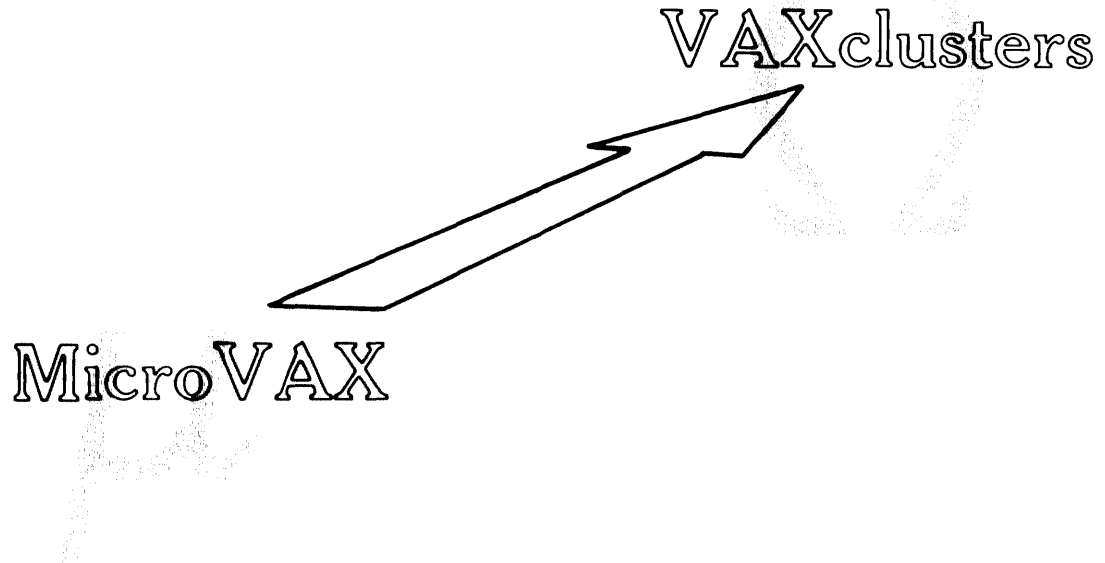


# competitive update

SPECIAL ISSUE

JANUARY 28, 1985

## VAXclusters VS IBM Mainframes



Compatibility.... The Competitive Edge

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# competitive update

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V A X   B A S E   P R O D U C T   M A R K E T I N G

VAXCLUSTERED 8600s VS. THE IBM 308X FAMILY

Roger Bisbo  
DTN 229-6346  
LTN1-2/D08   RCS:   LTNX

The spectacular success of VAXclusters and the threat of VAXclustered 8600s positioned against IBM's 308X family appears to have resulted in a major IBM campaign to discredit the viability of VAXclusters. Prior to the introduction of the VAX 8600, IBM sales reps were calling VAXclusters a short-term product designed to cover our inability to get high-end machines to market. Now we have been assailed by several derogatory articles in publications which are widely read in the IBM mainframe community proclaiming that it is inappropriate to speak of VAXclustered 8600s as competitors to IBM's 308X family of large-scale systems. What have we done to IBM and its followers that they feel compelled to spew forth so much VAXcluster-inspired negative rhetoric?

Simply put, the introduction of VAXclustered 8600s has placed an excellent interactive computing environment in the heart of IBM's bread-and-butter, batch-oriented mainframe markets. Far from being a short-term product, VAXclusters are the result of major engineering investments in interconnect technology made over the last ten years. This technology has been widely accepted by our customers and we have installed over 1,500 VAXclusters.

VAXclustered 8600s have positioned us as a full-range information-processing vendor. We now offer an alternative, interactive style of computing to IBM's 20-year old S/360/370 batch architecture; and we have done this at a critical period in the evolution of IBM's installed mainframe base -- critical for many reasons.

THE IBM MAINFRAME BASE

First, despite all of IBM's promotion of the "Information Center" concept as a means for the central DP shop to provide application development relief to the end user, the backlog of applications waiting to be developed in Fortune-500 companies stands at an all-time high. End users have to wait years for new programs and systems to be implemented. At a time when access to corporate information is the competitive edge many companies need, IBM has yet to deliver the style of computing required to effectively accomplish this on their mainframe systems. Approximately 70%-80% of the processing done by these systems is still batch.

Second, many companies are moving to decentralize their organizational structures. This is being done to push down decision-making responsibility to line managers and reduce corporate staffs. As a result, data processing functions are also being decentralized. These companies have, over the years, climbed the ladder of IBM's largely incompatible mainframe operating systems (DOS/VS to VS1 to VS2 to MVS to MVS/XA). Each step up this ladder has increased their system support staffs and incurred a great deal of conversion expense.

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However, since IBM's large mainframe commercial operating system does not run on small to mid-range 4300 CPUs, these companies are now faced with supporting multiple O/S environments to implement their corporate decentralization strategies. This means duplicate application development and, more significantly, duplicate software maintenance. These lead to escalating application development costs and even larger application backlogs.

Third, there are strong indications that the System/38 is their next mainframe architecture and users of low to mid-range 4300s running the DOS/VSE operating system would be "encouraged" to migrate to System/38 over the next few years. Clearly, migration to System/38 will represent yet another, and very major, conversion expense for these IBM customers.

Certainly the very existence of the System/38 family, which with the recent addition of the Models 20 and 40 covers much of the 4300 space, is a defacto admission of the failure of the 4300 to provide an acceptable distributed solution for many customers. One can only wonder what level of commitment IBM will retain for even its high-end operating system environment as System/38 moves up the performance ramp.

Fourth, the extraordinary success of the IBM Personal Computer, which delivered interactive computing directly to the desktop, has fueled an end-user revolt in many large companies. As PCs have proliferated, the central DP shops have recognized this inherent threat to their dominance and have moved to place strict controls on PC acquisition. This situation has been aggravated by the fundamental incompatibility of the PC with IBM's mainframe offerings (ASCII vs. EBCDIC). This makes interoperability expensive and cumbersome.

Fifth, at a time when local area networks are being installed by many large companies as a means to support the PC explosion and the move to interactive processing, IBM has indicated that its own proprietary LAN will not be fully available for another two-to-three years. Even then it may not be worth waiting for. Several distributors and customers have complained publicly about the price and quality of the cabling system components (reference Communications Week dated December 31, 1984, page 1).

Sixth, IBM's aggressive behavior vis-a-vis the vendors of IBM plug-compatible mainframes, personal computers and peripherals raises the specter of total IBM account dominance in the mainframe arena. The PCM vendors have acted as the "invisible hand" of the marketplace -- competition. As these vendors continue to withdraw from selling plug-compatible gear, there will be less and less incentive for IBM to continue to maintain current rates of price/ performance improvement. Those accounts following a single-vendor strategy may well be faced with paying more for less.

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We bring to these IBM customers a family of systems -- from MicroVAX I to VAXclustered 8600s -- which offers a compatible range of information processing capacity unavailable from IBM. We provide the ideal solution for the implementation of corporate information processing decentralization strategies. We are totally committed to the VAX architecture and the VMS application environment, and that means no more conversions for users who adopt our style of computing. The IBM PC is more compatible with our products than with IBM's and we are delivering Ethernet products, an industry standard, today. At a time when it makes sense economically to embrace a dual-vendor strategy to support information processing objectives, we are the alternative to IBM.

Considering all this, is it little wonder that we have been the target of so much negative rhetoric?

#### MEETING INFORMATION PROCESSING GROWTH DEMAND

A key strength of our VAXcluster style of computing is cost-effective incremental growth. This provides significant growth options beyond those previously available with "DEC-networked" systems. We will now assess how we better serve the fast-growing information processing needs of today's decentralized organizations.

The following analysis is based on a CPU capacity growth of approximately 40% compounded annually (the growth rate of IBM mainframe installed-base MIPS). Initially, it is assumed that about two VAX 8600 worth of CPU capacity is installed. The target configurations for a five-year growth period are:

<u>Year</u>	<u>Capacity X 8600</u>	<u>Aggr MB</u>	<u>Terminals</u>	<u>Disk GB</u>	<u>125 IPS Tapes</u>	<u>1200 LPM Printers</u>
1	2	24	512	20.0	3	2
2	3	48	768	22.5	3	3
3	4	64	1024	25.0	3	4
4	6	96	1536	30.0	4	6
5	8	132	2048	40.0	6	8

Two growth scenarios are constructed following the above configuration guidelines:

- (1) A VAXcluster is incrementally expanded by adding VAX 8600 processors.
- (2) An IBM 308X mainframe system running the MVS/XA operating system is field upgraded to meet the yearly capacity growth demands.

