, APPLICATIONS
- o PREPARE FOR THE 90'S

### THRU

- o DEVELOPMENT PRODUCTIVITY
- o CAPABILITY (& KNOWLEDGE) IN SPECIFIC KEY TECHNOLOGY AREAS



How

- o ACHIEVE COMMON UNDERSTANDING OF THE SOFTWARE TECHNOLOGY SPACE
- o APPRAISE OURSELVES BY AREA } TRACKING
- o REINFORCE THIS WHEN NEEDED } METRICS
- o AGREE UPON WHERE DEC SOFTWARE SHOULD BE IN
  - 1985
  - 1990
  - 2000
- o PRIORITIZE AREAS FOR IMPROVEMENT CONSISTENT WITH GOALS
- o SELECT MEANS FOR IMPROVEMENT
  - o ADVANCED DEVELOPMENT
  - o ARCHITECTURE SELECTION/ADDITIONS/CONTROL
  - o TOOLS/TRAINING
  - o PROCESS

QUESTIONS FOR EACH TECHNOLOGY AREA:

TECHNOLOGY	PRIORITY (1-10)	Now	1985	1990	
		_____	_____	_____	_____
<u>ASSESSMENT</u>					
		RATE (0-10)	TREND +, -	GOALS '85	'90
COMPETENCE (AS SHOWN BY PRODUCTS)		_____	_____	_____	_____
UNDERSTANDING OF AREA (PERSONNEL)		_____	_____	_____	_____
METRICS :		_____	_____	_____	_____
TOOLS		_____	_____	_____	_____
PROCESS		_____	_____	_____	_____

(NOTE: FOR HIGH EXPOSURE AREA ADD (H) BEHIND-RATE)

\$'s BEING SPENT

AD \_\_\_\_\_

TOOLS \_\_\_\_\_

ALL ACTIVITY IN AREA \_\_\_\_\_

POSITIVELY

NEGATIVELY

RELATED TECHNOLOGIES

NOTES:



# KEY ELEMENTS SUPPORTING SOFTWARE TECHNOLOGY

(INTEND TO TIE INTO TAXONOMY)

## STATUS

### ADVANCED DEVELOPMENT

~ 7.5% FY81

- o CONCEPT LIVES
- o CLOSELY COUPLED
- o MUST SUPPORT D.P. BETTER
- o PROBLEMS IN NEW SPACES

### ARCHITECTURE

~ 4% OF FY81

- o PROCESS MODEL IS EMERGING
- o SARA WILL HELP
- o NEW AREAS DIFFICULT TO ADDRESS
- o WHEN IS CHANGE DEMANDED?

### TOOLS

~ 6% OF FY81

- o BASIC TOOLS IN PLACE
- o NEW KEY TOOLS COMING
- o SOME AREAS UNTOUCHED
- o OVERALL INTEGRATION OF OFFERING

### PROCESS/ORGANIZATION

- o TOP LEVEL MODELS - O.K.
- o HASSEL IN PLANNING/BUDGET/CHARTERS
- o DO PROCESSES HELP ?
- o VIABLE SOFTWARE SUPPORT

THE FUTURE

1990

2000



## SCENARIO

50's	BIRTH	SCIENTIFIC/DEVOTED SYSTEM
60's	BATCH	COM/SCIENTIFIC/MULTIPROGRAMMING
70's	INTERACTIVE	G.P. & TP
80's	DISTRIBUTED	PROCESSING & DATA

- o COMPLEXES OF COOPERATING PROCESSORS
- o MOVING BACK TOWARD DEVOTED-FUNCTION SUBSYSTEMS
- o COOPERATION AT SEVERAL LEVELS (AND MANAGEMENT)  
SUBSYSTEMS/SYSTEMS/MULTI/NETS

90's SOLUTIONS / THE KNOWLEDGE (INFO) INDUSTRY

WHY: VOID EXISTS - USER APPETITES  
VENDOR GROWTH

NOTE DEC (1996) AT 70 BILLION  
REQUIRES SHIPPING OVER  
1000 TIMES SYSTEM POWER

## CHARACTERIZATION OF LEADING SYSTEM VENDOR 1990

### A REPUTATION FOR MANAGING COMPLEX TECH IN SIMPLE PACKAGES

#### BASED ON:

- o QUALITY: PRODUCTS MEET USER EXPECTATIONS
- o LOW COST OF OWNERSHIP
- o DISTRIBUTED PROCESSING -
  - CONFIGURATION OPTIONS FROM PC TO LARGE TS FUNCTION SERVERS (MODULES) AS NEEDED
  - SOFTWARE MANAGES PROCESS/DATA DIST AT MULTI LEVELS SUB-SYSTEM/SYSTEMS/LOCAL NETS/NETS/WORLD
- o USEABILITY: SATISFIES NOVICE - TO - SOPHISTICATE PRODUCTS ADAPT TO NEEDS & OPERATION
- o PROGRAMMER & OPERATIONS PRODUCTIVITY LEADERSHIP
  - LANGUAGES/FACILITIES/TOOLS/SUPPORT SYSTEMS
  - GENERAL APPLICATIONS
- o CONSISTENCY & SYNERGY BETWEEN ALL PRODUCTS
- o PROVIDED USER CONTINUITY FROM PAST
- o LIVES WELL WITH ESTABLISHED COMPETITORS
- o FLEXIBILITY: PAY FOR NEED; RELIABILITY, AVAILABILITY, SECURITY
- o SOLUTIONS TO THE SIMPLER, GENERIC PROBLEMS

IN 90'S LEADERSHIP MUST BE ACHIEVED ON NEW FRONTS

PROCESSING INDUSTRY  $\xrightarrow{\text{BECOMES}}$  KNOWLEDGE INDUSTRY

TRADITIONAL PROCESSING, EVEN DISTRIBUTED

PROCESSING, OFIS AND OTHER LIKE OPPORTUNITIES WILL START TO SATURATE

THESE HOWEVER WILL BE BASE FOR THE KNOWLEDGE INDUSTRY:

WHAT IS THIS? - FOR THE CUSTOMER, COST EFFECTIVE:

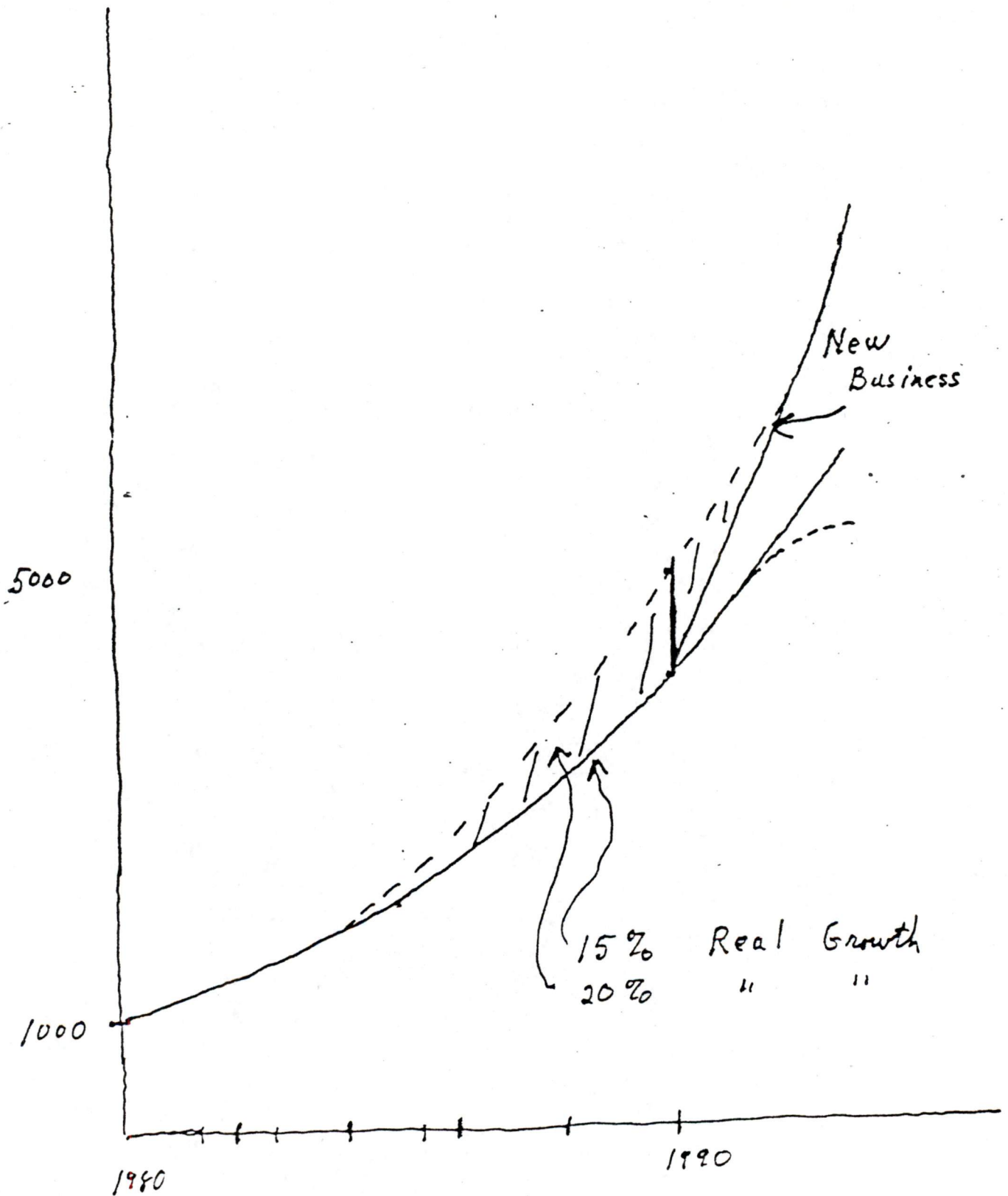
- O SOLUTIONS/NEAR SOLUTIONS TO COMPLEX BUT REGULAR PROBLEMS
- O SOFTWARE (ABOVE OS'S) FOR COMPETITOR SYSTEMS  
(THE SOFTWARE BUSINESS)
- O INFORMATION AND BACKUP SERVICE BUREAUS
- O FACILITY MANAGEMENT - FACILITATED BY LEADERSHIP TOOLS  
(I.E. NI INSTALL & MANAGEMENT)
- O CONSULTING & EXPLOITING IN TOUGH NEW EMERGING AREAS  
LIKE A.I.;  
SPECIAL ENVIRONMENTS & CONFIGURATIONS; SPECIAL LANGUAGES

PARLAY STRONG TOOLS IMAGE OF 80'S  
TO SOLUTION LEADER OF 90'S }

FORMULA FOR SUCCESS

# The Challenge

Software Skills Central Eq.



SEMICONDUCTOR/90

CYCLES OF EFFORT

1980-1985 - BUILD TECHNOLOGY BASE

- o DEVELOP STRONG BASE S/C TECHNOLOGIES
- o IMPLEMENT KEY STRATEGIC S/C DEVICES IN HL.
- o ADVANCE DEVELOPMENT OF SILICON ARCHITECTURES
- o EXPAND THE EFFORTS ON DESIGN TOOLS, TECHNICAL TRAINING, DESIGN METHODOLOGIES.

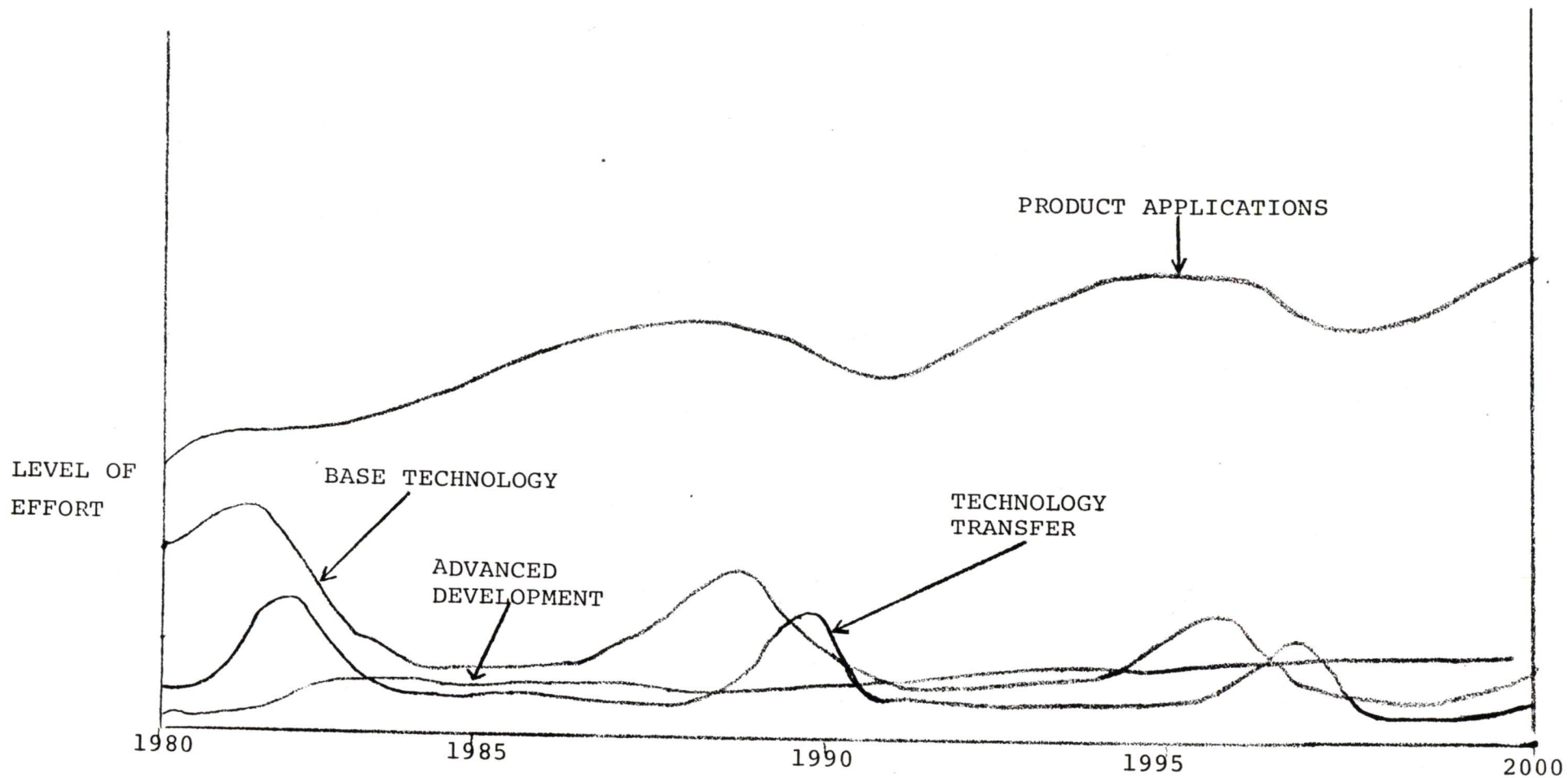
1983-1988 - TRANSFER TECHNOLOGY BASE

- o MAJOR EFFORT TO INSTALL S/C DESIGN SYSTEMS AND STANDARD DEVICES IN PRODUCT ENGINEERING GROUPS
- o DESIGN LEADING EDGE S/C DEVICES IN HL IN CONJUNCTION WITH PROGRAM OFFICE STRATEGY
- o CONTINUE TO EVOLVE KEY S/C TECHNOLOGIES
- o CONTINUE ADVANCED DEVELOPMENT

1985-1990 - EXPLOIT TECHNOLOGY BASE

- o S/C DESIGN ACCEPTED AS "STANDARD" DESIGN MEDIA FOR NEW HARDWARE PRODUCTS BY ENGINEERING COMMUNITY
- o CONTINUE TO MAINTAIN ADVANCED DEVELOPMENT AND TECHNOLOGY EFFORTS IN HL
- o LEADING EDGE DEVICES DEVELOPED IN HL
- o TECHNOLOGY INVESTMENT LEVERAGED BY INCREASED APPLICATION TO MULTIPLE PRODUCTS.





