

To: Ken Olsen and the Board of Directors
CC: Ed Kramer, Jack Shields, Jack Smith and Win Hindle

I would like to strongly recommend that we buy an interest in Trilogy for the following reasons:

1. We can build several, significant VAX products that offer a factor of 2 to 8 increase in performance times the machines we are introducing in the next two years. We have NO technology in house or in development that approaches this; we know of no technology that rivals this at IBM or in Japan.

Nearly all of our customers require significantly more computing power, and the application of very large scale, high priced computing technology to minicomputers constitutes a major breakthrough in the design of minicomputers.

2. High performance, minicomputer-priced computers, coupled with our ability to interconnect machines would hold American Bell and other customers who may leave DEC for IBM. Just the announcement of our agreement may keep customers.
3. Minicomputers built with this mainframe technology will have an order of magnitude higher reliability, and as such, some may NEVER fail. Service cost, which constitutes half the total system cost is reduced a factor of two. Service is by simple replacement at the user's convenience.
4. The technology as a whole is a breakthrough, and forms the basis of both direct descendant technology and other systems:
 - a. Their Computer Aided Design is the best we've seen. With it, designer productivity is an order of magnitude better than with our most advanced systems.
 - b. Their mainframe design techniques are useful in mini-computers. We have already learned much from the Amdahls.
 - c. The packaging and semiconductor technologies are state of the art, yet conservative, and extendable to another generation and probably lower cost machines. These technologies are coupled to the critical manufacturing processes development.
 - d. The method for achieving reliability and obtaining higher yields through redundancy is truly unique, and a breakthrough. It goes directly to the ultimate goal of building a computer that will never fail. The current state of the art only permits the diagnosis of faults.
5. The technology is being developed by Gene Amdahl, who has built great high speed computers for the last 30 years.
6. We have able designers who want to start now.

Indeed, the only reason NOT to go with Trilogy is one of risk. We believe the risk is manageable, the people are the best, and our entry will increase their likelihood of success by additional resources and a different view.

We have the opportunity to participate in a breakthrough. Let's go.

Gordon Bell
19 June 1983

GB6.10

GENE M. AMDAHL, AGE 60

CHAIRMAN OF THE BOARD OF DIRECTORS, TRILOGY SYSTEMS

- o PRIOR TO 1970, MANAGER OF ARCHITECTURE FOR THE IBM SYSTEM/360 AND DIRECTOR OF IBM'S ADVANCED SYSTEMS LABORATORY.
- o LEFT IBM WHEN IBM DISCONTINUED DEVELOPMENT OF LARGE COMPUTERS.
- o 1970 - FOUNDED AMDAHL CORPORATION TO DEVELOP POWERFUL COMPUTERS USING IBM SOFTWARE.
- o 1975 - AMDAHL CORPORATION INTRODUCED ITS 470 COMPUTER LINE AND FOUNDED THE "PLUG-COMPATIBLE" INDUSTRY.
- o 1976 - REVENUES AT AMDAHL WERE \$93M, AND EARNINGS PER SHARE WERE \$1.21.
- o 1978 - REVENUES WERE \$321M, EARNINGS PER SHARE OF \$2.86. STOCK VALUE HAD INCREASED FROM \$12 TO \$71.
- o IN THE COURSE OF FINANCING DEVELOPMENT OF AMDAHL CORPORATION'S PRODUCTS, FUJITSU LTD. AND HEIZER CORPORATION ACQUIRED LARGE BLOCKS OF STOCK. CURRENTLY THESE CORPORATIONS HOLD 33% AND 23% RESPECTIVELY. GENE AMDAHL'S EQUITY OWNERSHIP DROPPED TO ABOUT 5%.
- o 1979 - LEFT AMDAHL CORPORATION. AMDAHL CORP. EARNINGS DROPPED TO \$1.02 PER SHARE, REVENUES DROPPED TO \$300M.
- o SINCE 1979, AMDAHL CORP. EARNINGS HAVE BEEN NO HIGHER THAN \$1.31 PER SHARE. REVENUES INCREASED TO \$462M BY 1982.
- o 1980 - TRILOGY FORMED.

FOUNDRY

OUR NEED:

LOW COST OF SUPPLY

THEIR GOALS

SECOND SOURCE OF SUPPLY

SELL LARGE CHIPS TO OTHER COMPANIES

TRILOGY/DIGITAL FOUNDRY PROPOSAL
STATEMENT OF DIRECTION

- TRILOGY WILL BUILD, STAFF, AND RUN A 10,000 WAFER START/MONTH MANUFACTURING FACILITY
- DIGITAL WILL FINANCE BUILDING, EQUIPMENT, AND STARTUP COSTS (\$60M)
- TRILOGY WILL REPAY CAPITAL COSTS OVER 5 YEARS BEGINNING WHEN PRODUCTION BEGINS

- MODULE COST = ACTUAL COST + 25%
- DIGITAL'S CAPACITY = 6000 WAFER STARTS/MONTH

RISKS

- FORECASTING FLEXIBILITY
- MANUFACTURING YIELDS

ANOTHER APPROACH

ALTERNATIVE:

DIGITAL BUILD ITS OWN FAB FACILITY

REASONS NOT PREFERRED:

- DIGITAL DOES NOT HAVE A WEALTH OF BIPOLAR EXPERIENCE
- DIGITAL SEMICONDUCTOR EFFORT FOCUSED ON LOW COST TECHNOLOGIES
- EASIER FOR TRILOGY TO ATTRACT SEMICONDUCTOR PROFESSIONALS
- TRILOGY WILL HAVE FASTER YEILD ATTAINMENT

BACKUP
SLIDES

HIGH END STRATEGY

- A UNIQUE OPPORTUNITY

TO HAVE A LEADERSHIP PRODUCT SET IN THE HIGH
END VAX MARKETPLACE

- WE ARE ASKING FOR

BOARD OF DIRECTORS SUPPORT OF PROPOSED STRATEGY

CURRENT TECHNOLOGY STRATEGY

- EVOLUTION OF VENUS SEMICONDUCTOR TECHNOLOGY
- DEVELOP NEW LIQUID COOLED PACKAGE

TRILOGY TECHNOLOGY STRATEGY

UNIQUE NEW CONCEPT:

- VERY LARGE CHIPS
- VERY HI DENSITY PACKAGE
- VERY HI RELIABILITY

To: Len Olsen

CC: Ed Kramer, Jack Shields, Jack Smith and Win Hindle

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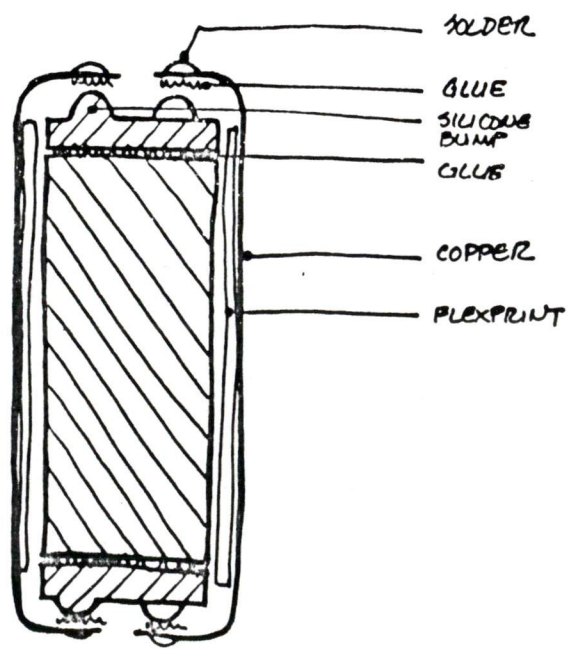
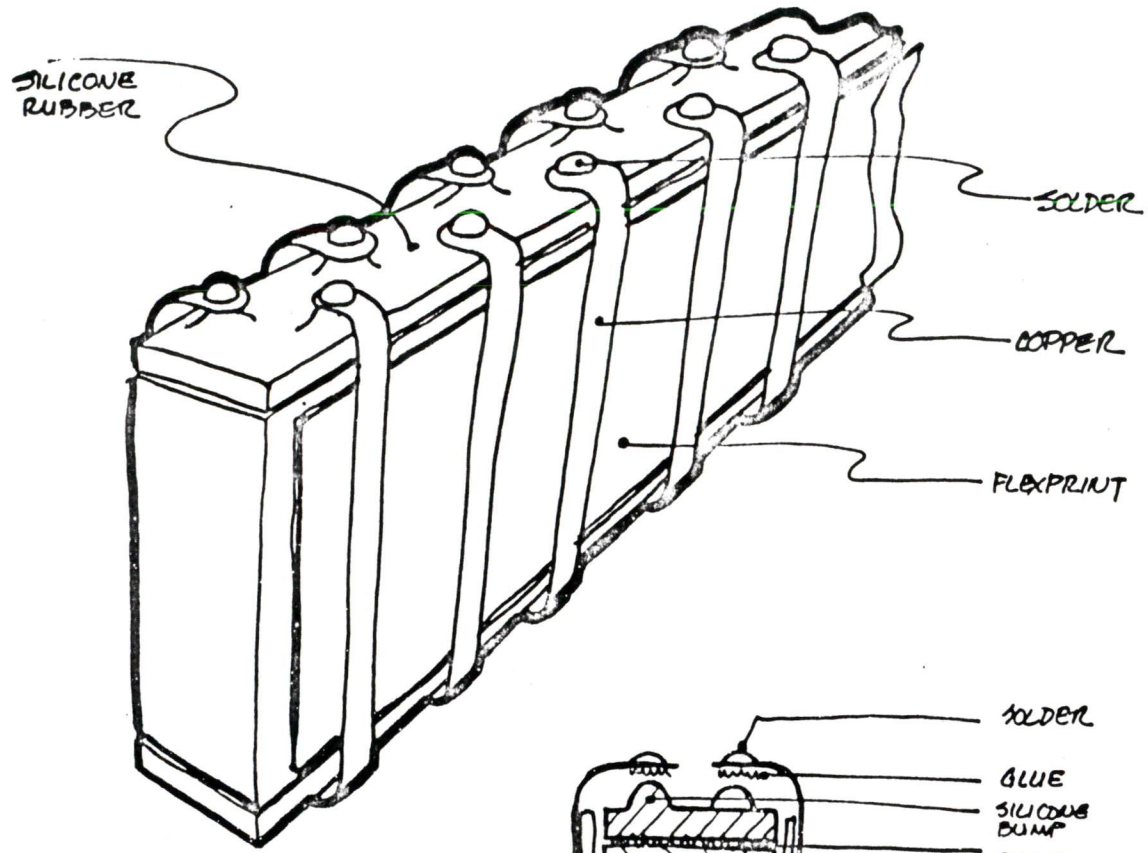
Nearly all of our customers require significantly more computing power, and the application of very large scale, high priced computing technology to minicomputers constitutes a major breakthrough in the design of minicomputers.

2. High performance, minicomputer-priced computers, coupled with our ability to interconnect machines would hold American Bell and other customers who may leave DEC for IBM. Just the announcement of our agreement may keep customers.
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4. The technology as a whole is a breakthrough, and forms the basis of both direct descendant technology and other systems:
 - a. Their Computer Aided Design is the best we've seen. With it, designer productivity is an order of magnitude better than with our most advanced systems.
 - b. The techniques for designing large machines will be useful in minicomputers. Already, the Amdahls have taught us much about pipelined computers.
 - c. The packaging and semiconductor technologies are state of the art, yet conservative, and extendable to another generation and probably lower cost machines. These technologies are coupled to the critical manufacturing processes development.
 - d. The method for achieving reliability and obtaining higher yields through redundancy is truly unique, and a breakthrough. It goes directly to the ultimate goal of building a computer that will never fail. The current state of the art only permits the diagnosis of faults.
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6. We have able designers who want to start now.

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Gordon Bell
19 June 1983



TRILOGY
MODULE
CONCEPT
CONFIDENTIAL

	CURRENT STRATEGY		PROPOSED STRATEGY	
	SYSTEM	SYSTEM	TRILOGY	TRILOGY
	<u>A</u>	<u>B</u>	<u>1</u>	<u>2</u>
PERFORMANCE (X780)	*8	*15	12	25

* TARGET TECHNOLOGY NOT YET DEFINED

	<u>CURRENT</u>		<u>PROPOSED</u>	
	<u>STRATEGY</u>		<u>STRATEGY</u>	
	SYSTEM	SYSTEM	TRILOGY	TRILOGY
	<u>A</u>	<u>B</u>	<u>1</u>	<u>2</u>
PERFORMANCE (X780)	*8	*15	12	25
NUMBER OF MODULES/WAFERS	8	16	6	15

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	<u>CURRENT</u>		<u>PROPOSED</u>	
	<u>STRATEGY</u>		<u>STRATEGY</u>	
	<u>SYSTEM</u>	<u>SYSTEM</u>	<u>TRILOGY</u>	<u>TRILOGY</u>
	<u>A</u>	<u>B</u>	<u>1</u>	<u>2</u>
PERFORMANCE (X780)	*8	*15	12	25
NUMBER OF MODULES/WAFERS	8	16	6	15
PRODUCT COST (CPU - K\$)	40	75	45	100