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The following tables summarize the cumulative yearly costs (rounded to nearest \$1,000) of both growth scenarios. All configuration details are provided in the attached appendices:

VAXcluster	Year				
	1	2	3	4	5
H/W Purchase	\$2,820K	\$3,973K	\$5,079K	\$7,231K	\$9,653K
H/W Maintenance	200K	547K	998K	1,629K	2,485K
S/W Licenses	71K	100K	129K	185K	240K
S/W Maintenance	55K	89K	128K	174K	230K
<b>Total</b>	<b>\$3,146K</b>	<b>\$4,709K</b>	<b>\$6,333K</b>	<b>\$9,219K</b>	<b>\$12,607K</b>

IBM Mainframe	Year				
	1	2	3	4	5
H/W Purchase	\$5,214K	\$7,823K	\$9,433K	\$15,481K	\$17,633K
H/W Maintenance	141K	440K	839K	1,398K	2,198K
S/W Licenses	70K	70K	70K	70K	70K
S/W Maintenance	222K	469K	716K	975K	1,234K
<b>Total</b>	<b>\$5,648K</b>	<b>\$8,802K</b>	<b>\$11,059K</b>	<b>\$17,924K</b>	<b>\$21,137K</b>

Following the stated growth requirements, the five-year sum of costs of the IBM mainframe approach is 68% more (\$8.5 million more) than the VAXcluster solution. A five-year cost-of-ownership analysis of these two growth scenarios (taking into account the cost of capital, investment tax credits, marginal tax rate, salvage value and using the 5-year ACRS depreciation method) reveals that the IBM mainframe would cost the customer 76% more than the VAXcluster solution (\$5.8 versus \$10.3 million)!

Other Support Costs

It is important to note that no user support personnel costs are included in this analysis to avoid blurring pure vendor product cost comparisons. In reality, the IBM mainframe software support personnel costs would be at least five times that of the VAXcluster. If the VAXcluster required two people, the IBM mainframe would need at least ten -- assuming burdened annual labor rate of \$60,000 per person would add \$120,000/year to VAXcluster operating costs while increasing yearly IBM mainframe costs by \$600,000!

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## COMPUTER ROOM REQUIREMENTS

In addition to the financial aspects of acquisition and maintenance are the computer room requirements of the selected system. The following analysis illustrates the cumulative five-year computer room environmental needs of both the VAXcluster and the IBM mainframe. Air conditioning capacity is represented by the number of kBTUs (British Thermal Units X 1,000) per hour and power consumption is given in kVA (Volt-Amps X 1,000) per hour. Two figures appear for floorspace. Footprint is the area (in square feet) covered by just the hardware. Computer room area (CR Area) is the space needed for installed hardware, including required service clearances:

VAXcluster	Year				
	1	2	3	4	5
kBTUs	187	231	272	362	485
kVAs	66	79	92	121	162
Footprint Sq Ft	166	206	242	323	431
CR Area Sq Ft	596	722	831	1,078	1,376

IBM Mainframe	Year				
	1	2	3	4	5
kBTUs	215	239	288	492	541
kVAs	69	83	94	161	180
Footprint Sq Ft	271	300	327	523	583
CR Area Sq Ft	1,068	1,158	1,309	1,953	2,137

Across the board, the VAXcluster's computer room requirements are less than IBM's mainframe. At a time when computer room space is at a premium in most large companies, the IBM mainframe requires 55% more floorspace!

### SUMMARY

VAXclusters are delivering exceptional interactive capabilities and unique growth opportunities TODAY which IBM has yet to provide their S/360/370 mainframe customers. The introduction of VAXclustered 8600s has positioned us as a full-range information processing vendor and an alternate to IBM at a critical period in the evolution of IBM's mainframe base. Large companies implementing corporate decentralization strategies will find the VAX architecture and the VMS application environment the ideal computing style to support their objectives.

However, we are not in the 308X "replacement business." This has been the unsuccessful strategy of the "BUNCH" companies -- we are different and unique. VAXclustered 8600s remove a key competitive advantage that IBM has always had against us -- upward growth capability. For new application areas we now offer a wider family of compatible systems than IBM.

Spread the word and good selling!

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## SUMMARIES

## Appendix A Notes:

This appendix contains summary data which is extracted from the detailed configurations found in Appendix B and the computer room layouts in Appendix C. Page 8 presents five-year incremental and cumulative costs and computer room requirements for both the VAXcluster and the IBM mainframe. The rows starting with "1st Year" represent the first year costs associated with each individual year's hardware and software upgrades. It adjusts for any warranty allowances applicable to these items.

Page 9 is an analysis, by major component, of the five-year cumulative costs. The component costs are presented for both the VAXcluster and the IBM mainframe, the difference is calculated ("DEC-IBM" table) and the delta percent is generated ("(DEC-IBM)/IBM" table). Finally, a component distribution is provided to illustrate how costs are distributed within a given configuration growth scenario.

Pages 10 and 11 present a cost of ownership analysis for both scenarios. The only difference between pages 10 and 11 is that page 10 assumes a 20% hardware salvage value whereas page 11 assumes no hardware salvage value. Both five-year and ten-year costs of ownership are calculated. The ten-year cost of ownership assumes hardware and software maintenance fees remain at year-five levels and that no additional software license fees are incurred.

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>> SUMMARY <<<

	Year 1	Year 2	Year 3	Year 4	Year 5
<b>VAXcluster</b>					
<b>Incremental:</b>					
Net H/W Purch	\$2,819,939	\$1,152,736	\$1,106,286	\$2,151,663	\$2,422,313
1st Yr H/W Maint	\$200,223	\$79,956	\$76,833	\$155,763	\$171,612
Next Yrs H/W Maint	\$266,964	\$106,608	\$102,444	\$207,684	\$228,816
Net S/W Lic	\$70,902	\$29,198	\$29,198	\$55,475	\$54,891
1st Yr S/W Maint	\$55,000	\$4,200	\$4,200	\$8,400	\$8,400
Next Yr S/W Maint	\$30,000	\$4,200	\$4,200	\$8,400	\$8,400
kBTU	187.4	43.6	41.3	89.9	122.5
kVA	65.5	13.9	12.8	28.5	40.8
Footprint Sq Ft	165.7	40.6	35.3	81.4	108.1
CR Area Sq Ft	596.2	125.8	109.1	246.5	298.4
<b>Cumulative:</b>					
Net H/W Purch	\$2,819,939	\$3,972,675	\$5,078,961	\$7,230,625	\$9,652,938
H/W Maint	\$200,223	\$547,143	\$997,548	\$1,629,327	\$2,484,639
Net S/W Lic	\$70,902	\$100,099	\$129,297	\$184,772	\$239,663
S/W Maint	\$55,000	\$89,200	\$127,600	\$174,400	\$229,600
Sum of Costs	\$3,146,063	\$4,709,117	\$6,333,406	\$9,219,123	\$12,606,840
kBTU	187.4	231.0	272.3	362.2	484.7
kVA	65.5	79.4	92.2	120.7	161.5
Footprint Sq Ft	165.7	206.3	241.6	323.0	431.1
CR Area Sq Ft	596.2	722.0	831.0	1077.5	1375.9