← BUILD TECH →

← BUILD TECH →

← TRANSFER →

← TRANSFER →

← EXPLOIT →

← EXPLOIT →



## SEMICONDUCTOR/90

### BEHAVIOR/CRITICAL DEPENDENCIES

- SEG WILL BE DEPENDENT UPON THE PRODUCT ENGINEERING GROUPS TO BECOME SKILLED AT SEMICONDUCTOR DEVICE DESIGN FOR THEIR SPECIFIC PRODUCT AREA, USING CENTRALLY (HL) DEVELOPED TOOLS, TRAINING AND TECHNOLOGY.
- PRODUCT GROUPS AND SEMICONDUCTOR ENGINEERING NEED LONG RANGE JOINT TECHNOLOGY PLANS.
- LEADING EDGE SEMICONDUCTOR DEVICES WILL BE DESIGNED IN HL TO FOCUS TOOLS AND TECHNOLOGY. THIS REQUIRES HIGH DEGREE OF COMMUNICATION AND PLANNING.
- REWARD/RECOGNITION CULTURE NEEDS TO BE BALANCED BETWEEN ENGINEERS WHO DESIGN PRODUCTS AND THOSE WHO DEVELOP TECHNOLOGIES AND TOOLS.
- WE NEED OUR BEST, MOST CREATIVE ENGINEERS TO BE THE DESIGNERS OF TOOLS.

Number of Transistors

1 MEG  
900 K  
800 K  
700 K  
600 K  
500 K  
400 K  
300 K  
200 K  
100 K

Comparative Transistor Count-  
Basic CPU, No Options or  
Memory

CPU

CT100

11/23

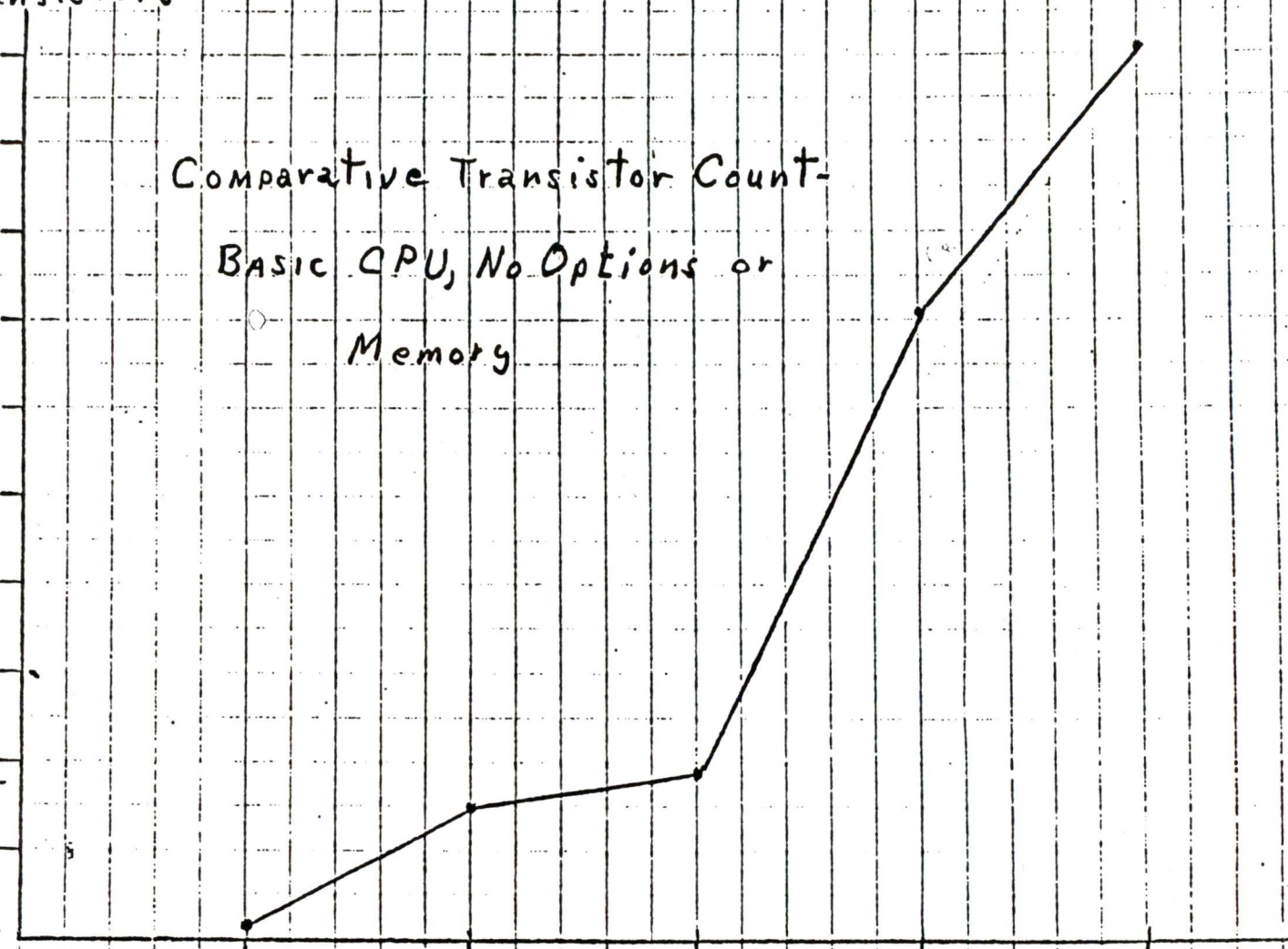
J-11

16 BIT

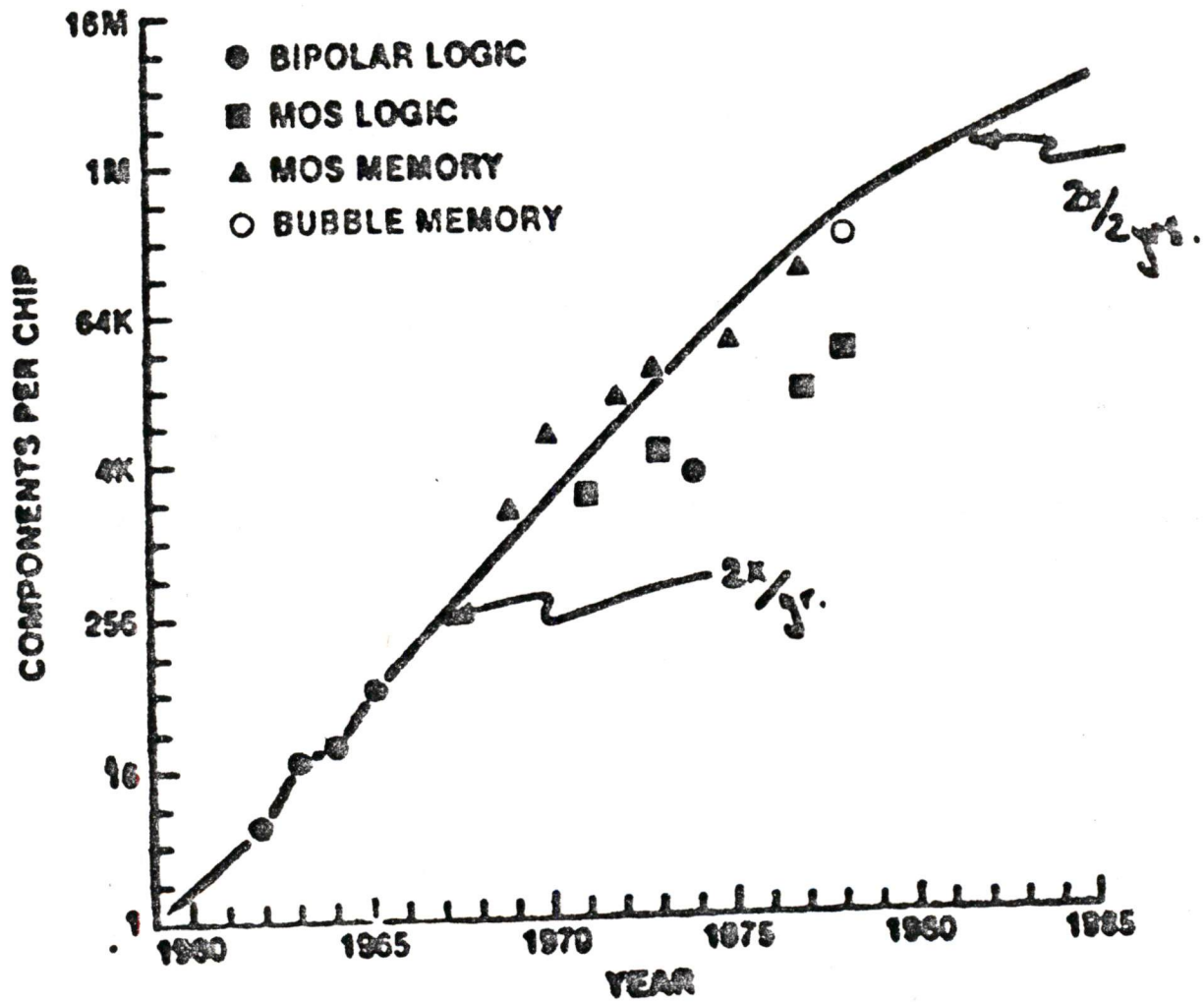
32 BIT

MICROVAX

11/750



# MOORE'S LAW



SYSTEMS REQUIREMENT GRID (FOR NEXT SYSTEM DESIGNS(85->))

	<u>MID RANGE SYSTEMS</u>	<u>LARGE SYSTEMS</u>	<u>MASS STORAGE</u>	
• COSTS DEVICE COST	<\$35.00	<\$45.00	<\$35.00	<\$25.00
• PERFORMANCE GATE DELAYS	≤ 1.5 NS	≤ 400 PS	≤ 1.5 NS	≤ 1.5 NS
• DENSITY GATES/CHIP	≥ 5000	≥ 3000	≥ 5000	≥ 2500
• PIN OUTS I.O./CHIP	≈ 200	> 120	≈ 200	> 120
• POWER WATTS/CHIP	≤ 2.5 W	< 10 W	≤ 2.5 W	≤ 1.5 W

COMMENTS:

- NOT AN OVERLY AGGRESSIVE STEP (CONSTRAINED BY PACKAGING)
- MAYBE SYSTEMS PEOPLE LURED INTO BELIEVING THIS IS ONLY JUST POSSIBLE
- DEC DEVICES ARE SOMEWHERE BETWEEN CAPTIVES & SEMICONDUCTOR INDUSTRY TODAY
- NEEDS ARE MORE AGGRESSIVE IN SPEED THAN DENSITY

## &gt;&gt;VITAL STATISTICS:

PROCESS	HMOS I	5uNMOS	6uNMOS
PROC. DENS. (lambda)	2.2u	2.5u	3.0u
DIE SIZE	53 K mil**2	40K mil**2	122K mil**2
# XTORS	27K	17K	43K
DEV PERF	1.0	1.0	1.0
PROC PERF INDEX	1.0	.7	.7
PROC SPEED/ POWER INDEX	1.0	.77	.63
DEVICE POWER	1.5W	.75W	3.5W

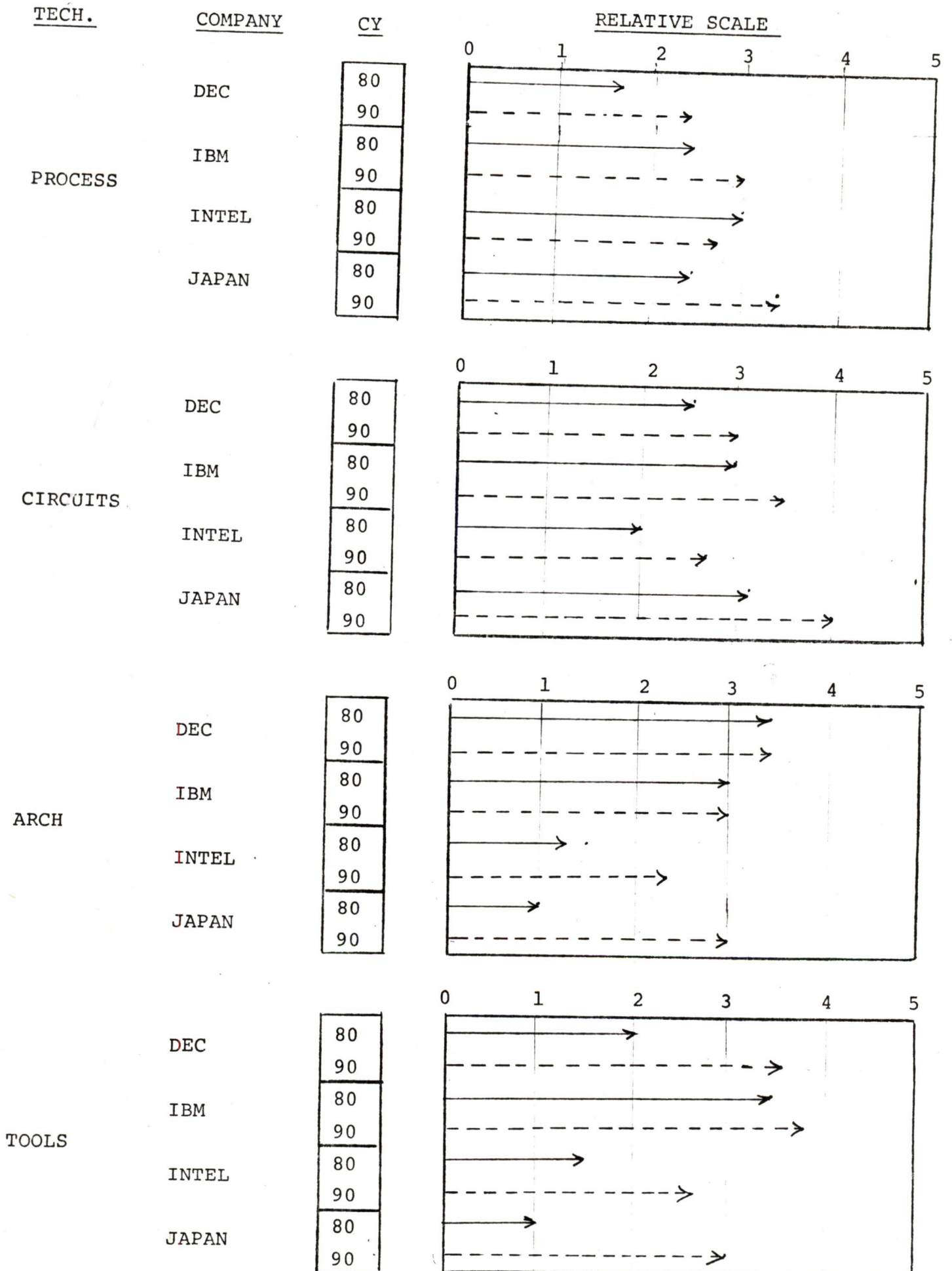
## &gt;&gt;NORMALIZED COMPARISONS:

#XTORS/ 1000 lambda**2	3.8	4.1	4.9
DEV PERF/PROC	1.0	1.43	1.43
XTORS/mW/INDEX	18.0 XTORS/mW	29.4 XTORS/mW	20.7 XTORS/mW

rar:1.6



# TECHNOLOGY BALANCE





SEMICONDUCTOR/90

OVERVIEW

LEADERSHIP IN THE SEMICONDUCTOR INDUSTRY DURING THE 1980'S WILL DEPEND ON THE OPTIMUM BALANCE OF FOUR CRITICAL TECHNOLOGIES; PROCESS, CIRCUITS, ARCHITECTURE AND DESIGN TOOLS. THIS CONTRASTS TO THE REQUIREMENTS DURING THE 1970'S TO BE LEADERS ONLY IN PROCESS AND CIRCUITRY.