* TARGET TECHNOLOGY NOT YET DEFINED

CURRENT
STRATEGY

PROPOSED
STRATEGY

SYSTEM SYSTEM TRILOGY TRILOGY
 A B 1 2

PERFORMANCE
(X780)

*8 *15 12 25

NUMBER OF MODULES/WAFERS

8 16 6 15

PRODUCT COST
(CPU - K\$)

40 75 45 100

FIRST SHIP

FY87 FY87 FY87 FY87

* TARGET TECHNOLOGY NOT YET DEFINED

FINANCIAL SUMMARY

	<u>CURRENT</u>	<u>PROPOSED</u>
	<u>STRATEGY</u>	<u>STRATEGY</u>
DEVELOPMENT COSTS (FY84-FY91)	\$150.0M	\$128.0M
FOUNDRY COSTS		60.0M
TECHNOLOGY PURCHASE		26.0M
SIZE OF MARKET (FY87-FY90)		
250K-625K PRICE RANGE	\$10.1B - 15.9B	\$10.1B - 15.9B
625K-1.6M PRICE RANGE	\$ 5.0B - 6.3B	\$ 5.0B - 6.3B
MARKET SHARE (FY87-FY90)		
250K - 1.6M PRICE RANGE	10 - 11%	10 - 16%
UNITS SHIPPED	RANGE OF 11000 - 17000	14000 - 20000
FY87 TO FY92	ANALYSIS BASED UPON 15000	16000
REVENUE		
FY87 TO FY92	\$ 6.5B	\$ 8.0B
PRESENT VALUE CASH FLOWS @ 40%	(\$ 5.0M)	\$25.0M
OPERATING PROFIT BEFORE TAX	\$ 2.0B 28% OF NOR	\$ 3.0B 34% OF NOR

ANALYSIS ASSUMES SALES PRICE OF STOCK IN 1992 IS SAME AS PURCHASE PRICE IN 1983. IF TRILOGY IS SUCCESSFUL, THE STOCK OFFERS A PROFIT POTENTIAL

ENGINEERING COSTS

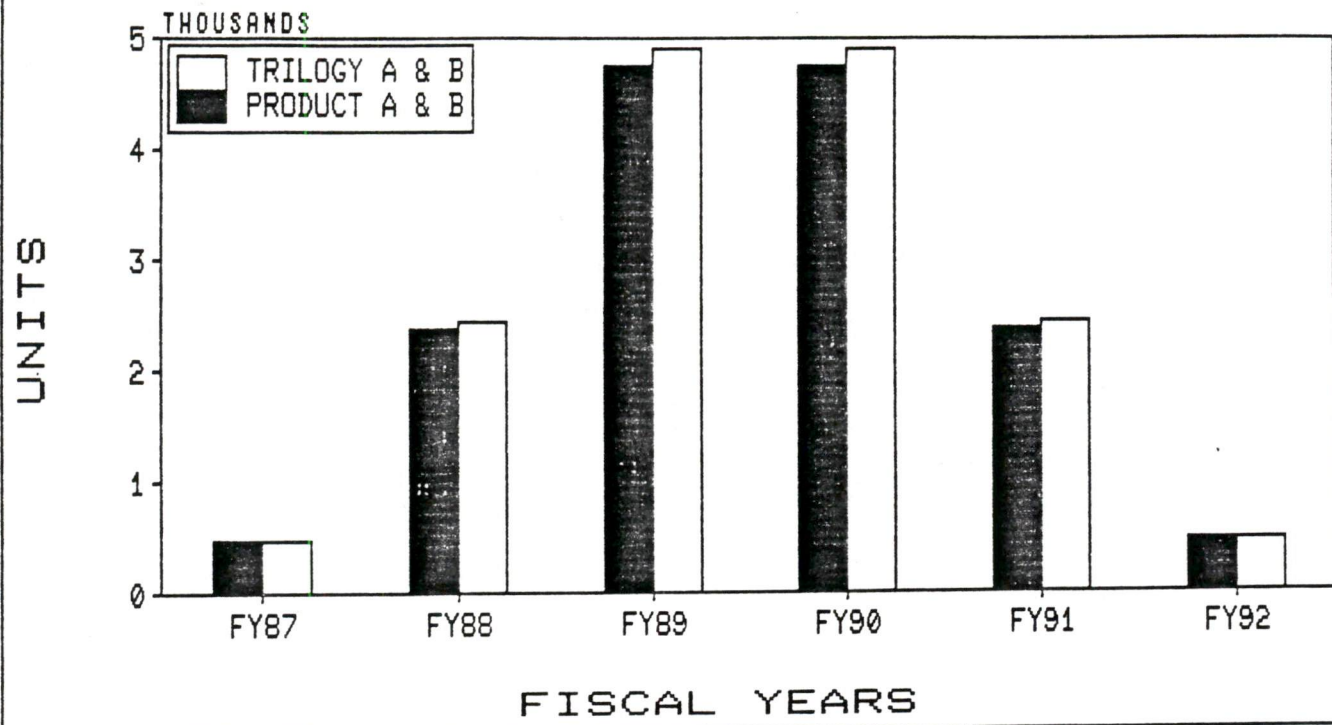
\$M

	<u>CURRENT STRATEGY</u>	<u>PROPOSED STRATEGY*</u>
FY1984	9	14
FY1985	23	27
FY1986	36	36
FY1987	29	27
FY1988	23	13
FY1989	17	6
FY1990	9	3
FY1991	4	2
TOTAL	150	128