**IBM Mainframe**

<b>Incremental:</b>					
Net H/W Purch	\$5,214,423	\$2,608,780	\$1,610,045	\$6,047,841	\$2,152,397
1st Yr H/W Maint	\$141,336	\$47,295	\$58,437	\$131,567	\$112,010
Next Yrs H/W Maint	\$251,088	\$90,204	\$85,932	\$260,838	\$151,410
Net S/W Lic	\$70,427	\$0	\$0	\$0	\$0
1st Yr S/W Maint	\$221,518	\$5,335	\$0	\$11,220	\$0
Nxt Yr S/W Maint	\$241,656	\$5,820	\$0	\$12,240	\$0
kBTU	215.4	23.9	48.3	204.6	48.3
kVA	69.0	14.1	10.5	67.3	19.0
Footprint Sq Ft	270.6	29.8	26.2	196.8	59.1
CR Area Sq Ft	1068.0	90.5	150.9	643.4	184.6
<b>Cumulative:</b>					
Net H/W Purch	\$5,214,423	\$7,823,203	\$9,433,247	\$15,481,089	\$17,633,486
H/W Maint	\$141,336	\$439,719	\$839,448	\$1,398,239	\$2,198,310
Net S/W Lic	\$70,427	\$70,427	\$70,427	\$70,427	\$70,427
S/W Maint	\$221,518	\$468,509	\$715,985	\$974,681	\$1,234,397
Sum of Costs	\$5,647,704	\$8,801,858	\$11,059,107	\$17,924,435	\$21,136,620
kBTU	215.4	239.3	287.6	492.2	540.5
kVA	69.0	83.1	93.6	160.9	179.9
Footprint Sq Ft	270.6	300.4	326.6	523.4	582.5
CR Area Sq Ft	1068.0	1158.4	1309.3	1952.7	2137.3

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>>> COST ANALYSIS <<<<

Cumulative SOC	Year 1	Year 2	Year 3	Year 4	Year 5
VAXcluster					
CPU	\$893,000	\$1,388,900	\$1,867,700	\$2,767,844	\$3,681,524
Disk	\$896,896	\$1,059,596	\$1,192,946	\$1,464,741	\$1,947,995
Local Term	\$588,991	\$831,191	\$1,073,391	\$1,536,131	\$1,996,779
Remote Term	\$296,380	\$520,326	\$744,273	\$1,183,851	\$1,623,111
Tape	\$93,730	\$93,730	\$93,730	\$117,955	\$190,805
Printer	\$50,942	\$78,932	\$106,922	\$160,103	\$212,724
H/W Maint	\$200,223	\$547,143	\$997,548	\$1,629,327	\$2,484,639
S/W Charges	\$125,902	\$189,299	\$256,897	\$359,172	\$469,263
Total	\$3,146,063	\$4,709,117	\$6,333,406	\$9,219,123	\$12,606,840

IBM Mainframe					
CPU	\$2,415,000	\$3,900,000	\$4,550,000	\$8,150,000	\$8,150,000
Disk	\$864,150	\$1,032,930	\$1,097,370	\$1,630,540	\$1,888,300
Local Term	\$1,031,475	\$1,462,335	\$1,839,482	\$2,648,083	\$3,441,446
Remote Term	\$693,348	\$1,217,487	\$1,666,581	\$2,611,836	\$3,621,660
Tape	\$71,720	\$71,720	\$71,720	\$93,805	\$115,890
Printer	\$138,730	\$138,730	\$208,095	\$346,825	\$416,190
H/W Maint	\$141,336	\$439,719	\$839,448	\$1,398,239	\$2,198,310
S/W Charges	\$291,945	\$538,936	\$786,412	\$1,045,108	\$1,304,824
Total	\$5,647,704	\$8,801,858	\$11,059,107	\$17,924,435	\$21,136,620

IBM-DEC:

Cumulative SOC	Year 1	Year 2	Year 3	Year 4	Year 5
CPU	\$1,522,000	\$2,511,100	\$2,682,300	\$5,382,156	\$4,468,476
Disk	(\$32,746)	(\$26,666)	(\$95,576)	\$165,799	(\$59,695)
Local Term	\$442,484	\$631,144	\$766,091	\$1,111,952	\$1,444,667
Remote Term	\$396,968	\$697,161	\$922,308	\$1,427,985	\$1,998,550
Tape	(\$22,010)	(\$22,010)	(\$22,010)	(\$24,150)	(\$74,915)
Printer	\$87,788	\$59,798	\$101,173	\$186,722	\$203,466
H/W Maint	(\$58,887)	(\$107,424)	(\$158,100)	(\$231,089)	(\$286,329)
S/W Charges	\$166,043	\$349,637	\$529,515	\$685,936	\$835,561
Total	\$2,501,640	\$4,092,741	\$4,725,702	\$8,705,312	\$8,529,780

(IBM-DEC)/DEC:

Cumulative SOC	Year 1	Year 2	Year 3	Year 4	Year 5
CPU	170.4%	180.8%	143.6%	194.5%	121.4%
Disk	-3.7%	-2.5%	-8.0%	11.3%	-3.1%
Local Term	75.1%	75.9%	71.4%	72.4%	72.3%
Remote Term	133.9%	134.0%	123.9%	120.6%	123.1%
Tape	-23.5%	-23.5%	-23.5%	-20.5%	-39.3%
Printer	172.3%	75.8%	94.6%	116.6%	95.6%
H/W Maint	-29.4%	-19.6%	-15.8%	-14.2%	-11.5%
S/W Charges	131.9%	184.7%	206.1%	191.0%	178.1%
Total	79.5%	86.9%	74.6%	94.4%	67.7%

DEC Dist:

Cumulative SOC	Year 1	Year 2	Year 3	Year 4	Year 5
CPU	28.4%	29.5%	29.5%	30.0%	29.2%
Disk	28.5%	22.5%	18.8%	15.9%	15.5%
Local Term	18.7%	17.7%	16.9%	16.7%	15.8%
Remote Term	9.4%	11.0%	11.8%	12.8%	12.9%
Tape	3.0%	2.0%	1.5%	1.3%	1.5%
Printer	1.6%	1.7%	1.7%	1.7%	1.7%
H/W Maint	6.4%	11.6%	15.8%	17.7%	19.7%
S/W Charges	4.0%	4.0%	4.1%	3.9%	3.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

IBM Dist:

Cumulative SOC	Year 1	Year 2	Year 3	Year 4	Year 5
CPU	42.8%	44.3%	41.1%	45.5%	38.6%
Disk	15.3%	11.7%	9.9%	9.1%	8.9%
Local Term	18.3%	16.6%	16.6%	14.8%	16.3%
Remote Term	12.3%	13.8%	15.1%	14.6%	17.1%
Tape	1.3%	0.8%	0.6%	0.5%	0.5%
Printer	2.5%	1.6%	1.9%	1.9%	2.0%
H/W Maint	2.5%	5.0%	7.6%	7.8%	10.4%
S/W Charges	5.2%	6.1%	7.1%	5.8%	6.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

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>>> COST OF OWNERSHIP <<<

Overall Parameters:  
 Cost of Capital 20%  
 Investment Tax Credit 10%  
 Marginal Tax Rate 46%  
 Salvage Value 20%  
 Depreciation Method 5-Year ACRS