THE DRIVING FORCE BEHIND THIS CHANGE IS THE INCREASING DENSITY AND PERFORMANCE OF VLSI BEYOND THE POINT WHERE A SINGLE APPLICATION, SUCH AS MEMORY, AND THE BRAIN OF A SINGLE DESIGN ENGINEER IS SUFFICIENT TO EFFECTIVELY UTILIZE THIS INCREASED CAPABILITY.

DIGITAL IS FACING A UNIQUE OPPORTUNITY IN THAT THE ADDITIONAL SKILLS AND STRENGTHS TO BE A SEMICONDUCTOR LEADER IN THE 80'S ARE THE SKILLS AND STRENGTHS THAT DIGITAL HAS BEEN DEVELOPING FOR THE PAST 25 YEARS.

THIS FACT, COUPLED WITH THE MOMENTUM BEHIND OUR EFFORTS IN BASE SEMICONDUCTOR TECHNOLOGY IN PROCESS AND CIRCUITRY, ENCOURAGES US TO CONTINUE MORE AGGRESSIVELY TO SEIZE THIS OPPORTUNITY.

R.J.M.  
2-19-81

SEMICONDUCTOR/90

EXTERNAL FORCES

- o SEMICONDUCTOR COMPLEXITY AND PERFORMANCE WILL CONTINUE TO INCREASE.
- o ENGINEERING RESOURCE UTILIZATION AND PRODUCTIVITY WILL BE A KEY ISSUE IN THE 80'S.
- o LIFE CYCLE COSTS OF PRODUCTS WILL BE A KEY PURCHASE METRIC FOR CUSTOMERS.
- o OWNERSHIP OF SEMICONDUCTOR TECHNOLOGY WILL BE AN INCREASINGLY COMPETITIVE ADVANTAGE FOR MANUFACTURES OF ELECTRONICS PRODUCTS.

SEMICONDUCTOR/90

KEY MESSAGES FOR THE 80'S

- MANAGING THE BALANCE AND COMPETITIVE POSITION OF THE CRITICAL S/C TECHNOLOGIES FOR TOTAL SYSTEM RESULTS WILL BE THE KEY TASK OVER THE NEXT 10 YEARS.
  
- DIGITAL WANTS TO LEAD THE INDUSTRY IN DESIGN SYSTEMS TECHNOLOGY FOR VLSI CUSTOM SEMICONDUCTORS:
  - APPROACHABLE
  - ROBUST
  - VAX BASED
  - TRANSPORTABLE
  - SALEABLE
  
- SILICON WILL BE THE DESIGN MEDIA FOR HARDWARE GROUPS DESIRING CONTROL OF PRODUCT FORM AND FUNCTION. PRODUCT UNIQUENESS WILL MEAN SEMICONDUCTOR UNIQUENESS.
  
- DEC HARDWARE DESIGN ENGINEERS WILL BE CAPABLE OF DESIGNING SEMICONDUCTORS FOR THEIR PRODUCT APPLICATIONS.

## SEMICONDUCTOR/90

### CRITICAL TECHNOLOGIES

#### o PROCESS TECHNOLOGY

DEC NEEDS TO BE COMPETITIVE IN S/C PROCESSES CONSISTENT WITH THE CHARACTERISTICS OF DEC'S PRODUCTS.

#### o CIRCUIT TECHNOLOGY

DESIGN OF S/C CIRCUITS TO OPTIMIZE SIZE, SPEED AND POWER WILL BE INCREASINGLY IMPORTANT AS LITHOGRAPHY TECHNIQUES ALLOW SMALLER GEOMETRIES.

#### o DESIGN METHODOLOGIES

LEADERSHIP S/C DESIGN TOOLS AND METHODS WILL ALLOW DEC TO APPLY ITS ENGINEERING RESOURCES TO THE SYSTEMS WE SELL, RATHER THAN THE COMPONENTS WE MAKE, AND GET THEM TO THE MARKET AHEAD OF OUR COMPETITORS.

#### o ARCHITECTURE

TO BE COMPETITIVE, PRODUCT ARCHITECTURES (SYSTEMS, NETWORKS, TERMINALS, COMMUNICATIONS, CONTROLLERS) NEED TO BE DESIGNED INCORPORATING THE ADVANTAGES OF SEMICONDUCTOR TECHNOLOGY.

#### o PROJECT MANAGEMENT

COMPLEXITY OF SINGLE SEMICONDUCTOR DEVICES WILL REQUIRE NEW TECHNIQUES OF PROJECT MANAGEMENT, SPECIFICATION CONTROL, WORK PARTITIONING, MEASUREMENT AND COORDINATION.



1981 - 1985

Business.

Pretty much business as usual. There will be a slow migration to new Local Area Networks due to current levels of investment in "time sharing" systems. As a function decides to upgrade its operation it will most likely move to the new concepts. Most "500" companies currently have some form of network primarily based on dumb terminals. The successful vendors will demonstrate coexistence now with easy migration later.

For those implementing new networks the trend will be to a system of individual work stations such as Apollo, Xerox, Suvax?, rather than for large system communication.

In the later part of this period networks will offer digital voice in a store and forward format and image processing. X.25 will become the closest thing to a world wide standard.

There will still be a need for large computer systems for the classical computation and simulation market, but the relative market value for the products will shrink.

The demand for more functionality will become very apparent during this period, i.e. Security will be demanded and necessary to sell in certain markets and programming tools to aid program development is a must. The cost of supporting a programmer will be in the neighborhood of 100,000 per year (machine time, courses, etc.) Hence, a major selling point for a more expensive system will be the aids supplied to help programmer productivity.

The new semiconductor industry micro's will start to impact our low end business more as a result of a perceived, as opposed to real, need. (The effect is the same.) Hopefully, Scorpio will salvage this situation.

1981-1985

Critical technologies

VLSI MOS Both Process & Design Tools.  
Bipolar Gate Arrays Buy-out.  
BI Packaging - Module/Backplane.  
Chip Packaging - Carrier/Substrates.  
CAD Tools.  
Small Operating Systems.  
Power Systems.  
Digital voice techniques  
Shared Data Base  
High resolution graphics (video & printing)  
Fault tolerant techniques  
Software Distribution  
networking Technologies  
Video Techniques  
Security Techniques  
Multiproccesing (Perf. Enhancement, Task Partitioning, Fault  
Tolerent)



1985 - 1990

Business

Move to Local Area Network will accelerate. As a result, the average mips per system will flatten out at about the Scorpio level, the big technological push will be to lower cost significantly while maintaining that level of performance. The openness of the distributed system will require the inclusion of flexible, but foolproof, security capability in our systems. Although each user will now physically own his active files, he will undoubtedly have a large number of common files with other users. Therefore, there will be a need for a very large cost effective Data Bank capability. Also, with the distribution of processing power to the individual nodes, the need for large multi-programming software will be minimized and the need for smaller, more user oriented, systems will be required.

With the increasing number of systems sold and the lowering of price for the hardware, we must begin to price the software much better than in the past. We must also find a means to distribute documentation with less paper (video disk). The interesting point here is the concept of selling software modules as the video games do now for \$50-\$100 a program. Instead of a tape cartridge, it would be interesting to think about the new Fujitsu Bubble Cartridge which uses bubble memory. Another thought would be the rental of programs which would then allow for updates, maintenance, etc.

We will also reach a crisis during this period in the area of installation and service. The volume of product and its lower unit cost will force us to greatly modify our current techniques to allow for customer installation and maintenance. This problem will not only affect Field Service but will impact the way we design and manufacture our products.

Fault tolerant systems will increase in importance as business becomes completely dependent on the computer networks.

In our non-network markets there will be a need for our products to be more application oriented. A good example would be in the area of Robotics. This should be one of the fastest growing markets during this period and to be successful we must understand and supply its needs.

1985-1990

### Critical Technologies

Continued investment in VLSI MOS processor & CAD.  
To meet cost targets we must reduce significantly  
the cost of Power and Packaging.  
Continue Buy-out of Bipolar from Semi Industry.  
Large low cost/Bit mass storage.  
High performance/cost effective mid-range disks, AZTEC II.  
Small (less than 20 mb) disks less important.  
Small single user VMS compatible operating systems.  
Human engineering for work stations.  
System level packaging for office environment.  
Speech synthesis/recognition.  
Automatic manufacturing techniques.  
System security.  
Robotics/artificial intelligence.  
Installation/service techniques.  
Multiprocessing  
Software Distribution

1990 - 2000

Business

This will be a vital period for the company. In order to maintain a reasonable growth we must both expand our current markets as well as enter new fields. In all likelihood, our average ship value will be less than \$5000 during the early part of the period and approach \$1000 later on. The volumes required to maintain a 10-15% level growth are staggering. The largest untapped market today is the home. To date, the lack of success in this area is the cost/benefit ratio. Therefore, for this market to open up, one must create a "need". This will be accomplished by the establishment of a nationwide (world) network of users (the home) and suppliers (business). Examples of suppliers will be merchandising (mail order), Mail, Information, Entertainment, Education, Ticketing; diagnostics (equipment & personal). These functions could be done today over the Bell system, but the cost and flexibility is prohibitive for general use. A hardwire system similar to CATV will be the eventual solution with individual satellite stations a remote second choice. Other new markets that are potential for our involvement would be Robotics at a total system level, rather than just supply the intelligence.

## Technologies

Continue in VLSI technologies.  
Robotics/Artificial Intelligence.  
CATV/Satellite Systems.  
Automated Mfg systems (critical to volume & cost needs).  
Self Diagnostic/Repair.  
Reliability.  
Language Processors.  
Speech Synthesis/Recognition.  
Video Displays.  
Human Engineering.  
All areas affecting cost.  
Marketing/Distribution (Large Volume Low Cost).



**II. STRATEGIES BY  
APPLICATION**



"Process" Rules  
+ Schedule



February 12, 1981

APRIL OC WOODS PACKAGE

CONTENTS

1. Calendar-at-a-Glance. (An Informal Summary)
2. April Operations Committee Woods Planning Calendar.  
(The "official" calendar)
3. Larry Portner, "Plans & Strategies Review to Operations Committee" (The objective of the OC Woods, a tentative agenda for it, and some vital background information.)
4. Larry Portner, "Rules for Planning and Funding." (Documents the conceptual framework for funding within Engineering. Essential reading.)
5. Bruce Delagi, "Strategic Planning Woods Meeting Agenda".
6. Rick Corben, AOCW - - Reaffirming the Current Base Plan -- Revision I" (The detailed guide to the process for reaffirming the base plan.)
7. Rick Corben, "AOCW - - Guidelines for Re-Assignment to Programs" (As a part of the reaffirmation of the base plan, it must be recast from its existing organization cut to a program cut. This memo provides some very simple guidelines.)
8. Rick Corben, "AOCW - - Tentative Outline for Presentations at OC Woods".

CALENDAR-AT-A-GLANCE

BASE PLAN REAFFIRMATION

STRATEGY WOODS

FEBRUARY 12

SESSION I  
COMPETITIVE, MARKET GROUP  
AND STRATEGIC OVERVIEW

FEBRUARY 20

SESSION II  
OUTSIDE CONSULTANT ON  
ENVIRONMENT/STRATEGY;  
OOD TECHNOLOGY  
PRESENTATIONS

FY'81-83 BASE PLAN  
REAFFIRMED BY  
ORGANIZATION AT PEG  
MEETING

FEBRUARY 26

REAFFIRMED FY'81-83  
BASE PLAN PUBLISHED  
BY PROGRAM

MARCH 6

MARCH 9

MARCH 10

MARCH 26

MARCH 31

APRIL 1

APRIL 15-16

SESSION III  
ABC SCENARIO  
PRESENTATIONS  
CRITICAL STRATEGIC  
ISSUES AND INVESTMENT  
STRATEGIES

DISTRIBUTE REVISED ABC  
SLIDES

SESSION IV  
FINAL REVIEW OF ABC  
SCENARIOS AND SELECTION  
OF INTEGRATED STRATEGIES

DISTRIBUTE ABC SLIDES TO  
OPS COMMITTEE

OC WOODS MEETING



April Operations Committee Woods Planning Calendar  
(Revision II)

February 12 (Thursday) -- Strategic Planning Woods -- Session I  
(Competitive, Market Group and Strategic Overview  
Presentations. Opportunity for OOD members to raise  
and discuss critical issues for development of B and  
C Scenarios -- See Revised Agenda from Delagi.)

February 20 (Friday) -- Strategic Planning Woods -- Session II  
(Includes environment/strategy presentations from  
outside consultant and technology presentations from  
OOD members; no ABC scenarios -- See agenda from  
Delagi for details)

February 26 (Thursday) -- PEG Meeting (to lock up the FY'81-83 Base  
Plans. Most issues should be resolved prior to the  
meeting, and copies of the plans should be distributed  
in advance. The meeting ends when the OOD members  
collectively agree to the Plan.)

March 2 (Monday) -- Each OOD organization distributes to Engineering  
Staff its Base Plan with any minor revisions resulting  
from the February 26 meeting.

March 6 (Friday) -- Each Program office distributes its plan to  
Engineering staff, Operations Committee, Product  
Managers Committee, et. al. (This is just a  
reorganization by program of the same data from the  
February 26 meeting. There will be an optional  
project characterization checksheet for each project  
in order to do certain analysis for Gordon. You can  
extrapolate to the FY'84 program budget by adding 13%  
to the FY'83 budget.)



March 9-10 (Monday/ - - Strategic Planning Woods -- Session III (with Tuesday) first day devoted to rehearsal of ABC Scenarios for Ops Committee and second day to developing a shared vision of the critical strategic issues for Engineering and a common framework for selecting investment alternatives within constrained resources - See revised agenda from Delagi.)

March 26 (Thursday) - - Presenters of ABC scenarios distribute advance copies of their revised slides and any other material intended for the Operations Committee for review prior to March 31 meeting

March 31 (Tuesday) - - Strategic Planning Woods -- Session IV (includes final rehearsal of Operations Committee ABC scenario presentations and selection of integrated strategies - - See agenda from Delagi for details.