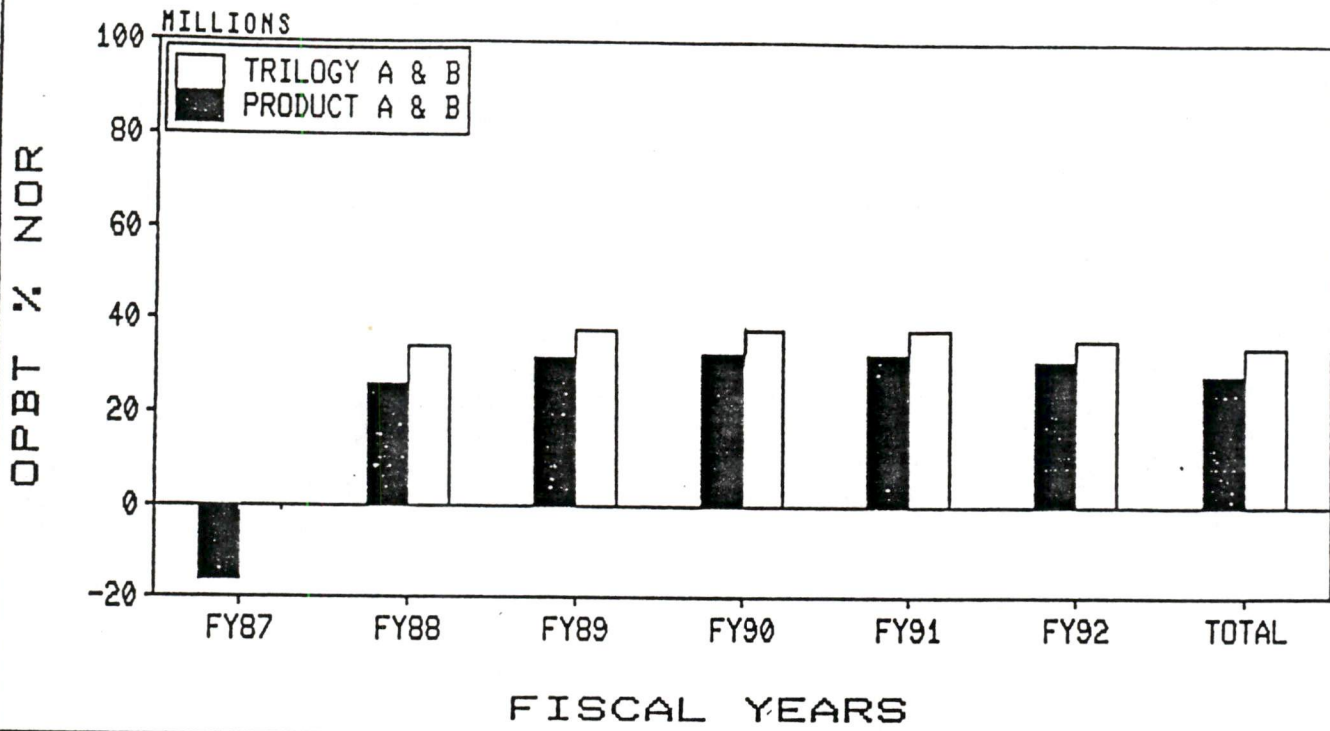
*CAD ASSUMPTIONS BASED UPON TRILOGY'S PLANNING METRICS

ENGINEERING COSTS REPRESENT CPU DEVELOPMENT AND SYSTEM TEST.

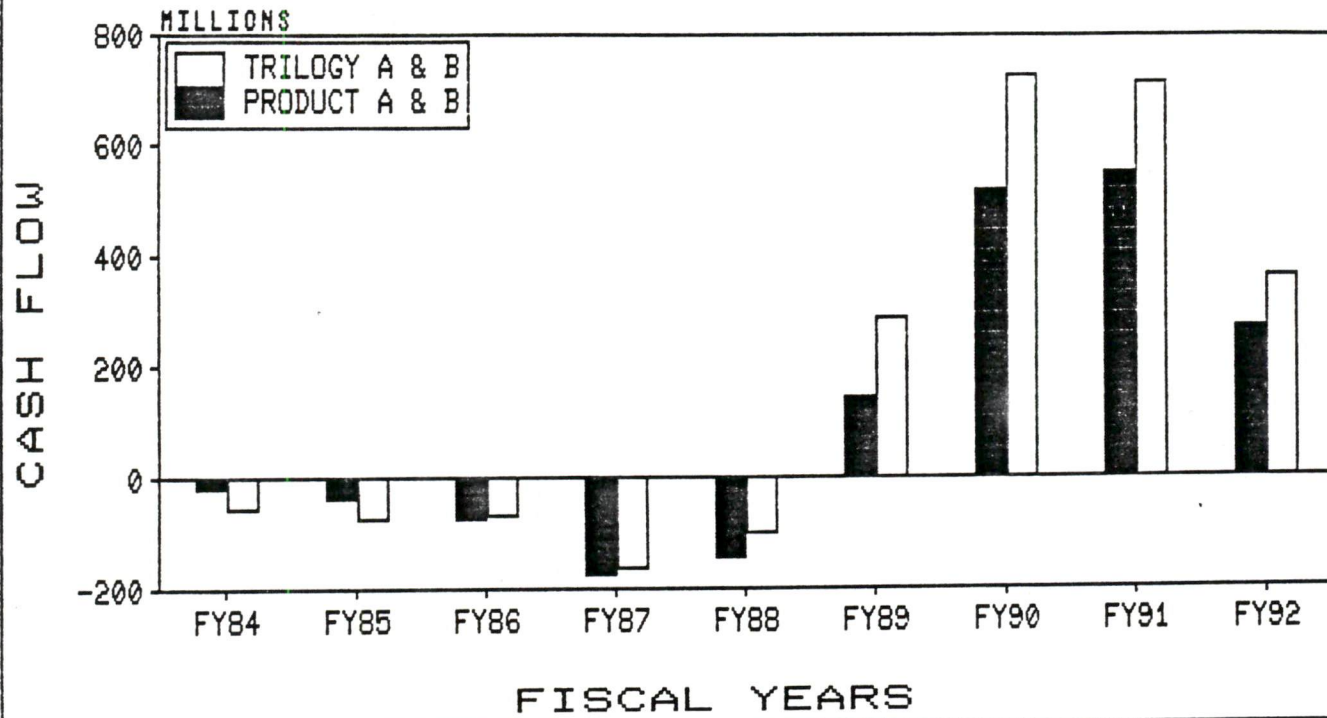
CURRENT PLAN VS TRILOGY UNITS



CURRENT PLAN VS TRILOGY OPBT % NOR



CURRENT PLAN VS TRILOGY CASH FLOW



TRILOGY FINANCING

EQUITY AND INCOME TO DATE:

1980 LIMITED PARTNERSHIP	\$55.0M
1980 SALE OF STOCK	\$1.5M
1981 SALE OF STOCK	\$26.7M
1982 SALE OF STOCK	\$23.8M
TO DATE INTEREST EARNED ON CAPITAL	\$15.0M

OTHER FINANCING

IRISH GRANTS AND FINANCING TO BE RECEIVED	\$18.0M
RENTAL OF CUPERTINO FACILITY	\$20.0M
NET EQUIPMENT LEASES AND LOANS	<u>\$27M</u>
TOTAL EQUITY, INCOME AND FINANCING	\$187.0M

TRILOGY'S CASH NEEDS
TO COMPLETE THE PROJECT

<u>CASH NEEDS</u>	\$ MILLION
CASH AVAILABLE AS OF OCTOBER 1, 1983	0
CASH FLOW PRIOR TO FIRST SHIPMENT (MARCH 1, 1985)	
1983 (LAST 3 MONTHS)	10
1984 (12 MONTHS)	70
1985 (FIRST 2 MONTHS)	<u>15</u>
	95
POST-FIRST SHIP WORKING CAPITAL - UNTIL BREAKEVEN	<u>35</u>
PROJECTED NEEDS	130