	Start Yr 1	End Yr 1	End Yr 2	End Yr 3	End Yr 4	End Yr 5
<b>VAXcluster</b>						
Gross Investment	\$2,819,939	\$1,152,736	\$1,106,286	\$2,151,663	\$2,422,313	
Less ITC	(\$281,994)	(\$115,274)	(\$110,629)	(\$215,166)	(\$242,231)	
Net Investment	\$2,537,945	\$1,037,463	\$995,658	\$1,936,497	\$2,180,082	
Operating Costs:						
H/W Maint	\$0	\$200,223	\$346,920	\$450,405	\$631,779	\$855,312
S/W Lic	\$70,902	\$0	\$29,198	\$29,198	\$55,475	\$54,891
S/W Maint	\$55,000	\$0	\$34,200	\$38,400	\$46,800	\$55,200
Total Operating Costs	\$125,902	\$200,223	\$410,318	\$518,003	\$734,054	\$965,403
Depreciation:						
Year 0 H/W		\$338,393	\$496,309	\$473,750	\$473,750	\$473,750
Year 1 H/W			\$138,328	\$202,882	\$193,660	\$193,660
Year 2 H/W				\$132,754	\$194,706	\$185,856
Year 3 H/W					\$258,200	\$378,693
Year 4 H/W						\$290,678
Total Depreciation		\$338,393	\$634,638	\$809,386	\$1,120,315	\$1,522,636
Total Expenses	\$125,902	\$538,616	\$1,044,955	\$1,327,388	\$1,854,370	\$2,488,039
Tax Savings	\$57,915	\$247,763	\$480,679	\$610,599	\$853,010	\$1,144,498
Op Costs Less Tax Savings	\$67,987	(\$47,540)	(\$70,362)	(\$92,596)	(\$118,956)	(\$179,095)
Year 0 H/W Salvage Value	\$0	\$0	\$0	\$0	\$0	(\$563,988)
Cash Outflow	\$2,605,932	\$989,922	\$925,296	\$1,843,901	\$2,061,126	(\$743,082)
5-Year Cost of Ownership	\$5,835,862					
10-Year Cost of Ownership	\$5,673,030					
<b>IBM Mainframe</b>						
Gross Investment	\$5,214,423	\$2,608,780	\$1,610,045	\$6,047,841	\$2,152,397	
Less ITC	(\$521,442)	(\$260,878)	(\$161,004)	(\$604,784)	(\$215,240)	
Net Investment	\$4,692,980	\$2,347,902	\$1,449,040	\$5,443,057	\$1,937,158	
Operating Costs:						
H/W Maint	\$0	\$141,336	\$298,383	\$399,729	\$558,791	\$800,072
S/W Lic	\$70,427	\$0	\$0	\$0	\$0	\$0
S/W Maint	\$0	\$221,518	\$246,991	\$247,476	\$258,696	\$259,716
Total Operating Costs	\$70,427	\$362,854	\$545,374	\$647,205	\$817,487	\$1,059,788
Depreciation:						
Year 0 H/W		\$625,731	\$917,738	\$876,023	\$876,023	\$876,023
Year 1 H/W			\$313,054	\$459,145	\$438,275	\$438,275
Year 2 H/W				\$193,205	\$283,368	\$270,488
Year 3 H/W					\$725,741	\$1,064,420
Year 4 H/W						\$258,288
Total Depreciation		\$625,731	\$1,230,792	\$1,528,374	\$2,323,407	\$2,907,493
Total Expenses	\$70,427	\$988,585	\$1,776,166	\$2,175,579	\$3,140,893	\$3,967,281
Tax Savings	\$32,396	\$454,749	\$817,036	\$1,000,766	\$1,444,811	\$1,824,949
Op Costs Less Tax Savings	\$38,031	(\$91,895)	(\$271,662)	(\$353,561)	(\$627,324)	(\$765,162)
Year 0 H/W Salvage Value	\$0	\$0	\$0	\$0	\$0	(\$1,042,885)
Cash Outflow	\$4,731,011	\$2,256,007	\$1,177,378	\$5,089,496	\$1,309,833	(\$1,808,046)
5-Year Cost of Ownership	\$10,279,008					
10-Year Cost of Ownership	\$9,622,206					

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>>> COST OF OWNERSHIP <<<

Overall Parameters:						
Cost of Capital		20%				
Investment Tax Credit		10%				
Marginal Tax Rate		46%				
Salvage Value		0%				
Depreciation Method	5-Year ACRS					
	Start Yr 1	End Yr 1	End Yr 2	End Yr 3	End Yr 4	End Yr 5
VAXcluster						
Gross Investment	\$2,819,939	\$1,152,736	\$1,106,286	\$2,151,663	\$2,422,313	
Less ITC	(\$281,994)	(\$115,274)	(\$110,629)	(\$215,166)	(\$242,231)	
Net Investment	\$2,537,945	\$1,037,463	\$995,658	\$1,936,497	\$2,180,082	
Operating Costs:						
H/W Maint	\$0	\$200,223	\$346,920	\$450,405	\$631,779	\$855,312
S/W Lic	\$70,902	\$0	\$29,198	\$29,198	\$55,475	\$54,891
S/W Maint	\$55,000	\$0	\$34,200	\$38,400	\$46,800	\$55,200
Total Operating Costs	\$125,902	\$200,223	\$410,318	\$518,003	\$734,054	\$965,403
Depreciation:						
Year 0 H/W		\$422,991	\$620,387	\$592,187	\$592,187	\$592,187
Year 1 H/W			\$172,910	\$253,602	\$242,075	\$242,075
Year 2 H/W				\$165,943	\$243,383	\$232,320
Year 3 H/W					\$322,750	\$473,366
Year 4 H/W						\$363,347
Total Depreciation		\$422,991	\$793,297	\$1,011,732	\$1,400,394	\$1,903,295
Total Expenses	\$125,902	\$623,214	\$1,203,614	\$1,529,735	\$2,134,448	\$2,868,698
Tax Savings	\$57,915	\$286,678	\$553,663	\$703,678	\$981,846	\$1,319,601
Op Costs Less Tax Savings	\$67,987	(\$86,455)	(\$143,345)	(\$185,675)	(\$247,792)	(\$354,198)
Year 0 H/W Salvage Value	\$0	\$0	\$0	\$0	\$0	\$0
Cash Outflow	\$2,605,932	\$951,007	\$852,312	\$1,750,822	\$1,932,289	(\$354,198)
5-Year Cost of Ownership	\$5,793,037					
10-Year Cost of Ownership	\$5,857,931					
IBM Mainframe						
Gross Investment	\$5,214,423	\$2,608,780	\$1,610,045	\$6,047,841	\$2,152,397	
Less ITC	(\$521,442)	(\$260,878)	(\$161,004)	(\$604,784)	(\$215,240)	
Net Investment	\$4,692,980	\$2,347,902	\$1,449,040	\$5,443,057	\$1,937,158	
Operating Costs:						
H/W Maint	\$0	\$141,336	\$298,383	\$399,729	\$558,791	\$800,072
S/W Lic	\$70,427	\$0	\$0	\$0	\$0	\$0
S/W Maint	\$0	\$221,518	\$246,991	\$247,476	\$258,696	\$259,716
Total Operating Costs	\$70,427	\$362,854	\$545,374	\$647,205	\$817,487	\$1,059,788
Depreciation:						
Year 0 H/W		\$782,163	\$1,147,173	\$1,095,029	\$1,095,029	\$1,095,029
Year 1 H/W			\$391,317	\$573,932	\$547,844	\$547,844
Year 2 H/W				\$241,507	\$354,210	\$338,109
Year 3 H/W					\$907,176	\$1,330,525
Year 4 H/W						\$322,860
Total Depreciation		\$782,163	\$1,538,490	\$1,910,467	\$2,904,259	\$3,634,367
Total Expenses	\$70,427	\$1,145,017	\$2,083,864	\$2,557,672	\$3,721,745	\$4,694,154
Tax Savings	\$32,396	\$526,708	\$958,577	\$1,176,529	\$1,712,003	\$2,159,311
Op Costs Less Tax Savings	\$38,031	(\$163,854)	(\$413,203)	(\$529,324)	(\$894,516)	(\$1,099,523)
Year 0 H/W Salvage Value	\$0	\$0	\$0	\$0	\$0	\$0
Cash Outflow	\$4,731,011	\$2,184,048	\$1,035,837	\$4,913,733	\$1,042,641	(\$1,099,523)
5-Year Cost of Ownership	\$10,174,921					
10-Year Cost of Ownership	\$9,968,639					

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## DETAILED CONFIGURATIONS

## Appendix B Notes:

This appendix contains the detailed configuration pricing information for the five-year growth scenarios. Each yearly price sheet depicts the upgrade costs for that year only. Refer to Appendix A for cumulative cost rollups. All applicable volume discounts have been applied and are shown in the yearly price sheets. Please note that IBM's "Volume Purchase Agreement" covers an 18-month period as compared to our own one-year time span. For this analysis three VPA periods are used: years 1 plus 2, 3 plus 4, and year 5.

## HIGH AVAILABILITY

To the extent feasible, the configurations represent high-availability interactive computing environments. All critical VAXcluster controlling hardware components have backup units, as have most of the IBM mainframe hardware (note: disks were not duplicated). Important exceptions in the year 1 IBM configuration are the 3083 CPU and the 3082 Processor Controller. The failure of either of these components would make the entire configuration unavailable. In years 2 and 3 a failure in the single 3082 would also make the entire configuration unavailable. Only in years 4 and 5, where the 3084 four-processor system requires duplicate 3082s, would this single point of failure be eliminated.

Refer to pages 16 and 17 for year 1 component interconnection schematics for the VAXcluster and the IBM mainframe.