April 1 (Wednesday) - - Distribution of ABC Scenarios to Operations Committee

April 15-16 (Wednesday-Thursday) - - Two-day Operations Committee Woods

- - - - -

(Calendar and Review Process for detailed FY82-84 Base Plans to be documented at a later date)

July 1 (Wednesday) - - FY'82 Beige Books Published

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## INTEROFFICE MEMORANDUM

TO: Engineering Staff

DATE: February 10, 1981

FROM: Larry Portner

DEPT: Central Engineering

LOC.: ML12-1/132 EXT.: 3-2471

SUBJECT: PLANS & STRATEGIES REVIEW TO OPERATIONS COMMITTEE  
IT IS RECOMMENDED THAT YOU READ ATTACHMENT I "RULES  
FOR PLANNING AND FUNDING" BEFORE YOU READ THIS MEMO

On April 15 and 16, and yearly thereafter if it works well, Engineering will present its' plans and strategies to the Operations Committee for approval. The significant changes from previous years are:

- The review body is the Operations Committee not EBOD.
- We will present the proposals by program, mirroring the new Engineering structure.
- Each Program Manager will provide the Operations Committee a range of alternatives showing the business rationale for each.
- Each program proposal will include a summary of the Manufacturing plan.

THE TARGET

The proposals must be in the hands of the Operations Committee members no later than April 1 to allow them sufficient time to study them before the mid April review. This is less of a time constraint than it may appear since it is not the intent to provide detailed work plans, just alternative sets of strategies and gross plans, reconciled to multi-year budgets and appropriately cross coupled within Engineering and Manufacturing.

After the proposals and alternatives have been reviewed with the Operations Committee and a set selected, we will begin the detailed planning that will update the Base Plan. All other Engineering calendars will be coordinated with this set of activities.

ACTIONS

Two related processes will proceed in parallel:

- Strategic Planning Activity Bruce Delagi will manage a strategic planning activity designed to provide additional insight and perspective to the Engineering Staff members who are developing their alternative scenarios. An additional

goal is to provide a "vision" of the products, technologies, and markets of the future, to use to evaluate the alternatives, in order to recommend "sets" that represent our view of an appropriate and balanced plan.

- Planning Process Each Program Manager together with a limited number of helpers, will prepare three alternative scenarios for their program or functional area of responsibility (see Attachment II for format). These scenarios will have different constraints:
  - **Scenario A**  
Uses Base Plan and Base Plan budgets (attached to scenario) through 1984
  - **Scenario B**  
Uses 25% budget growth 82-->83 and 83-->84 (this is instead of, not in addition to the 13% year-to-year growth in the plan)
  - **Scenario C**  
Your most aggressive plan constrained only by what we are (or could be) capable of doing

Each of these scenarios must be coordinated with your "subcontractors" so that every program plan scenario has a matching element in the plans of Software, Mass Storage, etc.

On Monday and Tuesday, March 9 and 10, the planning process comes together at a two day Strategy Planning meeting, arranged by Bruce Delagi. There we will review the alternatives, test the fit across Engineering, and evaluate the "viability." We will also select the "sets" that represent the Engineering organization's recommendations to the Operations Committee.

One of the tests that the Operations Committee will apply is to ask how your plans meet the requirements of DEC's businesses. Each Program manager must assure that his planning process includes relevant interaction with the product lines.

The time between the March 9,10 meeting and the March 31 rehearsal and integration meeting will be used to work issues, clean up the plans, and ensure that the necessary funds are available for organizations like TOPS, Physical Interconnect, SEC, etc.

In order to do this planning by our new program structure, two steps are necessary. The Base Plan of record must be reaffirmed (not replanned!) and then cut by program.

Rick Corben has attached the forms for updating the Base Plan by tracking changes, and Jim Lawless and Rick will explain how to publish the "program cut" as soon as the plan has been updated.



Rather than hassle the exact numbers, Jim and Rick will publish a simple set of rules for isolating program costs, and the numbers we will use for the roll-up will be accepted on faith and the word of the organization currently owning the budget.

Anticipating that some money will get "lost" in this process, any of the alternatives the Operations Committee approves must end up with enough slack in the total Engineering budget to fill these "holes" and to ensure that budgets contingent upon the implications of the selected alternatives are adequate.

#### ASSUMPTIONS

- We have a Base Plan
- This is not a massive, involve everybody/stop all work/change all plans exercise. The formulation of these scenarios will be done by the appropriate limited set of technologists and managers, and the current Base Plan stays on the books until formal changes are approved.
- Under each of the scenarios, the plans must include intelligent slack; if you plan to the limit and get in trouble, there won't be any OOD contingency to bail you out.
- The proposals you submit to the Operations Committee on April 1 may be viewed as mini-Red Books, including strategies and gross plans (I call them tactics). After these strategies and gross plans have been selected at the April meeting the detailed planning will follow, culminating in updated operating plans (Beige Books) for each organization, including updated Base Plans. The program cuts will consist of a Red Book per program, backed up by the Base Plans of the developing organizations.
- All priority setting, funds flow, and conflict resolution will be as agreed to at previous organizational discussions.
- The review will focus on programs, functional organizations, and certain technology areas as listed on Attachment 1. Only the product programs need offer three alternative scenarios, but others may propose them if they wish.

An overall calendar of activities to accomplish all this is attached, as well as various formats, schedules, etc. Also attached is a sample agenda for the two days.

LP/a  
Attachments

SAMPLE

## A G E N D A

SAMPLE

Day One (full day)PRODUCT  
PROGRAMSWHOREMARKS

16 Bit	Si Lyle, et al	Standard presentation format including three scenarios, competitive overview, market needs, Manufacturing position, business implications, and other implications (tools, process, etc.)
32 Bit	Bill Demmer, et al	"
36 Bit	Ulf Fagerquist, et al	"
Personal Computer	Avram Miller	"
OFIS	Bruce Stewart	"
Comm/Nets	Stan Pearson	"

COMPONENTS PROGRAMS

Terminals	Bill Piccott	"
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Day Two (morning)WHATWHOREMARKS

Mass Storage	Grant Saviers, et al	"
SEG	Jim Cudmore et al	Basic technology and capabilities strategy, program assumptions

TECHNOLOGY PROGRAMS

Software	Bill Johnson, et al	Overview of activities, goals. Use of technology funding
Physical Interconnect	Will Thompson	Program overview, etc.
Power and Packaging	John Holman Henk Schalke	"



(afternoon)

Overview of "other"  
Engineering

Gordon Bell  
Larry Portner

Summary of overall budgets,  
activities, including R&D,  
Personnel, Central Management,  
etc.

Presentation of En-  
gineering recommended  
sets

Gordon Bell

Operations Committee  
discussion and decision

## RULES FOR PLANNING AND FUNDING

Engineering funding is currently distributed to each OOD member consistent with a set of organizational commitments for deliverable products, or to fund services and capabilities (as in the case of Finance (services) and Micros (capabilities)). These funds may be augmented by money flowing from other organizations within or outside Engineering. Examples would be CSD funding for SCORPIO going to Cudmore's Semiconductor Engineering Group, or Product line funding for Software Development.

Our decision to focus on managing a combination of "Product Programs", "Component Programs" and "Technology Programs", and to establish a planning, priority setting, and (in some cases) funds flow hierarchy to do so will result in some changes in our budgeting and planning processes.

All three programs (Product, Component, and Technology) will receive direct Central Engineering funding to some level, but the rules for defining funds flow, setting priorities, and resolving conflicts need to be stated.

PRODUCT PROGRAMS

16 Bit Systems		Receive direct funding from Central 32
Bit Systems		Engineering to fund their approved 36
Bit Systems	>	programs; in most cases will flow
CFIS		funds into other organizations to
Personal Computers		pay for committed work
CCMM/NETS		

COMPONENTS PROGRAMS

		Will receive direct funding from Central
		Engineering to cover all product pro-
		grams, support and technology related
		activities, but the product development
Mass Storage	>	activities must be demonstrated to sat-
		isfy the needs of the customers for
		storage products. These customers are
		the 16,32, and 36 bit programs and per-
		sonal computers

		Will receive direct funding from Central
Terminals	>	Engineering to support their approved
		product plan and to maintain techno-
		logies and support.

TECHNOLOGY PROGRAMS

-----

Software Engineering		Will receive some direct funding from
Semiconductor Engr.		Central Engineering to cover technology,
Physical Interconnect		advanced development, and strategic
Power & Packaging		responsibilities; and to maintain capa-
High-end Systems		bilities. Also may receive money from
	>	Product Program groups to fund and pro-
		vide continuing support for product de-
		velopment or capabilities related work.
		As a consequence total funding for these
		organizations may change up or down over
		time, but these changes must be nego-
		tiated and appealed if no agreement can
		be reached

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SUPPORT AND SERVICE

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SAT		
TOPS		
R&D		Will be direct funded by Central
Administration	>	Engineering
Personnel		
Finance		

-----

MISCELLANEOUS OTHER CATEGORIES TO PLAN & BUDGET

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European Engineering		Will be direct funded by Central
Sites		Engineering only until mature enough
etc.	>	to fold funding into other program or
etc.		organizational structures

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## RULES FOR CONTINGENCIES, ECOs, SUPPORT, ETC.

The basic concept of a "contract" is key to this process. These contracts will be recorded in the form of the Base Plans of the developing organizations and reported on in the Yellow Book.

It is fundamental that any substantive change or risk to schedule, cost, content, transfer cost, etc. be communicated to the funding/using Program Manager as soon as it becomes visible, and that no unilateral action take place at this level. The same is obviously true for Engineering's contract with our customers, the product lines. The developing organizations are responsible for managing interactions with Manufacturing, Service, etc., consistent with guidelines set down by the Program Manager.

Each organization is expected to retain some contingency funds to ensure performance against its commitments, and to provide some management flexibility when the inevitable problems emerge.

Planning for and funding ECOs and other forms of continuing support is the responsibility of the developing organization. These expenses must be part of the funding negotiated with the buying organization. It is expected that on-going support of products/programs contracted for by a product Program Manager will become the budget obligation of that Program manager in future years.



SESSION I - FEBRUARY 12, 1981: NATICK HILTON HOTEL, RTE. 9, NATICK

7:30- 8:00 Continental Breakfast

8:00- 8:45 DEC's Markets/Applications Steve Coleman

We are developing a view of DEC's future business for review at the BOD. Steve has a synthesis of the PG LRP's to present and discuss. Ken has asked that the group engineering plans address DEC's marketing needs.

8:45- 9:15 Future Needs in Information Systems Ron Smart

Ron has an approach by which we can get a perspective on new markets for information systems. The intent of the presentation and discussion is to provoke consideration of the development of computing over an extended time frame.

Competitive Presentations "to the operating committee of a Fortune 500 multinational manufacturer by a senior manager representing his company's concepts and capabilities":

9:15- 9:45 PTT Don Feinberg

9:45-10:05 XEROX Peter Parsons

10:05-10:15 (Break)

10:15-10:35 IBM Don McGinnis

10:35-11:00 FUJITSU George Hayes

11:00-11:30 INTEL Lloyd Fugate

11:30-12:30 Competitive Breakout's - DEC's best response to the threats and opportunities represented by our most significant competitors, what will it take to win? What strengths will we capitalize on?  
(Working Lunch)

12:30- 1:15 Breakout Reports - discussion of presentations developed in breakout groups.

GRP. I Jim Cudmore, Lloyd Fugate, Grant Saviers, Will Thompson, Sam Fuller, Bill Picott, Larry Portner, Rick Corben, Bill McBride

GRP. II Si Lyle, Peter Parsons, Bruce Stewart, Steve Coleman, Stan Pearson, Don Feinberg, Henk Schalke, Peter van Roekens

GRP. III Ulf Fagerquist, Don McGinnis, Bill Demmer, George Hayes, Bill Johnson, Ron Smart, Gordon Bell, John Holman, Avram Miller



1:15- 2:30

Strategic Overview

Gordon Bell

Present action and discussion of a framework in which to view.

2:30- 5:30

Current Thinking on Future Directions

Time is reserved for those who would like early review and group discussion of their current thoughts on "ABC" Scenarios. Please see Winni Anketell for specific time slot.

5:30- 8:30

Reception and Dinner (if desired/necessary)

SESSION II - FEBRUARY 20, 1981: TECHNOLOGY & INDUSTRY PROJECTIONS

7:30- 8:00 Coffee, Danish and Chatter

Technology/Environmental/Usage Trends

Presentations and discussions of the technology extrapolations, expected critical events in the environment, and projected shifts in the usage of our products in '85, '90, '95 and in the year 2000.

8:00- 8:20	<u>Large Computer Systems</u>	Ulf Fagerquist
8:20- 8:40	<u>Distributed and Mid-Size Systems</u>	Bill Demmer
8:40- 9:00	<u>Software</u>	Bill Johnson
9:00- 9:20	<u>Semiconductors</u>	Jim Cudmore
9:20- 9:40	<u>Storage Systems</u>	Grant Saviers
9:40-10:00	<u>Terminals</u>	Si Lyle
10:00-11:00 (w/Break)	<u>Critical Technologies</u> Sam will present and lead a discussion of the critical technologies/skills we will need to have available to us through the 80's. Our discussion should highlight the most critical of these, add in any that seem overlooked, and attempt to focus in on the most critical issues. An open question, of course, is whether we need to "own" a technology in order that it be available to us.	Sam Fuller

External Check on Views - We may benefit from the perspective of "outsiders" (BOOZ, ALLEN) familiar with the information industry.

11:00-11:30	<u>Information Industry Outlook in the 80's</u>
11:30-12:15	<u>Customers/Markets/Applications/Products-</u> a framework for viewing needs and the product/services they dictate.
12:15-12:45	<u>Issues of Information Industry</u> <u>Supply Vertical Integration</u> - "the range of contiguous value-added functions between elementary components and customer operations which an organizational entity under common ownership chooses to provide (i.e. "make") internally."

- 12:45- 2:00  
(Working  
(Lunch)
- DEC's Position In the Value-Added Network of Information Systems - now and in 1990.  
(Breakout sessions to discuss and postulate for group presentation:
- Dependencies on sustained technological leadership and significant manufacturing cost differentials - or - on marketing/service superiority?
  - Forecasting diversity, competition, and reliability of the potential supplier base.
  - Joint venturing: willingness, pitfalls, possibilities.
  - Focusing limited resources on the most leveraged areas of technological advantage.
  - Positioning ourselves in the value-added chain.
- 2:00- 3:30
- Case Study Examples for Vertical Integration
- How other firms have faced the question and how they fared: parables, war stories, anecdotes - and some precepts.
- 3:30- 4:30
- Vertical Integration for DEC - breakout groups review positions developed earlier and modify or extend to a proposed policy for us to follow with respect to our value-added in:
- semiconductors
  - disks
  - terminals/human interfaces
  - applications
  - services
- 4:30- 6:00
- Presentation and Discussion of Proposed Policies - as developed in breakout sessions.
- 6:00- 7:30
- Reception and Dinner



SESSION III - MARCH 10, 1981: "ABC" SCENARIOS (This meeting is to be extended into a two day session - March 9 and 10th. A revised agenda will be forthcoming.)