CASH SOURCE (TRILOGY PLAN)

SPERRY	42
ADDITIONAL FINANCING FROM CURRENT INVESTORS	16
DIGITAL	26
PUBLIC OFFERING	<u>80 - 100</u>
SOURCES	164 - 184
EXCESS FUND TO COVER UNEXPECTED NEEDS	34 - 54

INVESTOR EQUITY
(000,000'S OMITTED)

	<u>\$</u>	<u>SHARES</u>	<u>%</u> [*]
AS OF 6/27/83			
PRINCIPALS & OPTIONS	0	18.9	36.1
CII - HONEYWELL - BULL	13	2.3	4.4
BANK OF AMERICA	10	2.0	3.8
IVORY - SIME	10	2.0	3.8
DEVELOPMENT CAPT CORP	5	.8	1.5
AETNA	3	.5	1.0
OTHERS	11	1.7	3.3
IDA COMMITMENT @ \$5.00	<u>0</u>	<u>.2</u>	<u>.4</u>
	52	28.4	54.3
SPERRY	<u>40</u>	<u>5.0</u>	<u>9.6</u>
	92	33.4	63.9
ADDITIONAL 1983			
DIGITAL	24	3.0	5.7
OTHER	16	2.0	3.8
STOCK BUYOUT OF R&D PARTNERSHIP	0	6.9	13.2
PUBLIC OFFERING	<u>100</u>	<u>7.0</u>	<u>13.4</u>
	232	52.3	100

* % ARE BASED UPON ANTICIPATED NUMBER OF SHARES OUTSTANDING
AFTER THE PUBLIC OFFERING

RELATIONSHIP BETWEEN THE PARTNERSHIP AND THE TRILOGY GROUP

I. TRILOGY SYSTEMS RECEIVES:

- o REIMBURSEMENT OF RESEARCH AND DEVELOPMENT COSTS.
CAPITAL COSTS ARE BORNE BY TRILOGY SYSTEMS.
- o MAXIMUM FUNDING - \$55M.

II. THE PARTNERSHIP RECEIVES:

- o EXCLUSIVE WORLD-WIDE RIGHT TO USE THE TECHNOLOGY
DEVELOPED BY TRILOGY SYSTEMS.

III. TRILOGY LTD. RECEIVES:

- o AN OPTION TO REACQUIRE ALL RIGHTS IN THE TECHNOLOGY
GRANTED TO THE PARTNERSHIP.
- o COST OF OPTION EXERCISE.
 - ROYALTIES OF 7 7/9% OF REVENUE TO \$111,111,111
REACHED. LESS AFTER THAT
 - OR
 - LUMP-SUM OF GREATER OF \$222,222,222 LESS ROYALTIES
PAID OR \$111,111,111 CASH.
 - PARTNERSHIP MAY ELECT TO RECEIVE 6,944,444 SHARES
OF TRILOGY COMMON STOCK IN LIEU OF A CASH LUMP-SUM
PAYMENT.

GENE M. AMDAHL, age 59

Chairman of the Board of Directors, Trilogy Systems and Storage Technology.

- o Prior to 1970, Dr. Amdahl was employed by IBM as Manager of Architecture for the IBM System/360 and Director of IBM's Advanced Systems Laboratory.
- o Left IBM when IBM discontinued development of large computers.
- o 1970 - Founded Amdahl Corporation to develop more powerful computers than IBM high end equipment, but using IBM software and operating systems.
- o 1975 - Amdahl Corporation introduced its 470 computer line and founded the "Plus-compatible" industry.
- o 1976 - Revenues at Amdahl were \$93 M, and earnings per share were \$1.21.
- o 1978 - Revenues were \$321 M, earnings per share of \$2.86. Stock value had increased from \$12 to \$71.
- o In the course of financing development of Amdahl Corporation's products, Fujitsu Ltd. and Heizu Corporation acquired large blocks of stock. Currently these corporations hold 33% and 23% respectively. Gene Amdahl's equity ownership dropped to about 5%.
- o 1979 - Left Amdahl Corporation. Amdahl Corp. earnings dropped to \$1.02 per share, revenues dropped to \$300 M.
- o Since 1979, Amdahl Corp. earnings have been no higher than \$1.31 per share. Revenues increased to \$462 M by 1982.
- o 1980 - Trilogy formed.

D I G I T A L H I G H
E N D V A X
S I R A I E G Y

PRESENTATION TO BOARD
OF DIRECTORS

JUNE 27, 1983

THE TRILOGY OPPORTUNITY

- OPPORTUNITY TO HAVE LEADERSHIP PRODUCTS AT THE HIGH END OF THE VAX FAMILY IN THE 1986-90 TIMEFRAME.
- OPPORTUNITY TO EXPLOIT FUTURE ENHANCEMENTS TO THIS UNIQUE TECHNOLOGY TO MAINTAIN VAX LEADERSHIP IN THE HIGH END INTO THE 1990'S.
- OPPORTUNITY TO EXPLORE THE USE OF THE TECHNOLOGY IN OTHER SYSTEMS ARCHITECTURES AND APPLICATIONS.
- OPPORTUNITY TO LEARN TECHNIQUES FOR THE DESIGN OF HIGH PERFORMANCE SYSTEMS.
- OPPORTUNITY TO LEARN TECHNIQUES FOR THE DESIGN OF HIGHLY RELIABLE SYSTEMS.
- OPPORTUNITY TO BEGIN INSTANT USE OF AN ESTABLISHED DESIGN PROCESS.
- OPPORTUNITY TO CONSIDER WAFER SCALE INTEGRATION CONCEPTS IN OTHER SEMICONDUCTOR TECHNOLOGIES.

THE DOWNSIDE

NOMINAL WORST CASE -- BASED UPON OUR TECHNICAL ASSESSMENT

INITIAL INVESTMENT - \$26M
WORSE CASE DELAY - 1 YEAR
TO TECHNICAL DEV

EFFECT: DELAY DIGITAL PRODUCT DEVELOPMENT 6 MONTHS
TRILOGY MIGHT REQUIRE \$10-20M

IMPACT: SMALL IMPACT ON OVERALL NEW BUSINESS PLAN

ABSOLUTE WORST CASE

WE CONCLUDE IN 18 MONTHS THE TECHNOLOGY IS NOT MANUFACTURABLE.