## CPUs

Please note that the year 2 IBM mainframe configuration contains compute capacity above that required by the configuration guidelines. A 3081-GX would have provided about the right compute power; however, IBM does not allow upgrades from the 3083-JX to the 3081-GX. The configured 3081-KX is the only upgrade allowed.

Also note that the year 4 3084-QX has more memory than is required by the configuration guidelines. IBM only supports "symmetrical" memory upgrades to the 3084. This forced the 3084 upgrade to the 132MB level.

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TERMINAL CONFIGURATION

The configurations assume the following terminal population distribution:

	----- Year -----				
	1	2	3	4	5
Local	416	576	736	1,056	1,376
Remote:					
Single Term	16	32	48	80	112
4 Term Group	32	64	96	160	224
8 Term Group	32	64	96	160	224
16 Term Group	16	32	48	80	112
	---	---	---	---	---
Total	512	768	1,024	1,536	2,048
	===	===	=====	=====	=====

VAXcluster local terminals are on Ethernet Terminal Servers [please note that as this article goes to press the VAX 8600 Terminal Server software license prices have not been finalized; estimated pricing has been used in the detailed configurations]. Backup local terminal access is a standard feature of the Terminal Server. All H4000 Ethernet Transceivers are included in the price sheets. Remote terminal access is through dial-in DMZ32 lines. Single terminals utilize DF03-AA 1200/300 Baud Modems. Remote terminals in groups of 4 are attached to DFM04-AB Statistical Multiplexers with integral 4800 baud modems. Remote groups of 8 terminals attach to DFM08-AB Statistical Multiplexers with integral 4800 baud modems. Remote groups of 16 terminals utilize the DFM16-AB. VAXcluster backup remote access capability is provided by including enough additional spare DMZ32 lines, multiplexers and modems to cover the outage of any single VAX 8600. All modems and multiplexers (both host-side and remote) are included in the pricing sheets.

IBM mainframe local terminals attach through 3299-001 Terminal Multiplexers to 3274-41C channel-attached Terminal Controllers. Backup local terminal access is provided by 3814-A01 Control Unit switches (note: this is a manual failover initiated by computer room personnel -- the Ethernet Terminal Server provides this function automatically). Remote access for single, groups of 4 and groups of 8 terminals is provided by the 3276-012 Control Unit Display Station (allows up to 8 clustered terminals to be attached). Remote groups of 16 terminals are attached to 3274-61C communicating Terminal Controllers. Host-side remote access capability is provided by multiple 3725-001 Communications Controllers. IBM mainframe backup remote access capability is provided by including enough additional spare 3725 lines and modems to cover the failure of any single 3725.

TAPE DRIVES

Enough tape drives have been configured to support the backup of the entire disk configuration in about four hours.

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#### PRINTERS

Equivalent printing capacity in lines per minute (LPM) are configured.

#### HARDWARE SERVICES

DECservice pricing has been used for all Digital hardware components.

#### SOFTWARE

Software has been included to provide a reasonable interactive computing environment with communications, relational data management, database query, transaction processing and two languages (FORTRAN and COBOL).

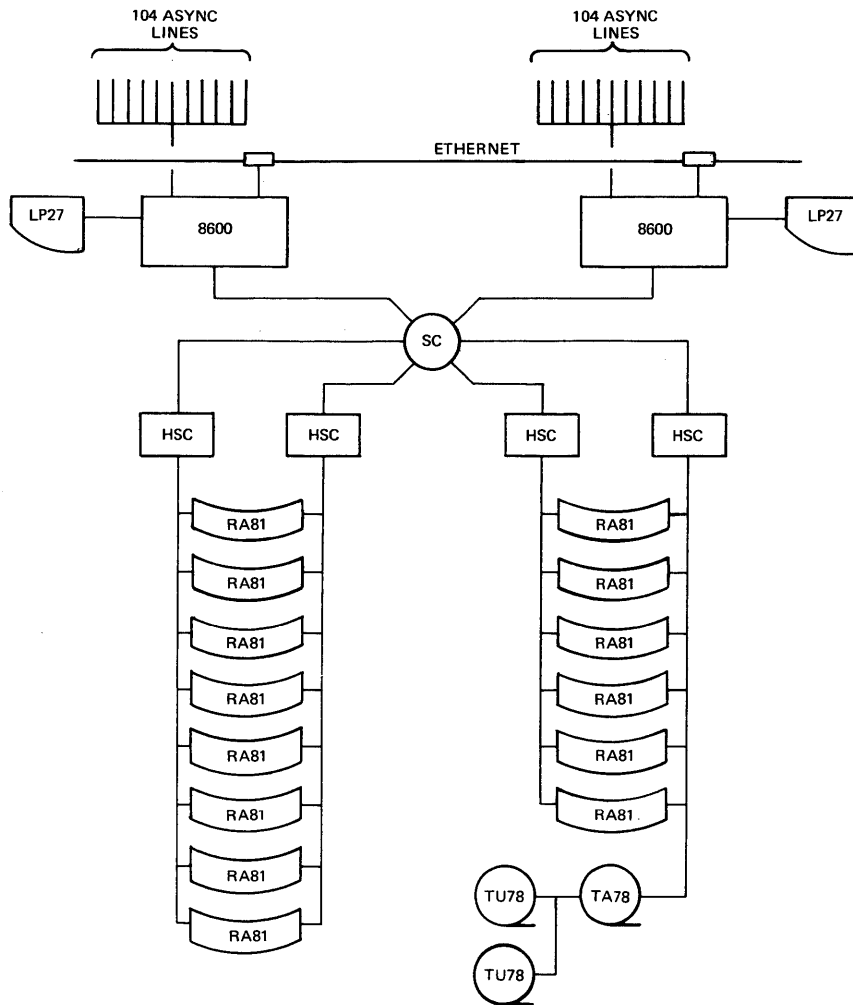
#### SOFTWARE SERVICES

The VAXcluster includes full DECsupport and System Start Service (Level III).

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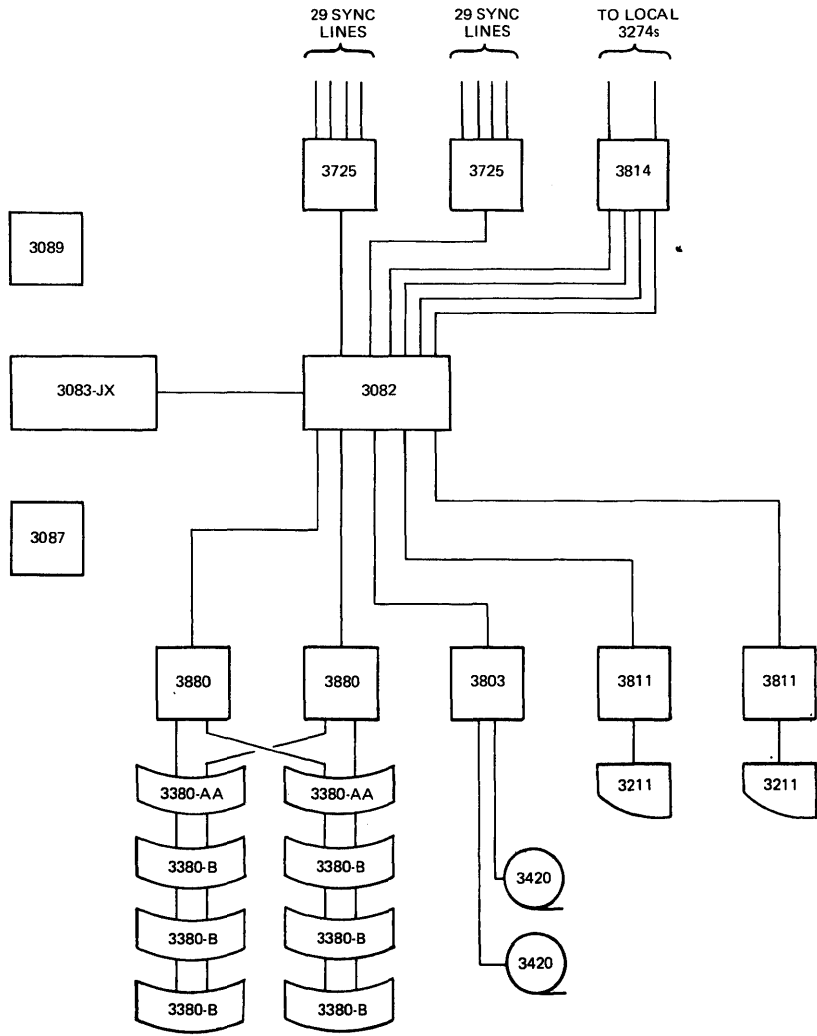