Review of '83 - '84 Investment Opportunities for Engineering

8:00- 8:15 Coffee, Danish and Chatter

"ABC" Product/Program Goals & Opportunities - Presentaion and discussion of the key (externally visable) aims we seek to accomplish with our products and programs over the time from now thru the 80's. These should be the half dozen or so most critical goals for the components groups and programs (as below). These aims and supporting tactics should be presented against the Scenario A, B, and C constraints established from '83 and '84 funding. (Graphs help a lot). These externally visable aims should include, in as objective terms as possible, the competitive positioning of the past and future product performance of the groups. Presentations should address their relation to DEC's marketing needs and their manufacturing impact. (Format guidelines are as attached).

8:15- 8:30	<u>Power and Packaging</u>	Henk Schalke
8:30- 8:50	<u>Physical Interconnect</u>	Will Thompson
8:50- 9:20	<u>Semiconductor Components</u>	Jim Cudmore
9:20- 9:50	<u>Storage Components</u>	Grant Saviers
9:50-10:15	Discussion with Break	
10:15-10:40	<u>Software</u>	Bill Johnson
10:40-11:00	<u>Communications</u>	Stan Pearson
11:00-11:30	<u>Terminals Components</u>	Bill Picott
11:30-12:00	<u>16-Bit and Personal Computers</u>	Si Lyle
12:00- 1:00	Discussion and Lunch	
1:00- 1:30	<u>OFIS Program</u>	Bruce Stewart
1:30- 2:00	<u>32-Bit Programs</u>	Bill Demmer
2:00- 2:30	<u>36-Bit Programs</u>	Ulf Fagerquist
2:20- 3:00	Discussion with Break	
3:00- 4:00	<u>"What I Heard"</u>	Bell/Portner
4:00- 5:00	<u>Recommended Changes to OC Presentations</u>	

Discussions during the day will generate a laundry list of issues that will need to be re-examined before publication of the Components Groups and Engineering Programs Operations Committee Review package.

Specific responsibilities for action will be developed at this time. The presentation "pre-prints" to be used at the April Woods will be internally distributed on March 25, 1981 for final review at the March 31, 1981 "rehearsal".

SESSION IV - MARCH 31, 1981: REHERSAL AND INTEGRATION

The purpose of the presentations is a final review before the Operations Committee April Woods. Only minor changes, if any, to the Woods handouts should be required as result of this meeting.

8:00- 8:10	Coffee, Danish and Chatter	
8:10- 8:30	<u>Power and Packaging</u>	Henk Schalke
8:30- 8:50	<u>Physical Interconnect</u>	Will Thompson
8:50- 9:20	<u>Semiconductor Components</u>	Jim Cudmore
9:20- 9:50	<u>Storage Components</u>	Grant Saviers
9:50-10:15	Discussion with Break	
10:15-10:40	<u>Software</u>	Bill Johnson
10:40-11:00	<u>Communications</u>	Stan Pearson
11:00-11:30	<u>Terminals Components</u>	Bill Picott
11:30-12:00	<u>16-Bit and Personal Computers</u>	Si Lyle
12:00- 1:00	Discussion and Lunch	
1:00- 1:30	<u>OFIS Program</u>	Bruce Stewart
1:30- 2:00	<u>32-Bit Programs</u>	Bill Demmer
2:00- 2:30	<u>36-Bit Programs</u>	Ulf Fagerquist
2:30- 3:00	Discussion with Break	
3:00- 3:45	<u>Alternative Integrations</u>	Bruce Delagi

In order to present the Operations Committee with some coherent strategic alternatives, a few sets of ("ABC") investment scenarios will be pulled together. The idea is to formulate the engineering investment decision in terms that deal with the overall object of the investments.

3:45- 6:30	<u>Discussion: A Recommended Integration</u>	
6:00- 8:00	<u>Dinner</u>	



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INTEROFFICE MEMORANDUM

TO: Engineering Staff

DATE: 10 February 1981

FROM: Rick Corben

DEPT: Corp. Prod. Mgmt.

SUBJ: AOCW - Reaffirming the  
Current Base Plan - Rev. 1

LOC.: ML12-1/T39 EXT.: 3-3123

The first major step on the path to the April Operations Committee Woods is reaffirming our current base plan so that everyone has a stable point of reference. The original FY'81-83 base plans appear in the 1981 Beige Books. Some ECOs have been approved formally by EBOD (12/9/80) or the EBOD Task Force (1/16/81). Some ECOs have been documented in the Yellow Book without formal review. Other changes are less visible. The following procedures are intended to produce a complete set of plans which sum to the entire Engineering budget:

1. Each OOD organization should review its existing base plan, line-item by line-item, updating the entries as appropriate. Some groups have documented their entire budget in base plan format (e.g., D&MS). Others have not. These groups must fill in the missing items such as advanced development, tools, research, product support, administration, product management, contingency, and other. The result of this effort should be a new plan document, identical in format to the original, but both up-to-date and complete.
2. For each line-item in the updated plan which differs from the original in schedule, content, transfer cost, or budget, a separate change sheet should be completed. Appendix A provides an example. This sheet should have the original line-item (if any) at the top. (In order to fit on regular paper, the single line-item can be split into two or more lines. Cut-and-paste from the original is the easiest way.)

Next the change sheet should have the reasons for the change. Indicate whether the change was approved by EBOD, the EBOD Task Force, or some other appropriate authority. (Many changes do not require EBOD approval.) Also, indicate whether the change was previously documented in the Yellow Book. When the new base plan entry has no corresponding entry in the original, explain the reason for creating the new entry such as "new project". When the entry is created to cover areas not previously documented in base plan format, explain where the budget was documented previously. For example, if contingency was documented in the Beige Book but not in base plan format, the change sheet for the new contingency line-item should give the page number in the Beige Book where the original budget for contingency was shown.

Finally, the change sheet should have the line-item as it appears in the updated base plan. The change sheets should appear in the same order as the line-items in the updated base plan.

3. The original base plans are organized by implementing OOD organization. Since the April presentation to the Ops. Committee and our future planning activity will be organized by program, we need a way to recast the updated base plan by funding program. The responsibility for assigning the line-items in the updated base plan to the appropriate program rests with the implementing OOD manager. (A set of guidelines to help in deciding on the proper program are contained in a separate memo "Guidelines for Re-assignment to Programs" from R. Corben.) The specific assignments should be documented in a Base Plan Reassignment Document---a sample of which appears as Appendix B. It simply lists the title of each base plan line item and the program to which it should be assigned. The list should be in the same order as the updated base plan.

Some base plan line-items cannot be assigned naturally to a single program. For instance, FMS has both 16-bit and 32-bit activity. D&MS product management could include both 16-bit and 32-bit work. The easiest way to handle the problem is to split the entry in the updated base plan into two; for instance, 16-bit PM and 32-bit PM. Then each line-item can be assigned to the obvious program.

The official list of the "funding" programs appears in Larry Portner's memo "Rules for Planning and Funding".



4. Each OOD organization should produce a package consisting of the following:
  - a. Updated Plan for FY'81-83
  - b. Set of Change Sheets
  - c. Base Plan Reassignment Document

The formal reaffirmation of the plan will take place at the February 26 PEG (Product Engineering Group) meeting. (It probably is advisable to distribute advance copies to the participants.) The meeting will end when the OOD managers collectively agree to THE PLAN.

If there are any changes as a result of the meeting, each group should correct its three-part package and formally distribute the result to Engineering Staff by Monday, March 2.

5. The last step in reaffirming the current base plan is the recasting by program. Each program office should be able to take the March 2 version of the plan with the Reassignment sheets and produce its own plan and corresponding budget by simple mechanical resort. On March 6, the Program Offices should distribute their FY'81-83 Program Base Plan to Engineering Staff, the Operations Committee, Product Group Managers, et. al. Be sure to sum the individual items and display the program budget for FY81, 82, and 83. (The FY'84 budget for scenario A is computed simply by multiplying the FY'83 budget by 1.13.) Note that the program plans cover technology and administrative areas just at the budget level while the product development area is covered at the schedule, content and budget level.

In order to assist in analyzing the composition of the total Engineering budget for Gordon, a simple project characterization checklist will be distributed shortly. The program offices will be asked to complete the checklist for each project in their base plan. This should not be a very demanding activity.

If there are any questions or suggestions concerning the above process, please call Rick Corben (DTN 223-9540).

APPENDIX A - SAMPLE CHANGE SHEET

CHANGE SHEET

ORIGINAL BASE PLAN ITEM:

ORGANIZATION: Software Engineering (CEG)

<u>PROGRAM NAME/ RELEASE NAME OR NUMBER</u>	<u>PRODUCT MANAGER</u>	<u>PROGRAM DEVELOPMENT MANAGER</u>	<u>DISCRETE PROJECT NUMBER</u>	<u>DATE OF ENTRY</u>	<u>GOALS/DESCRIPTION</u>	<u>CONSTRAINTS/DEPENDENCIES</u>
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SMALL BUSINESS SYSTEMS

SCS/RSTS

V8.0	Tom McKinney	Doug MacLean	20-05081	5/16	Bounded, easy to use general purpose s/w system designed for use on PDP-11/23 and -11/24 packaged systems.	Key dependencies include PDP-11/23 CIS, PDP-11/24, CIS & PAX, FMS, SMALL COBOL, SORT, EDT, RMS, DIBOL, 2780/3780 DECNETS, DMV & DPV.
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ENGINEERING EXPENSE (\$1000)

<u>PHASE COMPLETION DATES</u>	<u>FRS (FCS) DATE</u>		<u>EST. SPEND. THRU FY '79</u>	<u>EXPECT. SPEND. FY '80</u>	<u>BUDGET FY '81</u>	<u>BUDGET FY '82</u>	<u>BUDGET FY '83</u>	<u>ESTIMATED FY84 THRU FY90 COSTS</u>
	<u>TARGET</u>	<u>COMMITTED</u>						
<u>0 1 2 3</u>	<u>(PHASE -0, 0 OR 1)</u>	<u>(AFTER PHASE 1)</u>						

1205    479    690    936    1134    11732

5/80 9/80 12/80 Q4'81            Q4'81

FY'79    FY'80    FY'81    FY'82    FY'83    FY90 COSTS

1205    479    690    936    1134    11732

REASON FOR CHANGE:

Project cancelled. EBCD approved. Budget money was re-assigned to other projects in plan.

UPDATED BASE PLAN ITEM:

Not Applicable.



APPENDIX B

BASE PLAN REASSIGNMENT

OOD Implementation Group:            Software Engineering

Project/Product

"Funding" Program Office

VAX-11 VMS	32-Bit
o	o
o	o
o	o
DATATRIEVE-11	16-Bit
o	o
o	o
o	o
STEP V 1.0 (a tool)	Software
o	o
o	o
o	o
Advanced Development	Software
o	o
o	o
o	o

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INTEROFFICE MEMORANDUM

TO: Engineering Staff

DATE: 10 February 1981

FROM: Rick Corben

DEPT: Corp. Prod. Mgmt.

SUBJ: AOCW - Guidelines for

LOC.: ML12-1/T39 EXT.: 3-3123

Re-Assignment to Programs

The COD Manager with current base plan funding responsibility for a given project is responsible for determining the appropriate program to have "funding" responsibility in the future. This memo provides a set of guidelines to assist in making these assignments. Certain special cases may require a difficult judgement call by the COD manager. Additional guidance, if needed, can be obtained from Gordon and Larry.

1. Each OOD organization maintains a baseline funding level for technology, architecture, tools, research, finance, administration, personnel, quality assurance, et. al. Budgets for these areas stay with the home organization.
2. Product development and product support should be fairly straight-forward to reassign. Projects which serve two programs (e.g., FMS) probably should be split into two projects (FMS-16 and FMS-32). The division will be arbitrary but represent the best judgement of the OOD manager.
3. Some non-product areas also require an arbitrary but fairly natural split. For instance, D&MS product management and performance analysis probably can be split between 16-bit and 32-bit.
4. The most difficult areas to assign would seem to be "unallocated", "reserve for new starts", and other budget fillers, especially in FY'83. Obviously, these could be allocated using percentage splits based on historical spending patterns. But my reading of base plans indicates that much of the unallocated or reserve already has a "natural" home (e.g., Hydra, OFIS, et. al.). The judgement of the OOD manager will be the determining factor.
5. Recasting the base plan by program does not alter implementation responsibilities. Each OOD organization remains responsible for its updated FY'81-83 base plan. Therefore, the presumption is that any "funding" transferred for a particular project represents the proper dollar amount to meet the associated commitments. If there is a problem with the budget for a project, then that problem has to be resolved within the budget of the original owner before the transfer.

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INTEROFFICE MEMORANDUM

TO: Engineering Staff

DATE: 10 February 1981

FROM: Rick Corben

DEPT: Corp. Prod. Mgmt.

SUBJ: "ACCW -- Tentative Outline  
for Presentations at OC Woods"

LOC.: ML12-1/T39 EXT.: 3-3123

The detailed agenda for the April OC Woods has not been established yet, and it may be awhile before we have final resolution. For the present, it is best to assume the sample agenda contained in Larry Portner's memo, "Plans & Strategies Review to Operations Committee."

In order to assist presenters in thinking about their presentations, the attached tentative outline was developed. It has been reviewed by Steve Coleman, who approved; but there is still time to incorporate any modifications suggested by COD members.

The intent of the outline is to provide a minimum of structure -- just enough so that the OC can see some common threads but not so much as to constrain the message each OOD manager wants to deliver.

/ep



## INDIVIDUAL PRESENTATIONS AT OC WOODS

### I. PRODUCT RESPONSIBILITIES (ONLY FOR MANAGERS WITH PRODUCT PROGRAMS)

- SCENARIO A (BASE PLAN & INFLATION GROWTH)
- SCENARIO B (25% ANNUAL GROWTH)
- SCENARIO C (UNCONSTRAINED)

NOTE: EACH SCENARIO SHOULD BE COVERED WITH NO MORE THAN 4 OR 5 SLIDES. THE FIRST SLIDE OF EACH SCENARIO SHOULD USE A COMMON FORMAT SO THAT SCENARIOS ARE COMPARABLE. (A HYPOTHETICAL FIRST SLIDE FOR SCENARIO A OF 32-BIT SYSTEMS IS ATTACHED. THE FIRST SLIDE OF SCENARIOS B AND C SHOULD USE THE SAME FORMAT BUT EMPHASIZE THE INCREMENTAL ACHIEVEMENTS AND DELIVERABLES.) SUBSEQUENT SLIDES FOR EACH SCENARIO ARE FREE-FORMAT, BUT THERE IS A LIST OF SUGGESTED QUESTIONS TO ADDRESS.

### II. TECHNOLOGY RESPONSIBILITIES

NOTE: EACH OF THE PRESENTERS IS FREE TO USE WHATEVER FORMAT IS MOST APPROPRIATE FOR DESCRIBING HIS TECHNOLOGY AREA. AGAIN, THERE IS A LIST OF SUGGESTED QUESTIONS TO ADDRESS.

### III. PERFORMANCE-TO-DATE AGAINST FY'81 BASE PLAN

- BUDGET
- SCHEDULE
- ANY REMEDIAL ACTION

NOTE: BRIEF. NO RECOMMENDED FORMAT.