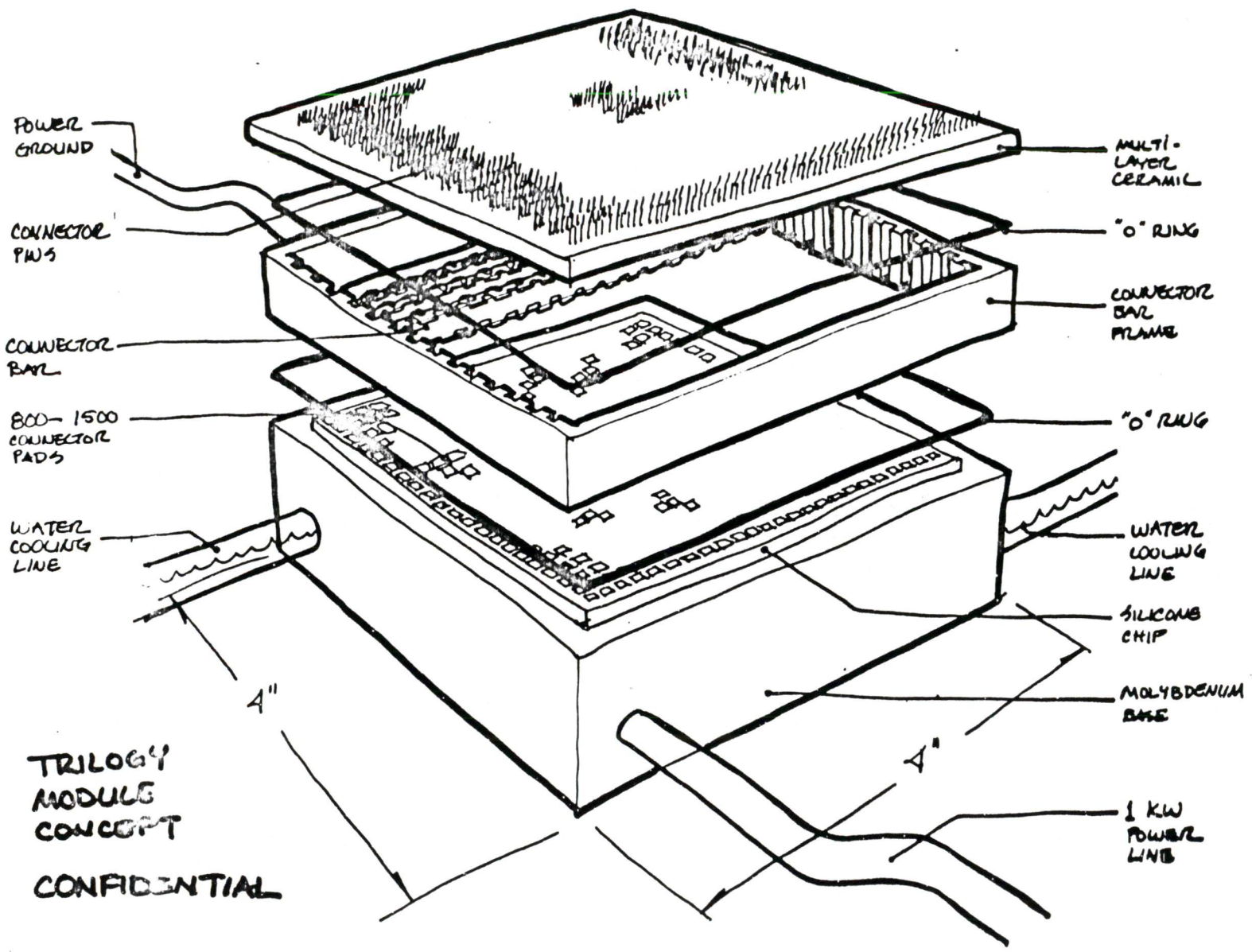
EFFECT: DELAYS DIGITAL'S CURRENT STRATEGY BY ONE
YEAR

IMPACT: SIGNIFICANT IMPACT ON OUR CURRENT BUSINESS
PLAN

RISK SUMMARY

- THE TRILOGY TECHNOLOGY IS A MAJOR TECHNICAL BREAKTHROUGH WITH \$100M OF DEVELOPMENT ALREADY INVESTED IN IT AND WITH A FINITE RISK OF FAILURE.

- THE DIGITAL ALTERNATIVE IS A SMALLER EVOLUTIONARY STEP THAT HAS HAD RELATIVELY LITTLE EFFORT APPLIED TO IT, AND WILL LIMIT THE UPPER RANGE OF SYSTEMS DIGITAL CAN OFFER. IT SHOULD HAVE A LOWER TECHNICAL RISK AND HIGHER TIME TO MARKET RISK.



TRILOGY
 MODULE
 CONCEPT
 CONFIDENTIAL

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	CURRENT		PROPOSED		
	<u>STRATEGY</u>		<u>STRATEGY</u>		
	SYSTEM	SYSTEM	TRILOGY	TRILOGY	
	<u>A</u>	<u>B</u>	<u>1</u>	<u>2</u>	
PERFORMANCE (X780)	4-5 *8	*15	12	25	32
NUMBER OF MODULES/WAFERS	8	16	6	15	
PRODUCT COST (CPU - K\$)	(25-40) 40	75	45	100	
FIRST SHIP	FY87	FY87	FY87	FY87	
MARKET POSITION	COMPETITIVE		LEADERSHIP		

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* TARGET TECHNOLOGY NOT YET DEFINED

THE OVERALL COMPETITIVE PICTURE

<u>TECHNICAL BASE</u>	<u>POTENTIAL COMPETITOR</u>	<u>ASSESSMENT RELATIVE TO TRIL VAX</u>
THERMAL CONDUCTION	IBM	GREATER NO OF INTERCONNECTS REQ'D
TRILOGY TECHNOLOGY	SPERRY, HONEYWELL	SYS ARCH NOT COMPETITIVE
OTHER TECHNOLOGY	HP, PRIME, SEL	NOT ABLE TO ACHIEVE EQUIV PERF
TRILOGY TECHNOLOGY	TRILOGY	CURRENT FOCUS AT VERY HIGH END