# VAXcluster - Year 1



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# IBM Mainframe - Year 1



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>>> VAXcluster - Year 1 <<<<

Part Number	Description	Qty	Purchase Price	Price Extension	Monthly Maint	War Mon	Maint Ext	1st Year Maint	kBTU	kVA	Sq Ft
861CB-AE	Vaxcluster SBB & 12MB	1	\$500,000	\$500,000	\$1,975	3	\$1,975	\$17,775	25.8	8.2	25.2
861CB-AP	VAXcluster SBB Upgrade & 12MB	1	\$450,000	\$450,000	\$1,776	3	\$1,776	\$15,984	22.0	6.5	15.5
	8600 List Price			\$950,000							
	Less 6% E/U Disc			(\$57,000)							
	8600 Net Price			\$893,000			\$3,751	\$33,759	47.8	14.7	40.7
VT220-B	Terminal	512	\$1,180	\$604,160	\$7	3	\$3,584	\$32,256			
	Less 500+ E/U Term Disc	512	(\$355)	(\$181,760)							
	Terminals Net Price			\$422,400			\$3,584	\$32,256			
DF03-AA	1200/300 Baud Sync/Async Modem	48	\$745	\$35,760	\$17	3	\$816	\$7,344			
DFM04-AB	4 Line Stat Mux w/4800 BPS Mdm	24	\$4,525	\$108,600	\$42	3	\$1,008	\$9,072			
DFM08-AB	8 Line Stat Mux w/4800 BPS Mdm	12	\$5,200	\$62,400	\$48	3	\$576	\$5,184			
DFM16-AB	16 Line Stat Mux w/4800 BPS Md	3	\$6,650	\$19,950	\$60	3	\$180	\$1,620			
	Modems & Mpxs List Price			\$226,710							
	Less 17% E/U Spares Discount			(\$38,541)							
	Modems & Mpxs Net Price			\$188,169			\$2,580	\$23,220			
LA120-DA	Hardcopy Terminal	2	\$2,800	\$5,600	\$40	3	\$80	\$720			
HSC50-AA	Intelligent I/O Server	3	\$34,500	\$103,500	\$113	3	\$339	\$3,051	7.2	3.3	15.9
HSC5X-BA	Disk Data Channel	21	\$8,100	\$170,100	\$30	3	\$630	\$5,670	14.7	6.3	0.0
HSC5X-EA	Power Supply	4	\$3,000	\$12,000	\$30	3	\$120	\$1,080	0.8	0.4	0.0
RAS1-EA	1.368GB Fixed Disk	14	\$50,000	\$700,000	\$321	3	\$4,494	\$40,446	92.4	33.6	74.2
TA78-BF	1600/6250 BPI Tape - Master	1	\$52,000	\$52,000	\$405	3	\$405	\$3,645	6.7	2.4	5.5
TU78-AF	1600/6250 BPI Tape - Slave	2	\$25,500	\$51,000	\$202	3	\$404	\$3,636	10.2	3.8	11.0
LP27-VA	1200 LPM Printer (64 Char Set)	2	\$27,990	\$55,980	\$286	3	\$572	\$5,148	7.6	1.0	18.4
CK-DMZ32-AV	24 Line Dist Panel w/Mdm Ctl	8	\$3,985	\$31,880							
DECSA-DA	32 Line ETHERNET Term Server	13	\$20,000	\$260,000	\$401	3	\$5,213	\$46,917			
H4000	ETHERNET Transceiver	15	\$300	\$4,500	\$5	3	\$75	\$675			
	Other H/W List Price			\$1,446,560							
	Less 9% E/U Disc			(\$130,190)							
	Other H/W Net Price			\$1,316,370			\$12,332	\$110,988	139.6	50.8	125.0
	Total Net H/W			\$2,819,939			\$22,247	\$200,223	187.4	65.5	165.7
QK354-UZ	RDB Lic w/War	1	\$13,500	\$13,500							
QK898-UZ	DTR Lic w/War	1	\$9,900	\$9,900							
QK897-UZ	CDD Lic w/War	1	\$1,980	\$1,980							
QK079-UZ	ACMS Lic w/War	1	\$14,850	\$14,850							
QK706-UZ	TDMS Lic w/War	1	\$4,125	\$4,125							
QK099-UZ	COBOL Lic w/War	1	\$11,950	\$11,950							
QK100-UZ	FORTRAN Lic w/War	1	\$7,755	\$7,755							
	Term Serv Lic w/War [Est]	1	\$895	\$895							
QK354-QZ	RDB VAXcluster Lic	1	\$8,100	\$8,100							
QK898-QZ	DTR VAXcluster Lic	1	\$5,940	\$5,940							
QK897-QZ	CDD VAXcluster Lic	1	\$1,190	\$1,190							
QK079-QZ	ACMS VAXcluster Lic	1	\$8,910	\$8,910							
QK706-QZ	TDMS VAXcluster Lic	1	\$2,475	\$2,475							
QK099-QZ	COBOL VAXcluster Lic	1	\$7,170	\$7,170							
QK100-QZ	FORTRAN VAXcluster Lic	1	\$4,650	\$4,650							
	Term Serv VAXcluster Lic [Est]	1	\$495	\$495							
	S/W Lic List Price			\$103,885							
	Less 25% SOFTPAK Disc			(\$25,971)							
	S/W Lic After SOFTPAK Disc			\$77,914							
	Less 9% E/U Disc			(\$7,012)							
	S/W Lic Net Price			\$70,902							
QK025-BM	SSP Lvl 3 - VAXcluster Base	1	\$45,000	\$45,000							
QK025-BZ	SSP Lvl 3 - VAXcluster Node	2	\$5,000	\$10,000							
QK025-9M	DPMC - VAXcluster Base	1	\$0	\$0	\$1,800	0	\$1,800				
QK025-9Z	DPMC - VAXcluster Node	2	\$0	\$0	\$350	0	\$700				
	S/W Maintenance						\$2,500	\$55,000			

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>>> VAXcluster - Year 2 <<<<