### IV. DISCUSSION



# FIRST SLIDE OF PRODUCT SCENARIO PRESENTATION

## 32-BIT SYSTEMS - SCENARIO A

### INVESTMENT LEVEL

	<u>FY'79</u>	<u>80</u>	<u>81</u>	<u>82</u>	<u>83</u>	<u>84</u>
M\$'s	~22.9	~28.6	35.7	47.5	52.8	59.7
% GROWTH		25%	25%	33%	11%	13%
% SUPPORT	~ 2%	~4%	~8%	~12%	~13%	~16%

### MAJOR PROGRAM ACHIEVEMENTS

1. 32-BIT SYSTEM PRODUCT EXCELLENCE IN \$30-500K RANGE (81-85)  
SUPPORTING ~\$2.5B SYSTEM NOR BY FY'84

EXTEND DOWN TO \$16K BY FY'85/86

LEADERSHIP OEM PRODUCTS AT \$15K AND UP

2. LEADERSHIP SOFTWARE FUNCTIONALITY FOR OPERATING SYSTEMS,  
LANGUAGES, LOCAL AREA DISTRIBUTED PROCESSING, AND OFIS

### MAJOR DELIVERABLES

#### NEAR TERM

11/730/RL02 SYSTEM (Q2'82)  
HYDRA (FY'83)  
VENUS (Q1'84)  
11/730/AZTEC (FY'84)  
SMALL VMS  
SOME OTHER SOFTWARE

#### LONGER TERM

SCORPIO SYSTEMS (FY85/86)  
COMET PRICE-CLASS  
REPLACEMENT ( - )  
  
SOME SOFTWARE PRODUCTS

REMAINDER OF PRODUCT SCENARIO PRESENTATION

USE 3 OR 4 ADDITIONAL SLIDES

NO RECOMMENDED FORMAT, BUT TRY TO ANSWER THE FOLLOWING SUGGESTED  
QUESTIONS EXPLICITLY OR IMPLICITLY

1. HOW DOES YOUR PLAN DIFFER FROM PREVIOUS YEARS? FROM PLAN ASSUMED IN P/L LRPs OF OCTOBER, 1980?
2. WHAT ARE THE KEY CHANGES IN CUSTOMER APPLICATIONS AND USAGE PATTERNS AFFECTING YOUR BUSINESS? (SEGMENTING YOUR CUSTOMERS/MARKETS IS A GOOD WAY TO APPROACH THIS.) HOW ARE YOU RESPONDING?
3. WHAT ARE THE KEY COMPETITIVE FACTORS AND EMERGING COMPETITION AFFECTING YOUR BUSINESS? WHAT ARE YOU DOING TO WIN?
4. WHAT ARE THE KEY PRODUCT-GROUP-DEFINED NEEDS? HOW DO YOU MEET THEM? (THIS SHOULD NOT BE A DON'T-GET LIST!!)
5. HOW IS YOUR PLAN ALIGNED WITH MANUFACTURING?
6. HOW IS YOUR PLAN ALIGNED WITH CUSTOMER SERVICES?

(SCENARIO C, ONLY) WHAT FACTORS CONSTRAINED YOUR PLAN?

## TECHNOLOGY PROGRAMS

NO RECOMMENDED FORMAT

SUGGESTED QUESTIONS TO ANSWER EXPLICITLY OR IMPLICITLY AS PART OF PRESENTATION (MULTIPLE SCENARIOS ARE OPTIONAL)

1. WHAT ARE YOU DOING TO MEET THE NEEDS OF YOUR CUSTOMERS (I.E., THE PRODUCT PROGRAMS)?
2. WHAT ARE THE KEY TECHNOLOGY ISSUES AND OPPORTUNITIES IN YOUR AREA OF RESPONSIBILITY?
3. HOW DO WE COMPARE WITH OUR MAJOR COMPETITION IN THIS TECHNOLOGY? CAN WE WIN?
4. ARE THERE ADDITIONAL INVESTMENTS THAT YOU STRONGLY RECOMMEND TO ASSURE THAT WE HAVE THE NECESSARY TECHNOLOGY CAPABILITIES TO MEET ANTICIPATED FUTURE PRODUCT NEEDS AND PRESERVE NECESSARY FLEXIBILITY FOR CHANGES IN PRODUCT STRATEGY?
5. HOW ARE YOUR PLANS ALIGNED WITH MANUFACTURING? IS THIS A TECHNOLOGY FOR MAKE VERSUS BUY?
6. HOW ARE YOUR PLANS ALIGNED WITH CUSTOMER SERVICES?





~~Central Eng~~  
Mgmt Over

\*\*\*\*\*  
 \* d i s i t a l \*  
 \*\*\*\*\*

Segmentation -  
 size  
 structure

TO: \*GORDON BELL  
 cc: RICK CORBEN  
 PER HJERPPE

DATE: TUE 17 FEB 1981 14:43 EST  
 FROM: BRUCE DELASI  
 DEPT: STRATEGIC ENG.  
 EXT: 223-4887  
 LOC/MAIL STOP: ML12-3/A62

SUBJECT: ADCW BOOK COMMENTS

Technology piece needs visability. Arrows show changes.

April DC Woods Book

Table of Contents

*chart* *Godspeed* *Bigelow*

ENGINEERING MANAGEMENT OVERVIEW

STRATEGY AND DISCUSSION OF DIRECTION

Theme (of Q&P) and Summary of Recommendations

- ✓ Strategy with PCC Strategy Update (sb)
- ✓ Essay on the 5th and 6th Computer Generations: Implications (sb)
- ✓ Strategic Threats: An Investment Policy to Meet Them (Delasi) - today <: : : : : : : : <: : : : : : : : *need*
- Operational Guidelines for Resource Allocation (sb; Delasi)  
 Imputed DEC direction  
 Guidelines on Make vs. Buy (Fwd vs. Backward Intesration) (FVR to drive)  
 Summary of tests
- ✓ Alternative Strategies (Delasi) - today <: : : : : : : : <: : : : : : : : *need*

- ✓ Essay on Competing with IBM, Intel and Japan (sb)  
*Essay on Open Market / Product position / growth Rate* *article*

QUANTITATIVE MEASURES

- Competitive Spending for Engineering versus time (Clinton)
- Proposed Allocation of Engineering Resources by group and by spending within group (Clinton)
- Projected NDR and Eng. Spending by Segments: Rationale (Hjerppe)
- Proposed Engineering Allocation by size, architecture, and level of intesration (Hjerppe)
- Market by size (with computer type and level of intesration) \$:\$
  - + market share (P.H.?) <: : : : : : : : <: : : : : : : :
  - + competitive investment (R.C.) <: : : : : : : : <: : : : : : : :
  - + qualitative strength in each band (B.D.?)  
 (done for years 79-85 where possible)
- (Who's going to take this one on??)
- Metrics for various products showing breakeven, roi, cash flow, eng/nor (Hjerppe) *Clinton*

Critical (Pending) Product and Engineering Process Issues (sb)

APPENDICES

- Format for PEG, CEG and EF&A Presentations (Corben)
- Engineering plan evaluation criteria (Clinton)



\*\*\*\*\*  
\* d i g i t a l \*  
\*\*\*\*\*

TO: \*GORDON BELL

DATE: WED 18 FEB 1981 14:15 EST  
FROM: DICK CLINTON  
DEPT: ENGRG. FINANCE  
EXT: 223-1932  
LOC/MAIL STOP: ML12-2/A16

cc: see "CC" DISTRIBUTION

SUBJECT: ADCW BOOK

DC3/65

I will have the followings by next Monday (February 23):

1) COMPETITIVE: NOR VS ENGINEERING DOLLARS VS TIME

Simple time trend chart of competitor's (and DEC) R&D investment levels, and how this may correlate with growth rates.

Will look at TI, Intel, DG, HP, IBM (GSD, OFD, DPD), Burroughs, Xerox, Fujitsu, NEC, NCR, Wang, Apple, AT&T, Sony, Hitachi, Seimens, Toshiba, Prime, Datapoint, Tandem.

2) PROPOSED ALLOCATION OF ENGINEERING RESOURCES BY GROUP AND SPENDING WITHIN GROUP

Joint with Per Hjerppe

3) "BURP" METRICS FOR VARIOUS PRODUCTS (IRR, CASH FLOW, ENGINEERING \$ % NOR, TOTAL REVENUES, BREAKEVEN)

Clinton, (not Hjerppe).

4) ENGINEERING PLAN EVALUATION CRITERIA

This will be a suggested list of how to evaluate the performance and plans of the line OOD groups (e.g. managed by the "holding company").

"CC" DISTRIBUTION:

RICK CORBEN  
LARRY PORTNER

BRUCE DELAGI  
PETER VAN ROEKENS

PER HJERPPE



## Diagrams / Tables

Per's product Cash flow & products



✓. Ecl vs M05 position ; mP on Scorpio !

Sam ?

✓. 310/370 vs UAX mips, Mp size sam

✓. 310/370 gestation period

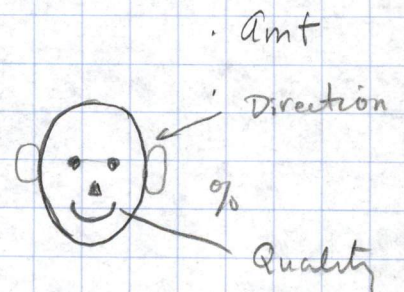
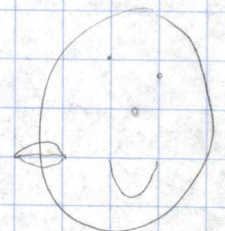
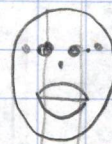
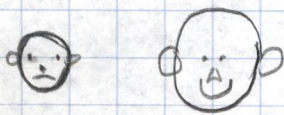
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100 K - 40 K

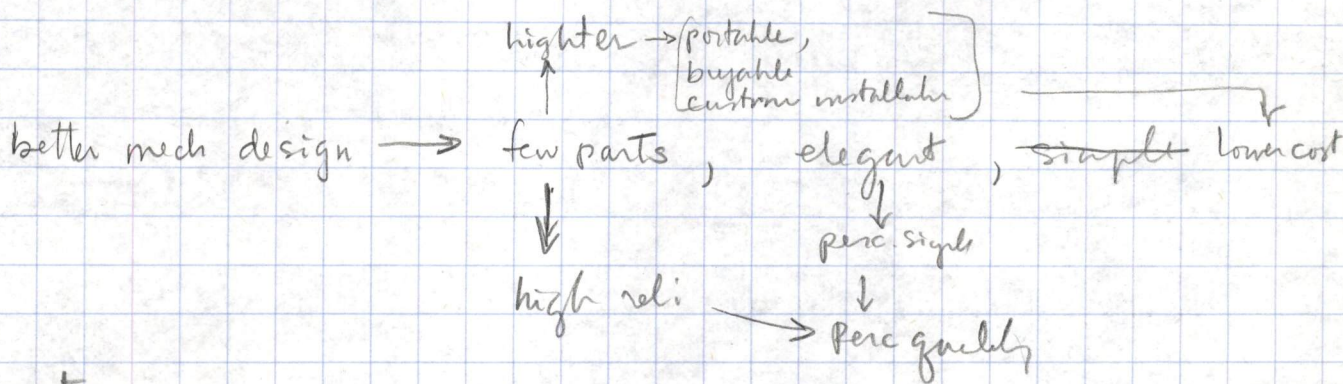
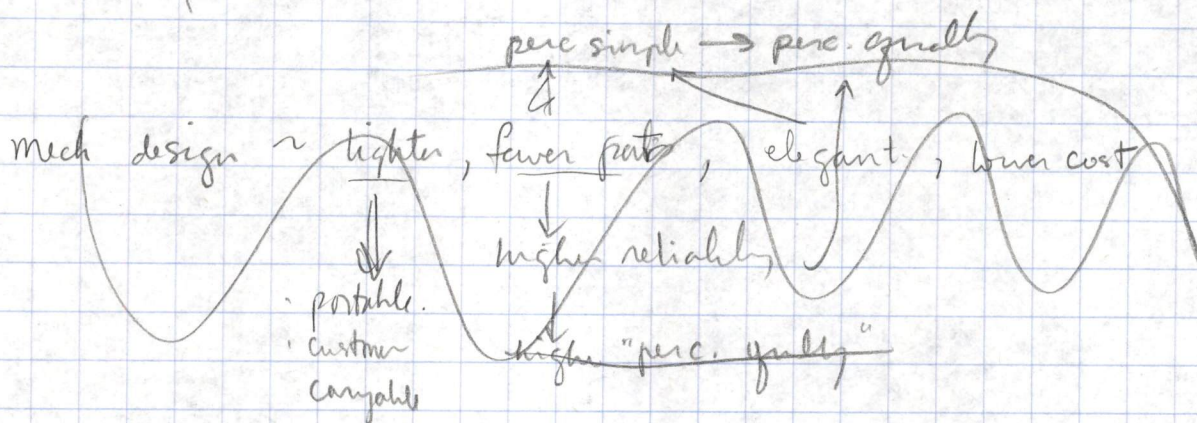
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# Theme (of Q&P) and Summary of Recommendation

Quality  $\Rightarrow$  Productivity; In addition there are other things  
Predictability; Response time



Targets  
eng. team : gateway, PCB,



Mkt. Share vs Price

Are we going into too much?



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\*\*\*\*\*

TO: see "TO" DISTRIBUTION

DATE: WED 18 FEB 1981 9:15 EST  
FROM: BRUCE DELAGI  
DEPT: STRATEGIC ENG.  
EXT: 223-4887  
LOC/MAIL STOP: ML12-3/A62

SUBJECT: PROPOSED RESOURCES ALLOC. CRITERIA (MTG. STRATEGIC THREATS)

BD 2/16

PROPOSED RESOURCES ALLOCATION CRITERIA (MEETING STRATEGIC THREATS)

1. We will only enter or remain in a product area if we are playing to win. We will withdraw from a product area if we can't state clearly why we are going to win-or-won't dedicate ourselves appropriately to this goal. [SINCERITY]

A corollary: If we are already winning in a given product area, we will give first priority to maintaining this position, (leveraging our installed base, existing products, and distribution channels).

2. We want to be known for a uniquely productive style of computing. This requires us to be primarily a company that understands and satisfies the information system needs of our users. [VISION]

This criterion is in distinction to becoming a company primarily engaged in high volume manufacture of component subsystems.

Highly productive computing makes effective use of the human contribution. We want to be known for leadership in the human interface to information systems. This requires an understanding of cognitive as well as classical human factors. It implies an investment in speech and image processing.

Leadership human interfaces are responsive, interactive human interfaces. To provide highly interactive systems, we need to support the cost-effective dispersal of processing to its point of use and use this processing power effectively in our terminals.

Increasing user productivity is measured against a given level of customer capital employed. Perceivably cost-effective user productivity is the goal.

3. Focus of our own resources and leveraging off the work of others must be a key premise of our strategy. We must invest to lead and sustain the industrialization of clear, efficient, effective human and machine interface standards over a broad product range.



We've been known historically as a company that makes products to which (and by which) others can easily provide complementary capabilities satisfying particular needs. We aim to continue in this position.

Our products are sold at several different levels of integration simultaneously through many kinds of channels. It's important that each level stand on its own competitive merits.