NET ASSESSMENT: TRILOGY TECHNOLOGY VAXs WILL BE LEADERSHIP PRODUCTS

THE PROPOSAL

EQUITY INVESTMENT IN TRILOGY

3 * MILLION SHARES @ \$8.00 = \$24,000,00

CASH

\$2,000,000 LICENSE FEE FOR
RIGHT TO TECHNOLOGY = \$2,000,000

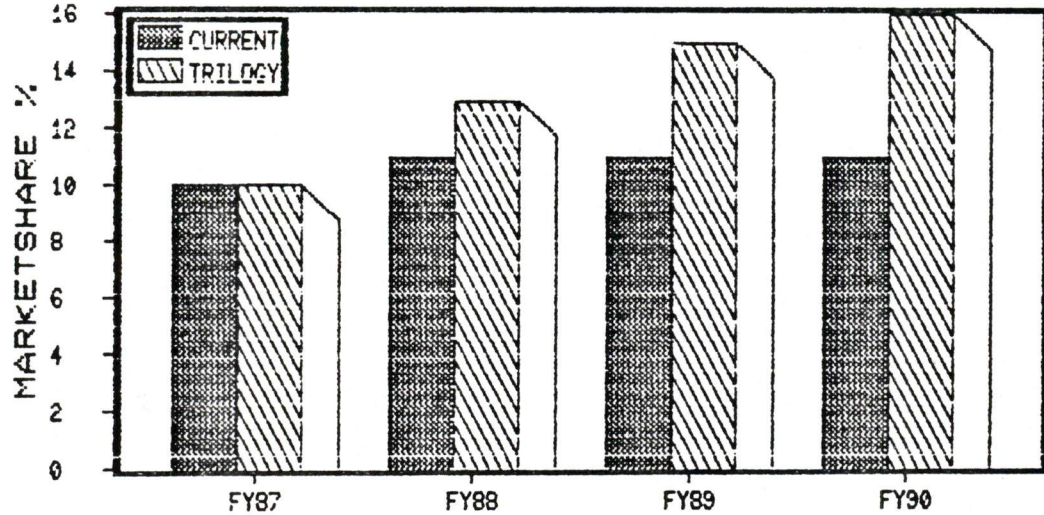
\$26,000,000

* DIGITAL HAS THE OPPORTUNITY TO BUY UP TO 5M SHARES

WHAT DIGITAL GETS

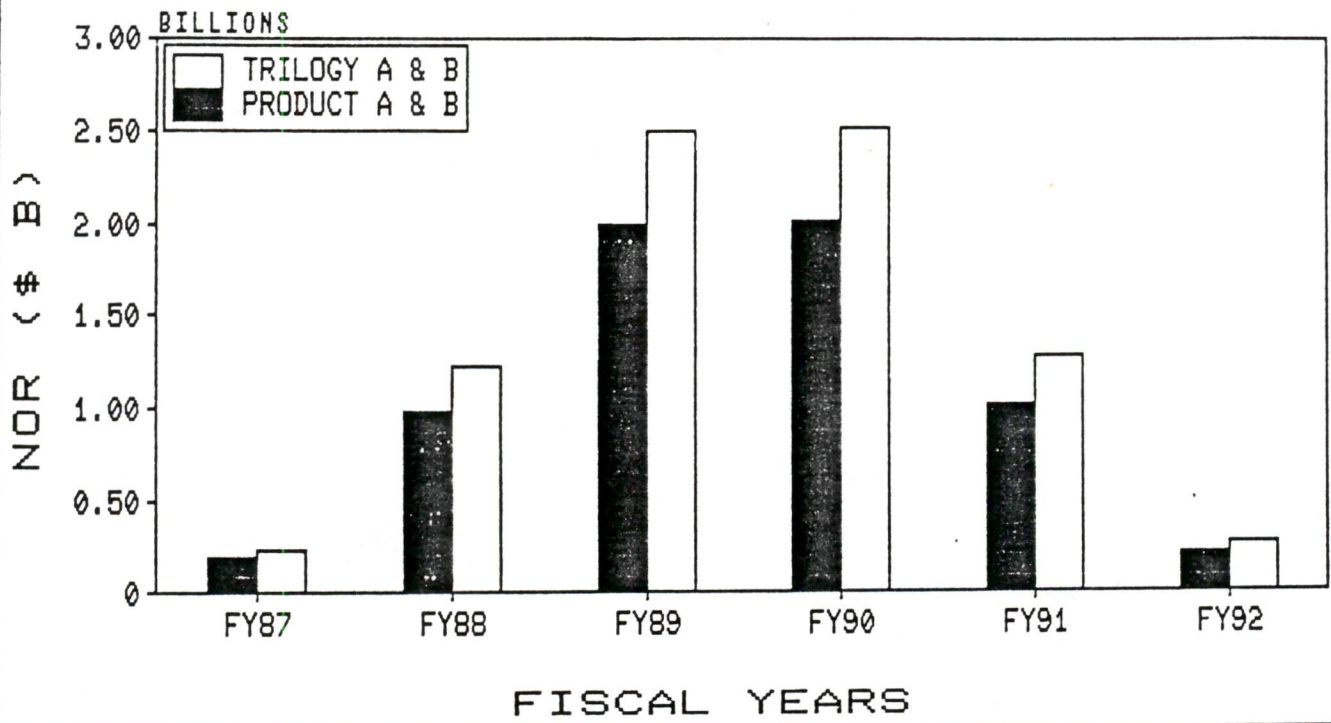
- RIGHTS TO THE TRILOGY TECHNOLOGY
- ACCESS TO HIGH PERFORMANCE COMPUTER DESIGN AND IMPLEMENTATION METHODOLOGY
- A TECHNOLOGY THAT CAN SUPPORT FUTURE HIGHER PERFORMANCE DESIGNS WITH OPPORTUNITY TO RECEIVE IMPROVEMENTS MADE TO THE TECHNOLOGY ITSELF
- RIGHTS TO THE TRILOGY DEVELOPMENT, TESTING, AND MANUFACTURING PROCESSES
- A SOURCE OF SUPPLY OR SUPPORT TO ESTABLISH ONE
- EQUITY INVESTMENT
 - 8% INITIALLY
 - 6% AT PUBLIC OFFERING TIME
- POSITION ON BOARD OF DIRECTORS