Part Number	Description	Qty	Purchase Price	Price Extension	Monthly Maint	War Mon	Maint Ext	1st Year Maint	kBTU	kVA	Sq Ft
861CB-AP	VAXcluster SBB Upgrade & 12MB	1	\$450,000	\$450,000	\$1,776	3	\$1,776	\$15,984	22.0	6.5	15.5
MS86-BB	4MB Memory Array X 3	1	\$72,000	\$72,000	\$300	3	\$300	\$2,700			
	8600 List Price			\$522,000							
	Less 5% E/U Disc			(\$26,100)							
	8600 Net Price			\$495,900			\$2,076	\$18,684	22.0	6.5	15.5
VT220-B	Terminal	256	\$1,180	\$302,080	\$7	3	\$1,792	\$16,128			
	Less 200-499 E/U Term Disc	256	(\$320)	(\$81,920)							
	Terminals Net Price			\$220,160			\$1,792	\$16,128			
DF03-AA	1200/300 Baud Sync/Async Modem	32	\$745	\$23,840	\$17	3	\$544	\$4,896			
DFM04-AB	4 Line Stat Mux w/4800 BPS Mdm	16	\$4,525	\$72,400	\$42	3	\$672	\$6,048			
DFM08-AB	8 Line Stat Mux w/4800 BPS Mdm	8	\$5,200	\$41,600	\$48	3	\$384	\$3,456			
DFM16-AB	16 Line Stat Mux w/4800 BPS Md	2	\$6,650	\$13,300	\$60	3	\$120	\$1,080			
	Modems & Mpxs List Price			\$151,140							
	Less 17% E/U Spares Discount			(\$25,694)							
	Modems & Mpxs Net Price			\$125,446			\$1,720	\$15,480			
LA120-DA	Hardcopy Terminal	1	\$2,800	\$2,800	\$40	3	\$40	\$360			
HSC50-AA	Intelligent I/O Server	1	\$34,500	\$34,500	\$113	3	\$113	\$1,017	2.4	1.1	5.3
HSC5X-BA	Disk Data Channel	2	\$8,100	\$16,200	\$30	3	\$60	\$540	1.4	0.6	0.0
HSC5X-EA	Power Supply	4	\$3,000	\$12,000	\$30	3	\$120	\$1,080	0.8	0.4	0.0
RAB1-EA	1.368GB Fixed Disk	2	\$50,000	\$100,000	\$321	3	\$642	\$5,778	13.2	4.8	10.6
LP27-VA	1200 LPM Printer (64 Char Set)	1	\$27,990	\$27,990	\$286	3	\$286	\$2,574	3.8	0.5	9.2
CK-DN732-AY	24 Line Dist Panel w/Mdm Ctl	4	\$3,985	\$15,940	\$0						
DECSA-DA	32 Line ETHERNET Term Server	5	\$20,000	\$100,000	\$401	3	\$2,005	\$18,045			
H4000	ETHERNET Transceiver	6	\$300	\$1,800	\$5	3	\$30	\$270			
	Other H/W List Price			\$311,230							
	Less 0% E/U Disc			\$0							
	Other H/W Net Price			\$311,230			\$3,296	\$29,664	21.6	7.4	25.1
	Total Net H/W			\$1,152,736			\$8,884	\$79,956	43.6	13.9	40.6
				=====			=====	=====	=====	=====	=====
BK354-QZ	RDB VAXcluster Lic	1	\$8,100	\$8,100							
BK898-QZ	DTR VAXcluster Lic	1	\$5,940	\$5,940							
BK897-QZ	CDD VAXcluster Lic	1	\$1,190	\$1,190							
BK079-QZ	ACMS VAXcluster Lic	1	\$8,910	\$8,910							
BK706-QZ	TDMS VAXcluster Lic	1	\$2,475	\$2,475							
BK099-QZ	COBOL VAXcluster Lic	1	\$7,170	\$7,170							
BK100-QZ	FORTRAN VAXcluster Lic	1	\$4,650	\$4,650							
	Term Serv VAXcluster Lic [Est]	1	\$495	\$495							
	S/W Lic List Price			\$38,930							
	Less 25% SOFTPAK Disc			(\$9,733)							
	S/W Lic After SOFTPAK Disc			\$29,198							
	Less 0% E/U Disc			\$0							
	S/W Lic Net Price			\$29,198							
				=====							
BK025-9Z	DPMC - VAXcluster Node	1			\$350	0	\$350	\$4,200			
	S/W Maintenance						\$350	\$4,200			
							=====	=====			

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>>> VAXcluster - Year 3 <<<

Part Number	Description	Qty	Purchase Price	Price Extension	Monthly Maint	War Mon	Maint Ext	1st Year Maint	kBTU	kVA	Sq Ft
861CB-AP	VAXcluster SBB Upgrade & 12MB	1	\$450,000	\$450,000	\$1,776	3	\$1,776	\$15,984	22.0	6.5	15.5
MS86-BA	4MB Memory Array	1	\$28,800	\$28,800	\$100	3	\$100	\$900			
	8600 List Price			\$478,800							
	Less 0% E/U Disc			\$0							
	8600 Net Price			\$478,800			\$1,876	\$16,884	22.0	6.5	15.5
VT220-B	Terminal	256	\$1,180	\$302,080	\$7	3	\$1,792	\$16,128			
	Less 200-499 E/U Term Disc	256	(\$320)	(\$81,920)							
	Terminals Net Price			\$220,160			\$1,792	\$16,128			
DF03-AA	1200/300 Baud Sync/Async Modem	32	\$745	\$23,840	\$17	3	\$544	\$4,896			
DFM04-AB	4 Line Stat Mux w/4800 BPS Mdm	16	\$4,525	\$72,400	\$42	3	\$672	\$6,048			
DFM08-AB	8 Line Stat Mux w/4800 BPS Mdm	8	\$5,200	\$41,600	\$48	3	\$384	\$3,456			
DFM16-AB	16 Line Stat Mux w/4800 BPS Md	2	\$6,650	\$13,300	\$60	3	\$120	\$1,080			
	Modems & Mpxs List Price			\$151,140							
	Less 17% E/U Spares Discount			(\$25,694)							
	Modems & Mpxs Net Price			\$125,446			\$1,720	\$15,480			
SC008-AD	8 Mode Star Coupler Upgrade	1	\$6,050	\$6,050	\$26	3	\$26	\$234			
LA120-DA	Hardcopy Terminal	1	\$2,800	\$2,800	\$40	3	\$40	\$360			
HSC5X-BA	Disk Data Channel	3	\$8,100	\$24,300	\$30	3	\$90	\$810	2.1	0.9	0.0
HSC5X-EA	Power Supply	1	\$3,000	\$3,000	\$30	3	\$30	\$270	0.2	0.1	0.0
RAB1-EA	1.368GB Fixed Disk	2	\$50,000	\$100,000	\$321	3	\$642	\$5,778	13.2	4.8	10.6
LP27-VA	1200 LPM Printer (64 Char Set)	1	\$27,990	\$27,990	\$286	3	\$286	\$2,574	3.8	0.5	9.2
CK-DMZ32-AY	24 Line Dist Panel w/Mdm Ctl	4	\$3,985	\$15,940							
DECSA-DA	32 Line ETHERNET Term Server	5	\$20,000	\$100,000	\$401	3	\$2,005	\$18,045			
H4000	ETHERNET Transceiver	6	\$300	\$1,800	\$5	3	\$30	\$270			
	Other H/W List Price			\$281,880							
	Less 0% E/U Disc			\$0							
	Other H/W Net Price			\$281,880			\$3,149	\$28,341	19.3	6.3	19.8
	Total Net H/W			\$1,106,286			\$8,537	\$76,833	41.3	12.8	35.3
QK354-QZ	RDB VAXcluster Lic	1	\$8,100	\$8,100							
QK898-QZ	DTR VAXcluster Lic	1	\$5,940	\$5,940							
QK897-QZ	CDD VAXcluster Lic	1	\$1,190	\$1,190							
QK079-QZ	ACMS VAXcluster Lic	1	\$8,910	\$8,910							
QK706-QZ	TOMS VAXcluster Lic	1	\$2,475	\$2,475							
QK099-QZ	COBOL VAXcluster Lic	1	\$7,170	\$7,170							
QK100-QZ	FORTTRAN VAXcluster Lic	1	\$4,650	\$4,650							
	Term Serv VAXcluster Lic [Est]	1	\$495	\$495							
	S/W Lic List Price			\$38,930							
	Less 25% SOFTPAK Disc			(\$9,733)							
	S/W Lic After SOFTPAK Disc			\$29,198							
	Less 0% E/U Disc			\$0							
	S/W Lic Net Price			\$29,198							
QK025-9Z	DPMC - VAXcluster Node	1			\$350	0	\$350	\$4,200			
	S/W Maintenance						\$350	\$4,200			