The environment of the 1980's will almost certainly include a more intimate relationship between computing and communications. We will seek to cooperate in the development and application of standards tying together these disciplines.

We will provide appropriate internal and external interfaces to tie our products to local (central and distributed) communications switching systems as well as to public and private nets supplied by a variety of carriers. We will invest to deal effectively with the integration of voice, data and video images.

4. Investments we make will be complete enough to ensure the development of products that work as expected in worldwide markets. [QUALITY]

Together with Manufacturing we will seek automated methods that allow an increasingly higher level of consistently delivered quality.

At a systems level we will invest to provide user-tolerant, self-documenting products that rarely need service.

We will invest to develop an increasing degree of data integrity in our products.

5. There is a strong possibility that the pace of change in our industry will increase. There are several strong new players in our game. Further, IBM is much less encumbered by its lease base than previously. We need a strategy for improving engineering responsiveness. Some key operating rules are emerging:

Make decisions that can stick (and stick by them);

Do advanced (standards) development so invention need not be incorporated in critical schedules;

Stick to standards (so invention is constrained to only what is critical for a product);

Provide tools for more productive design efforts;

Keep some slack resource so unanticipated events can be accommodated

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TO: see "TO" DISTRIBUTION

cc: JIM CUDMORE  
WILL THOMPSON

DATE: TUE 17 FEB 1981 9:20 EST  
FROM: BRUCE DELAGI  
DEPT: STRATEGIC ENG.  
EXT: 223-4887  
LOC/MAIL STOP: ML12-3/A62

SUBJECT: STRATEGIC THREATS (INTEGRATED/FILTERED AND PRIORITIZED)

- PC's, PCC's as set to TSS.*
- CT's*
1. LOSS OF IMAGE AS (THE) LEADER IN EFFECTIVE COMPUTING STYLES
    - o high productivity terminals (Apollo, 3Rivers, Convergent?)
    - o programmer productivity (IBM System 38, INTEL 432 ADA "capabilities" (IBM System/R) (Xerox, Apollo, Datapoint, servers, and intelligent you-name-its)
    - o relational data bases
    - o dispersed processing
  2. USER/INDUSTRY ACCEPTANCE OF THE "WRONG" STANDARDS
    - o SNA lockout/account control (IBM)
    - o WPS "standardization" (WANG)
    - o integrated comp/communications (NEC, ROLM, EXXON, XEROX?)
  3. POTENTIAL DEVELOPMENT OF AN IMAGE OF SECOND-RATE QUALITY
    - o doesn't fail (Fujitsu, Tandem)
    - o data integrity (IBM now, Future 432 file system?)
  4. UNRESPONSIVENESS (IN COST OR FUNCTION) TO INCREASED RATES OF CHANGE
    - o lease base reduction (IBM)
    - o entry of technology companies (Fujitsu, NEC, Hitachi)
    - o entry of communications co's. (NEC, AT&T?, Intelmatique)
    - o entry of office products co's. (XEROX)
  5. MARGIN/PRICE PRESSURES
    - o mass storage price/capacity (Fujitsu, IBM?)
    - o non-profit service (Fujitsu)
    - o vertically integrated competitors
    - o long-term view of profit (Hitachi, NEC, Fujitsu, MITI).

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STAN PEARSON  
LARRY PORTNER  
RON SMART



\*|\*|\*|\*|\*|\*|\*|\*|\*|\*  
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\*|\*|\*|\*|\*|\*|\*|\*|\*|\*

FEB 18 1981

TO: ENGINEERING STAFF

DATE: 17 Feb. 1981  
FROM: Bruce Delagi  
DEPT: Strategic Planning  
EXT: 223-4887  
LOC/MAIL STOP: ML12-3/A62

SUBJECT: ALTERNATIVE STRATEGIES

In order to understand better what we're likely to do with the "ABC funding", Rick Corben and I, with the help of Ron Smart, played out the following process:

- quickly formulated some sample "strategies";
- set out their implications in terms of the "ABC" scenario funding level;
- assessed (on a 1-10 subjective scale) the technical risk and potential revenue to DEC of each strategy;
- looked at the sensitivity of the scenario selection by varying the strategy;
- and finally, invented a modified strategy resulting from the analysis.

The results are summarized in an attachment.

The exercise was both interesting and exhausting. We took a bit over three hours on it and had several unfair advantages:

- We had no vested interest in the outcome (all the energy in the room was intellectual);
- Because of this, it was easy to accept another's judgement of facts without diving down the rabbit hole of proof;
- We were only 3 people.

Some time at the 10 March meeting is likely to be spent arriving at a common engineering position on the funding allocation for FY83+ that we'll propose to the OC in April. In order to make that meeting more productive, Rick and I will work with sets of you to formulate alternative strategies, match them to appropriate funding levels, and sort thru them in various ways to test their "goodness". (I believe, some of these meetings have already been set up).

One conclusion, I personally came to, was that the crux of the decision was really not funding level of any area - but rather its direction. (Admittedly, its easier for me to feel this than someone with current operational responsibilities.) If we can manage it, I'd like to spend a relatively small amount of time on 10 March on "funding" so that we might work together more on direction. How do you all feel?



ALTERNATIVE STRATEGIES - STARTER SET

{ "C" scenario is heaviest investment; "B+" is next most aggressive  
Funding all "B" scenarios easily satisfies total funding limit. }

I Continue natural extension of our business - using VAX over a wider range, particularly in larger systems. Test the personal computer area for an appropriate niches.

Mass Storage:	B+	Terminals:	B+	16-bit/36-bit:	A
(mid range to large)				Other pieces:	B

[Technically Realizability: 7]

[Potential DEC Revenue: 6]

II Hold dec's position in midrange computing while aggressively driving for the leadership position in distributed personal computers.

Mass Storage:	B	Terminals:	C	Personal:	C
(low end)		Comm/Nets:	B+	OFIS:	B+
16 and 36-bit:	A	(NI focus)		32-bit Software:	A
32-bit systems:	A+	Personal SW:	B	Semiconductors:	B

[Technical Realizability: 4]

[Potential DEC Revenue: 8]

III Line up our resources to support the midrange business for which we are principally known today. Build upon our established position in departmental machines.

Mass Storage:	B+/C	Comm/Nets:	B+	16-bit Software:	B+
(high end focus)		(focus on "Internet")		16-bit Systems:	B+
OFIS:	B	Terminals:	B-	Semiconductors:	A+
(layered only)		Personal:	A	36-bit Systems:	A
		(only via industry interconnect)			

[Technical Realizability: 8]

[Potential DEC Revenue: 4]

IV From our historic user community of technical/professional contributors, extend our position as a leader of approachable highly productive computing systems to become a recognized leader in systems well suited for use in managerial and factory automation tasks. The excellence of the human interface is critical to these applications.

Personal:	C	Terminals:	C	Comm/Nets:	B+
		(incl. voice & image)		(NI focus)	
Software:	B+	Mass Storage:	B-	OFIS:	A
(graphics and non-procedural languages)		(focused on low-end)		16-bit Systems:	A
32-bit Systems:	B	36-bit Systems:	A	Semiconductors:	B

[Technical Realizability: 2]

[Potential DEC Revenue: 9]

V Establish a solid position as a long term OEM manufacturer of high volume information products (not systems).

Terminals:	C	Semiconductors:	C	Mass Storage:	B
Personal:	B	OFIS:	A	(for low end)	
(providing OEM tools to build upon)		(facilities for OEM-development only)		Comm/Nets:	A+
32-bit Systems:	B	16-bit Systems:	B	36-bit Systems:	A-
		(Unibus J-11 and push harder on BI)			

[Technical Realizability: 5]

[Potential DEC Revenue: 8]



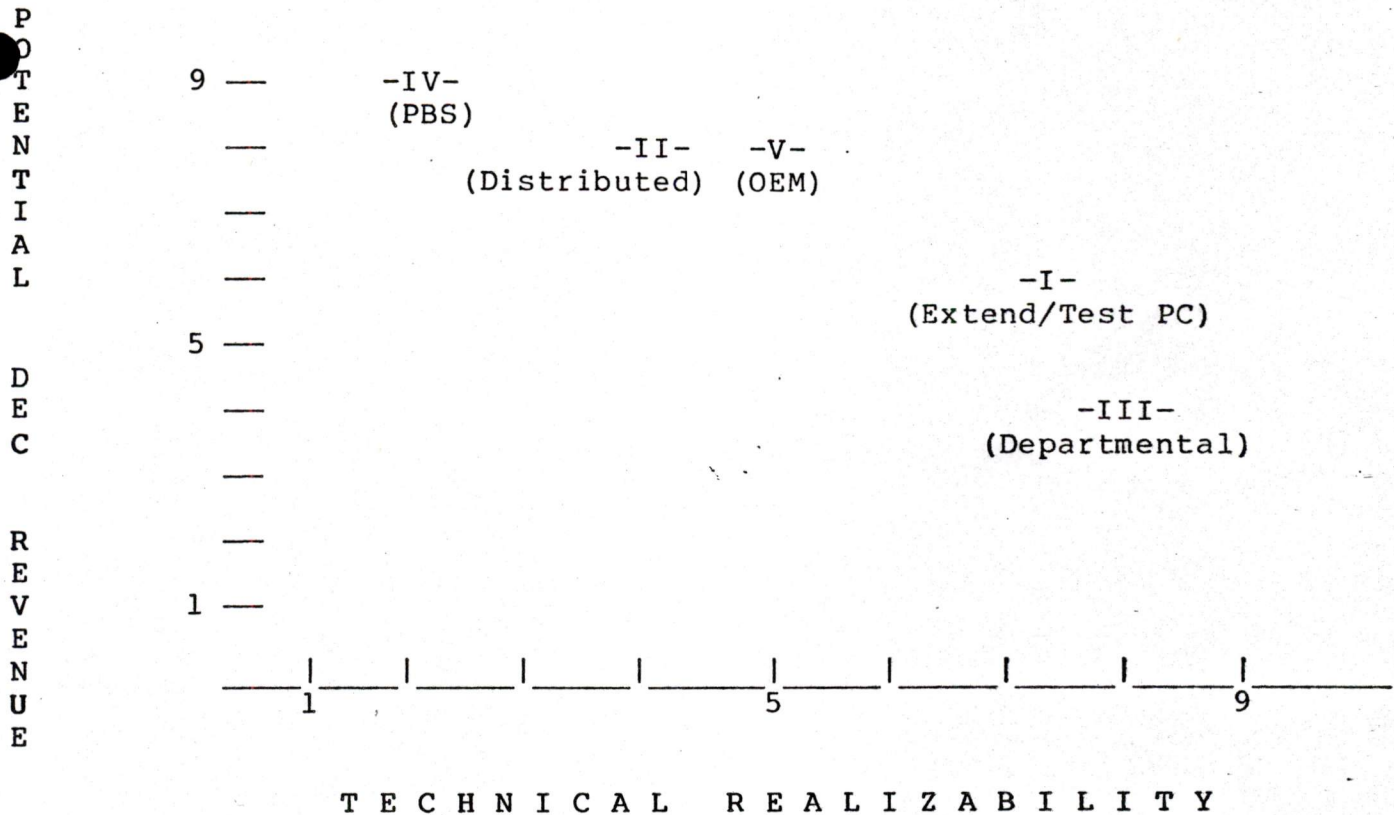
The points of commonality and difference for the six strategies (see below) lead to the following (tentative) conclusions:

1. It seems like there's a strong chance of selecting the "A" level scenario for 36-Bit Systems.
2. Under most conditions (except a definitive stand by DEC as an OEM manufacturer) 16-Bit Systems also get the "A" level funding.
3. We will probably fund 32-Bit Systems work at the "B" level.
4. Funding for Mass Storage will be a bit more aggressive than the "B" level. The significant question centers on the relative emphasis on small and large systems.
5. "Software" is an uncomfortable handle to use in describing our investment allocation. The question of direction is best addressed in other (program) terms.
6. The Comm/Nets question is (still) in the relative focus on local area nets (NI) or IBM compatibility (Internet).
7. Under many strategies, we'd like to invest more in terminals. It would be good to hear a lot of ideas we could interact with.
8. We'll probably select the "B" level for semiconductors. Somehow, the relevant issue doesn't appear to be funding per se.
9. OFIS is likely to get "B" level support as long as a credible program is presented.
10. Personal Computers is a free-for-all. Our ambivalence in making strategic decisions really shows up on this question.
11. The scenario named in braces {below} is the level that seems to prevail over the widest (subjective) range of the strategies considered. The "brace" scenario seems to preserve options for a little longer, in the absence of any clear strategic choice.

SCENARIOS:	I (Xtend)	II (Distr)	III (Depart)	IV (PBS)	V (OEM)	VI (Xtend&OEM PC)
Terminals {B++}	B(+)	C	B- (voice/image)	C	C	C
Semiconductors {B}	B	B	A+	B	C	B (for term)
Mass Storage {B+}	B+ (mid-high)	B (low)	B+/C (high)	B- (lo)	B (lo)	B+ (lo)
Comm/Nets {B+}	B	B+ (NI)	B+ (DEC&Inter)	B+ (NI)	A+	B+ (Inter&NI)
Software {?}	16A/32B	PC:B 16A/32A	B+ (gr. & n.pr.)	B+ (prog.dev)	A+	16A/32B
Personal {no call}	B	C (only via Inter)	A	C	B (OEM tools)	B (OEM tools)
OFIS {B}	B	B+ (layered)	B	A	A (tools only)	B (layered)
16-Bit Sys. {A}	A	A	A	A	B (U-J&BI)	A
32-Bit Sys. {B}	B	A+	B+	B	B	B
36-Bit Sys. {A}	A	A	A	A	A-	A



TECHNICAL REALIZABILITY VS POTENTIAL DEC REVENUE  
 (for Strategies I - V on previous page)



The presumed decision method for DEC (by our-system of values) would be to move inward from lowest technical risk and test whether the incremental potential payoff is "acceptable" in say moving from III to I to V.

With these biases, Strategy II is a "dominated strategy" since it provides more risk than V with no more payoff.

An idea that emerges from the (surprising?) strength of Strategy V is to go after the Personal Computer area strictly through OEM's. This allows innovation by a broad community on the base provided by DEC. (Using our equipment.) In this modification of Strategy I and V we get revenue if any of a number of good application ideas emerge as winners.