CURRENT VS. TRILOGY MARKETSHARE
\$250K-\$1.6M MARKET

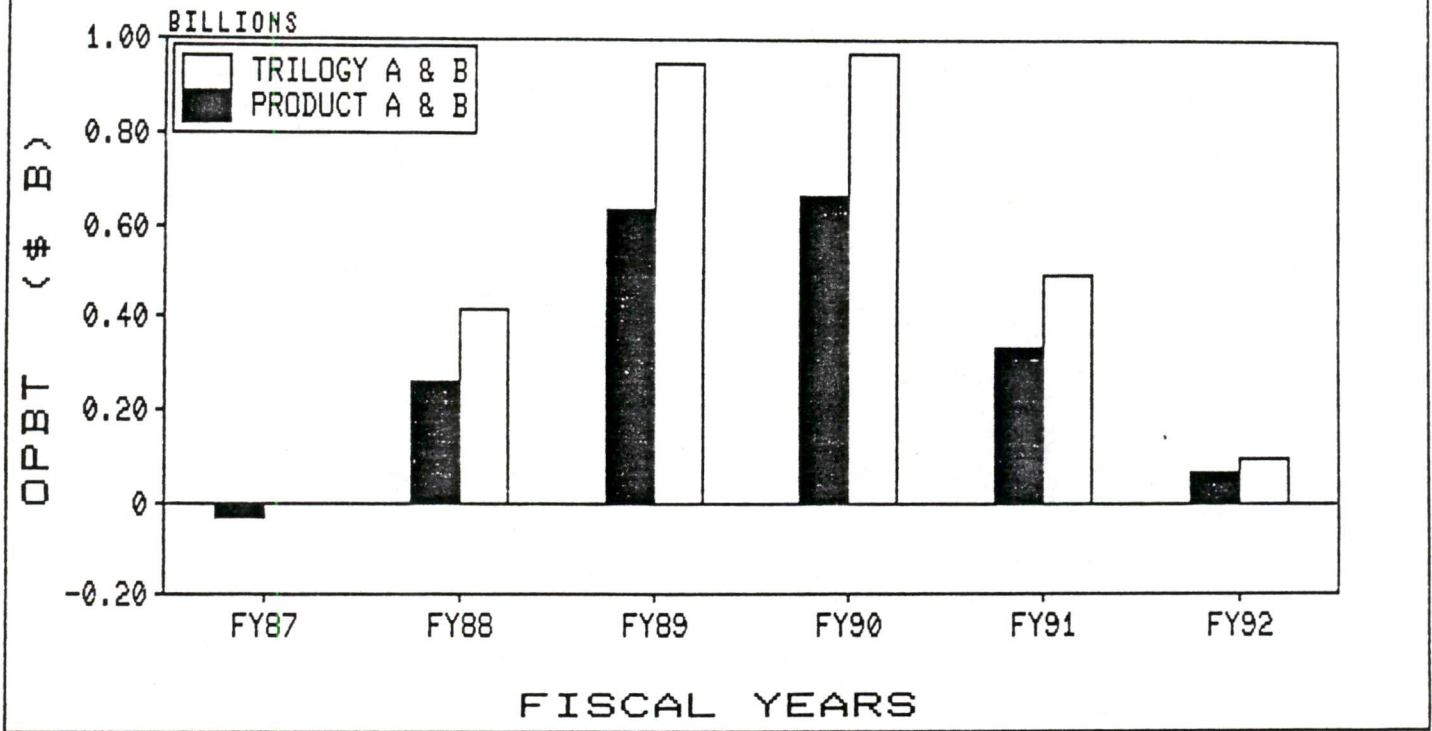


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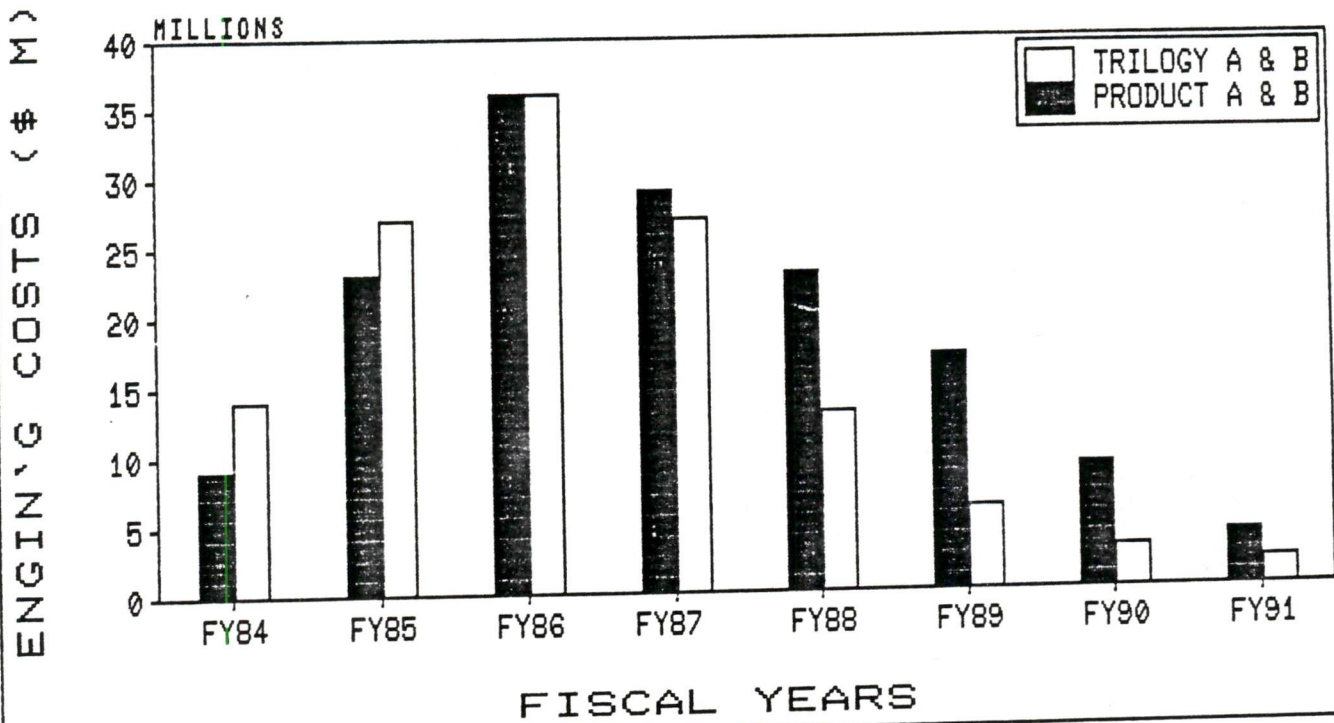
CURRENT PLAN VS TRILOGY
NET OPERATING REVENUE



CURRENT PLAN VS TRILOGY
OPERATING PROFIT BEFORE TAX



CURRENT VS. TRILOGY
ENGINEERING COSTS (CPU DEVEL & SYS TEST)



SUMMARY OF BENEFITS

COMPETITION

- BE LEADER IN HIGH END TECHNICAL MARKET

BUSINESS

- IMPROVED RETURN ON INVESTMENT
- HIGHER PROFIT MARGINS
- REDUCED TIME TO MARKET RISK
- SECOND GENERATION FOLLOW-ON PRODUCTS

TECHNOLOGY

- WAFER SCALE INTEGRATION DENSITY
- METHODOLOGY FOR COMPLEX DESIGNS
- POTENTIAL FOR NEW LEVELS OF RELIABILITY

DIGITAL CAN LEAD IN FUTURE HIGH END MARKET

Send to Gordon Bell

Gordon - surprised to hear Wednesday that you didn't know we have a large system mfg. organization - this should make your day! Charlie Bradshaw is Ulf's mfg. twin and they are even colocated! You'll like Charlie, he is an effective manager and has the right motivations. See first few pages for flavor.

Dave Knoll
9/12/80

SEP 16 1980