Strategy VI (I + V) selects scenarios as follows:

Terminals: C	Mass Storage: B+	Comm/Nets: B+
(provide base for OEM's to build on)	(low end focus OFIS: B	(Internet and NI)
Semiconductors: B	(layered)	32-bit Systems: B
16-bit Software: A	36-bit Systems: A	16-bit Systems: A

Quantitation





CENTRAL ENGINEERING BUDGET BY OOD GROUP

*Gordon,  
Updated cut.  
Per.  
FEB 17 1981*

Data within parenthesis (FY80, 81, 82) is from Mitch Kur's memo dated 12/12/79  
New FY81, 82, 83, 84 data is from Jim Lawless' memo dated 1/26/81

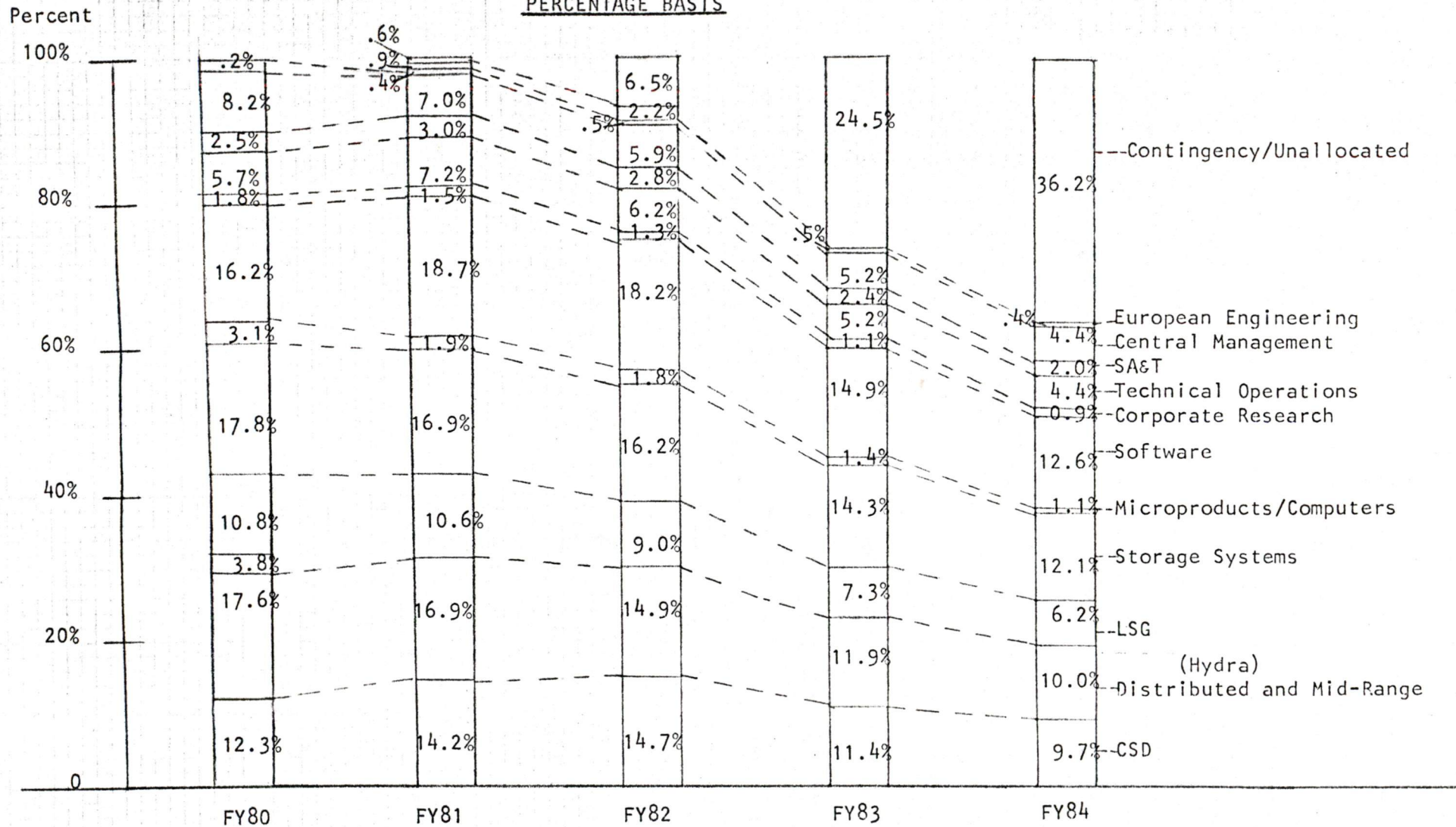
	FY80		FY81		FY82		FY83		FY84					
CSD	(16029	12.3%)	(21900	12.9%)	25037	14.2%	(26280	12.5%)	36077	14.7%	38095	11.4%	43047	9.7%
D & MS	(22824	17.6%)	(25782	15.3%)	29835	16.9%	(29670	14.1%)	36488	14.9%	39526	11.9%	44664	10.0%
(HYDRA)	( 4882	3.8%)	( 6039	3.6%)			( 6642	3.1%)						
LSG	(14082	10.8%)	(16145	9.6%)	18685	10.6%	(17760	8.4%)	22016	9.0%	24360	7.3%	27527	6.2%
STORAGE SYSTEMS	(22932	17.8%)	(29954	17.7%)	29796	16.9%	(37712	17.9%)	39744	16.2%	47574	14.3%	53759	12.1%
MICROPROD/COMP	( 4090	3.1%)	( 3384	2.0%)	3316	1.9%	( 3993	1.9%)	3993	1.8%	4512	1.4%	5099	1.1%
SOFTWARE	(21030	16.2%)	(28000	16.6%)	33073	18.7%	(35252	16.7%)	44681	18.2%	49600	14.9%	56048	12.6%
Spitbrook Relo			( 1000	.6%)										
CORPORATE RESEARCH	( 2360	1.8%)	( 2700	1.6%)	2646	1.5%	( 3186	1.5%)	3186	1.3%	3800	1.1%	4294	0.9%
TECH OPS	( 7450	5.7%)	( 9221	5.5%)	12656	7.2%	(10881	5.2%)	15173	6.2%	17207	5.2%	19444	4.4%
SA & T RAD & TRAD	( 1283	1.0%)	( 2100	1.2%)	5369	3.0%	( 2478)	1.2%)	6949	2.8%	7946	2.4%	8979	2.0%
RAD	( 1200	0.9%)	( 1530	0.9%)			( 1805	0.8%)						
TRAD	( 808	0.6%)	( 1280	0.8%)			( 1510	0.7%)						
CENTRAL MGMT TOTAL	(10591	8.2%)	(12785	7.6%)	12417	7.0%	(15086	7.1%)	14424	5.9%	17375	5.2%	19634	4.4%
CENTRAL MGMT					6940				8024		10000		11300	
FINANCE					2441				2900		3350		3786	
PERSONNEL					3036				3500		4025		4548	
EUROPE ENGINEERING	( 300	0.2%)	( 500	0.3%)	655	.4%	( 590	0.3%)	1300	0.5%	1520	0.5%	1780	0.4%
SITES & RELOCATION					1600	0.9%			5400	2.2%				
CONT/UNALLOCATED			( 6480	3.8%)	1121	0.6%	(18155	8.6%)	15902	6.5%	81787	24.5%	161306	36.2%
TOTAL	(129861)		(168800)		176206		(211000)		245333		333302		445581	

\*\*\*\*COMPANY CONFIDENTIAL\*\*\*\*

Per Hjerpe      RL0:7.30  
2/8/81

CENTRAL ENGINEERING BUDGET BY OOD GROUP

PERCENTAGE BASIS

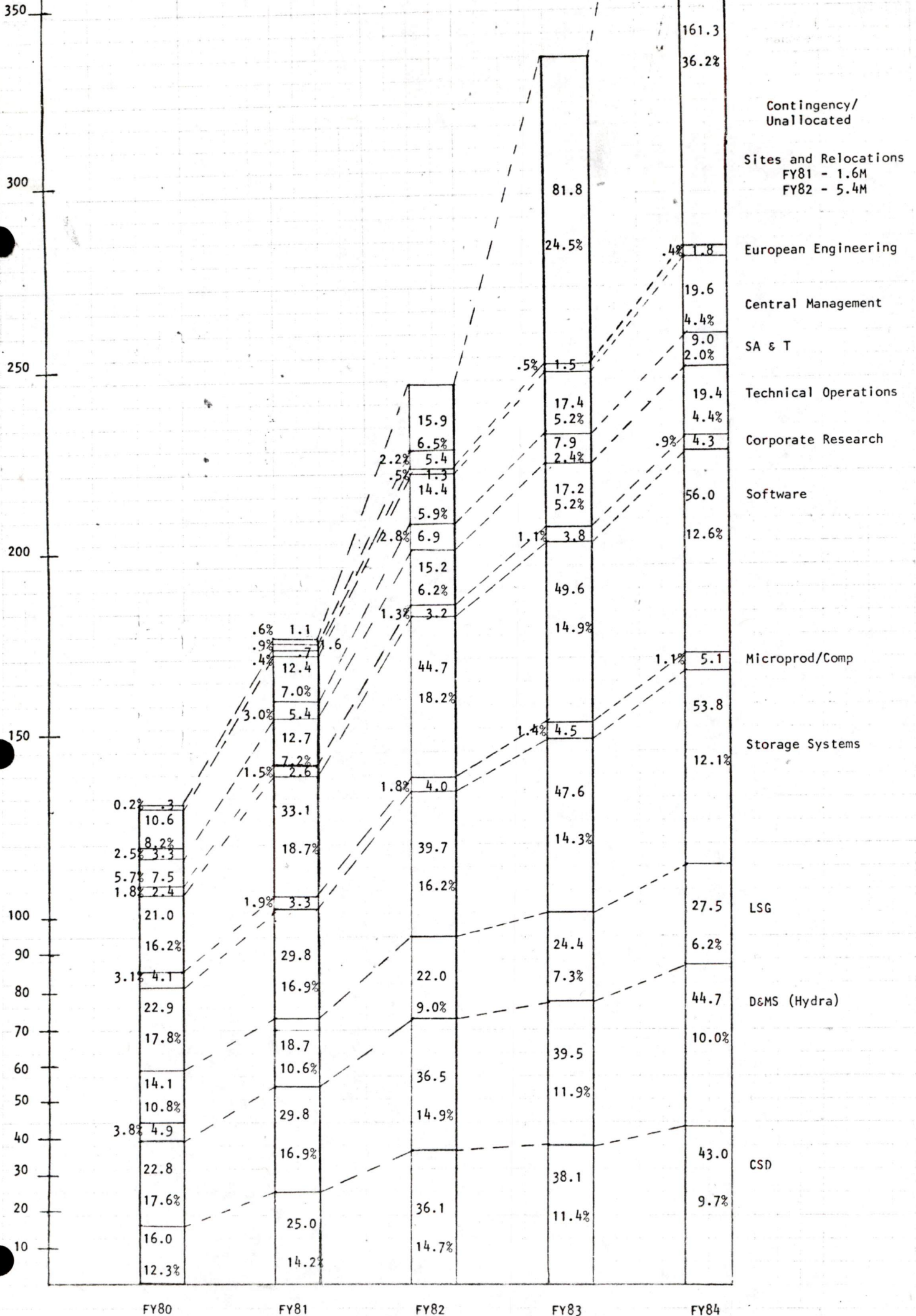




# CENTRAL ENGINEERING BUDGET

BY OOD GROUP

FY84 TOTAL = \$445.6M



\*\*\* COMPANY CONFIDENTIAL \*\*\*

PER HJERPPE 2/17/81



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\* D I G I T A L \*  
\*\*\*\*\*

INTEROFFICE MEMORANDUM

TO: BRUCE DELAGI  
CC: LARRY PORTNER  
MITCH KUR  
GORDON BELL

DATE: DECEMBER 31, 1980  
FROM: DICK CLINTON  
DEPT: CENT. ENG. FIN.  
EXT: 223-1932  
LOC/MAIL STOP: ML12-2/A16

SUBJECT: ADEQUACY OF THE INVESTMENT IN ENGINEERING (FOR FEBRUARY EBOD)

As a result of our discussion with Mitch, I've made a stab at how a positioning posture for EBOD on how the Corporate dollar investment in Engineering could be made. Some positioning is factual (quantifiable), but most is subjective. Further data collection, if needed, will take some time and resources.

It is, of course, impossible to reach a precise evaluation of the "right" amount of dollars to put into future product development (and current product maintenance). If there are obvious, universally accepted technology holes which may impair corporate survival, then any pre-established metric (such as today's 5.5%NOR) should be scrapped. If, however, near-term products appear to receive good market acceptance, and we can make money on them, then the investment level has probably been adequate. If we have too many products, poorly understood by the Sales Force, with maintenance costs too high, then the investment level may be too high (or, at least, not focused and managed well enough).

Investment in Engineering is a long-term thing. Unlike the Advertising budget, it should not be jerked around. The %NOR metric, I believe, is a pretty good starting point on which to establish the Engineering budget.

ADEQUACY TESTS BASED ON FACTS (MORE-OR-LESS QUANTIFIABLE):

- Competitive Comparison: Competitor's Investment in R&D (\$ amount, % of Sales, correlation with growth) (See Table I)
- Do we have many product winners and few marginal ones? (or vice versa?)
- Is an increasing proportion of Engineering \$ being spent on maintenance of existing products? What is growth of pure development \$ compared to NOR?
- Are critical programs (essential to Corporate survival) adequately funded? Are non-critical programs over-funded?
- What is time trend of:
  - a) number of products reaching production
  - b) cost per project
  - c) ratio of product winners to losers

d) ratio of number of Engineers to non-engineers

- If we "make" more than "buy", Engineering cost will rise. Are we "making" more as %NOR?
- What do the Wall Street analysts think is the "right" level of investment?

ADEQUACY TESTS BASED ON PERCEPTIONS (NOT VERY QUANTIFIABLE):

- Is Engineering spending current funds effectively?
- Are we happy with Corporate Growth/Market Share projections? Are they product dependent?
- Are we happy with the Markets we are in? not in?
- Do customers believe product quality is acceptable? Will they 5 years from now?
- If the Engineering budget were to significantly increase, what would be the impact? (Could the Corporation handle more products? higher growth? would better quality result? or would salaries simply inflate because of the scarcity of trained Engineers?)
- Does the "bigness" of an Engineering group automatically imply increased overheads, rules, and processes just to communicate with itself?
- Do P/L Engineering (appx 2%NOR) and Manufacturing Process Engineering (appx 0.5%NOR) effectively leverage Corporate Engineering? Is this money well spent?

DC2/96

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 |                   TABLE I                   |  
COMPETITIVE STATISTICS

R&D EXPENDITURES  
AS % OF SALES (NOR)

All U.S. Industry	1 1/2%
Electronics Industry	3%
Computer Industry	6 1/2%

		<u>APPX. TOTAL</u> <u>DOLLAR R&amp;D</u> <u>INVESTMENT-82</u>	<u>APPX. ANNUAL</u> <u>SALES GROWTH -</u> <u>PAST 5 YEARS</u>
TI (1/2 OF R&D IS GOVT FUNDED)	10%	\$340	15%
* INTEL	10%	165	60%
D.G.	10%	100	45%
H.P.	9%	325	25%
AMDAHL	9%		
NAT'L SEMICONDUCTOR	9%		55%
DEC	8%	300	55%
* IBM	6%	2270	13%
BURROUGHS	6%		
* XEROX	5%		
* FUJITSU	5%	130	14%
* NEC	5%	270	
SPERRY RAND	5%		
HONEYWELL	5%		
CONTROL DATA	5%		
NCR	5%		
* WANG	4%		
HARRIS	4%		
* APPLE	?		
* AT&T	?		

\* Key strategic competitor

Observations:

- 1) Corp. growth rates do show rough positive correlation with R&D as %NOR
- 2) IBM's absolute dollar investment is overwhelming
- 3) TI, HP, DEC, and NEC in the early 80s will all spend about the same dollars on R&D
- 4) WANG's R&D %NOR is probably higher because actual sales probably exceeded their budget

Source: Gnostic Concepts Study, Sept. 79, "R&D Expenditure Patterns";  
 Business Week; Annual Reports.





Prod. Goal + St.