FOR INTERNAL USE ONLY

>>>> VAXcluster - Year 4 <<<<

Part Number	Description	Qty	Purchase Price	Price Extension	Monthly Maint	War Mon	Maint Ext	1st Year Maint	kBTU	kVA	Sq Ft
B61CB-AP	VAXcluster SBB Upgrade & 12MB	2	\$450,000	\$900,000	\$1,776	3	\$3,552	\$31,968	44.0	13.0	31.0
MSB6-BA	4MB Memory Array	2	\$28,800	\$57,600	\$100	3	\$200	\$1,800			
	8600 List Price			\$957,600							
	Less 6% E/U Disc			(\$57,456)							
	8600 Net Price			\$900,144			\$3,752	\$33,768	44.0	13.0	31.0
VT220-B	Terminal	512	\$1,180	\$604,160	\$7	3	\$3,584	\$32,256			
	Less 500+ E/U Term Disc	512	(\$355)	(\$181,760)							
	Terminals Net Price			\$422,400			\$3,584	\$32,256			
DF03-AA	1200/300 Baud Sync/Async Modem	64	\$745	\$47,680	\$17	3	\$1,088	\$9,792			
DFM04-AB	4 Line Stat Mux w/4800 BPS Mdm	32	\$4,525	\$144,800	\$42	3	\$1,344	\$12,096			
DFM08-AB	8 Line Stat Mux w/4800 BPS Mdm	16	\$5,200	\$83,200	\$48	3	\$768	\$6,912			
DFM16-AB	16 Line Stat Mux w/4800 BPS Md	4	\$6,650	\$26,600	\$60	3	\$240	\$2,160			
	Modems & Mpxs List Price			\$302,280							
	Less 17% E/U Spares Discount			(\$51,388)							
	Modems & Mpxs Net Price			\$250,892			\$3,440	\$30,960			
LA120-DA	Hardcopy Terminal	2	\$2,800	\$5,600	\$40	3	\$80	\$720			
HSC50-AA	Intelligent I/O Server	1	\$34,500	\$34,500	\$113	3	\$113	\$1,017	2.4	1.1	5.3
HSC5X-BA	Disk Data Channel	6	\$8,100	\$48,600	\$30	3	\$180	\$1,620	4.2	1.8	0.0
HSC5X-EA	Power Supply	1	\$3,000	\$3,000	\$30	3	\$30	\$270	0.2	0.1	0.0
RAB1-EA	1.368GB Fixed Disk	4	\$50,000	\$200,000	\$321	3	\$1,284	\$11,556	26.4	9.6	21.2
TU78-AF	1600/6250 BPI Tape - Slave	1	\$25,500	\$25,500	\$202	3	\$202	\$1,818	5.1	1.9	5.5
LP27-VA	1200 LPM Printer (64 Char Set)	2	\$27,990	\$55,980	\$286	3	\$572	\$5,148	7.6	1.0	18.4
CK-DMZ32-AY	24 Line Dist Panel w/Mdm Ctl	8	\$3,985	\$31,880							
DECSA-DA	32 Line ETHERNET Term Server	10	\$20,000	\$200,000	\$401	3	\$4,010	\$36,090			
H4000	ETHERNET Transceiver	12	\$300	\$3,600	\$5	3	\$60	\$540			
	Other H/W List Price			\$608,660							
	Less 5% E/U Disc			(\$30,433)							
	Other H/W Net Price			\$578,227			\$6,531	\$58,779	45.9	15.5	50.4
	Total Net H/W			\$2,151,663			\$17,307	\$155,763	89.9	28.5	81.4
QK354-QZ	RDB VAXcluster Lic	2	\$8,100	\$16,200							
QK898-QZ	DTR VAXcluster Lic	2	\$5,940	\$11,880							
QK897-QZ	CDD VAXcluster Lic	2	\$1,190	\$2,380							
QK079-QZ	ACMS VAXcluster Lic	2	\$8,910	\$17,820							
QK706-QZ	TDMS VAXcluster Lic	2	\$2,475	\$4,950							
QK099-QZ	COBOL VAXcluster Lic	2	\$7,170	\$14,340							
QK100-QZ	FORTRAN VAXcluster Lic	2	\$4,650	\$9,300							
	Term Serv VAXcluster Lic [Est]	2	\$495	\$990							
	S/W Lic List Price			\$77,860							
	Less 25% SOFTPAK Disc			(\$19,465)							
	S/W Lic After SOFTPAK Disc			\$58,395							
	Less 5% E/U Disc			(\$2,920)							
	S/W Lic Net Price			\$55,475							
QK025-9Z	DPMC - VAXcluster Node	2			\$350	0	\$700	\$8,400			
	S/W Maintenance						\$700	\$8,400			

FOR INTERNAL USE ONLY

>>>> VAXcluster - Year 5 <<<<

Part Number	Description	Qty	Purchase Price	Price Extension	Monthly Maint	War Mon	Maint Ext	1st Year Maint	kBTU	kVA	Sq Ft
B61CB-AP	VAXcluster SBB Upgrade & 12MB	2	\$450,000	\$900,000	\$1,776	3	\$3,552	\$31,968	44.0	13.0	31.0
H5B6-BB	4MB Memory Array X 3	1	\$72,000	\$72,000	\$300	3	\$300	\$2,700			
	8600 List Price			\$972,000							
	Less 6% E/U Disc			(\$58,320)							
	8600 Net Price			\$913,680			\$3,852	\$34,668	44.0	13.0	31.0
VT220-B	Terminal	512	\$1,180	\$604,160	\$7	3	\$3,584	\$32,256			
	Less 500+ E/U Term Disc	512	(\$355)	(\$181,760)							
	Terminals Net Price			\$422,400			\$3,584	\$32,256			
DF03-AA	1200/300 Baud Sync/Async Modem	64	\$745	\$47,680	\$17	3	\$1,088	\$9,792			
DFM04-AB	4 Line Stat Mux w/4800 BPS Mdm	32	\$4,525	\$144,800	\$42	3	\$1,344	\$12,096			
DFM08-AB	8 Line Stat Mux w/4800 BPS Mdm	16	\$5,200	\$83,200	\$48	3	\$768	\$6,912			
DFM16-AB	16 Line Stat Mux w/4800 BPS Md	4	\$6,650	\$26,600	\$60	3	\$240	\$2,160			
	Modems & Mpxs List Price			\$302,280							
	Less 17% E/U Spares Discount			(\$51,388)							
	Modems & Mpxs Net Price			\$250,892			\$3,440	\$30,960			
LA120-DA	Hardcopy Terminal	2	\$2,800	\$5,600	\$40	3	\$80	\$720			
HSC50-AA	Intelligent I/O Server	2	\$34,500	\$69,000	\$113	3	\$226	\$2,034	4.8	2.2	10.6
HSC5X-BA	Disk Data Channel	11	\$8,100	\$89,100	\$30	3	\$330	\$2,970	7.7	3.3	0.0
HSC5X-EA	Power Supply	2	\$3,000	\$6,000	\$30	3	\$60	\$540	0.4	0.2	0.0
RAB1-EA	1.368GB Fixed Disk	7	\$50,000	\$350,000	\$321	3	\$2,247	\$20,223	46.2	16.8	37.1
TA7B-BF	1600/6250 BPI Tape - Master	1	\$52,000	\$52,000	\$405	3	\$405	\$3,645	6.7	2.4	5.5
TU7B-AF	1600/6250 BPI Tape - Slave	1	\$25,500	\$25,500	\$202	3	\$202	\$1,818	5.1	1.9	5.5
LP27-VA	1200 LPM Printer (64 Char Set)	2	\$27,990	\$55,980	\$286	3	\$572	\$5,148	7.6	1.0	18.4
CK-DNZ32-AY	24 Line Dist Panel w/Mdm Ctl	8	\$3,985	\$31,880							
DECSA-DA	32 Line ETHERNET Term Server	10	\$20,000	\$200,000	\$401	3	\$4,010	\$36,090			
H4000	ETHERNET Transceiver	12	\$300	\$3,600	\$5	3	\$60	\$540			
	Other H/W List Price			\$888,660							
	Less 6% E/U Disc			(\$53,320)							
	Other H/W Net Price			\$835,340			\$8,192	\$73,728	78.5	27.8	77.1
	Total Net H/W			\$2,422,313			\$19,068	\$171,612	122.5	40.8	108.1
				=====			=====	=====	=====	=====	=====
QK354-QZ	RDB VAXcluster Lic	2	\$8,100	\$16,200							
QK898-QZ	DTR VAXcluster Lic	2	\$5,940	\$11,880							
QK897-QZ	CDD VAXcluster Lic	2	\$1,190	\$2,380							
QK079-QZ	ACMS VAXcluster Lic	2	\$8,910	\$17,820							
QK706-QZ	TDMS VAXcluster Lic	2	\$2,475	\$4,950							
QK099-QZ	COBOL VAXcluster Lic	2	\$7,170	\$14,340							
QK100-QZ	FORTRAN VAXcluster Lic	2	\$4,650	\$9,300							
	Term Serv VAXcluster Lic [Est]	2	\$495	\$990							
	S/W Lic List Price			\$77,860							
	Less 25% SOFTPAK Disc			(\$19,465)							
	S/W Lic After SOFTPAK Disc			\$58,395							
	Less 6% E/U Disc			(\$3,504)							
	S/W Lic Net Price			\$54,891							
				=====							
QK025-9Z	DPMC - VAXcluster Node	2			\$350	0	\$700	\$8,400			
	S/W Maintenance							\$8,400			
								=====			

FOR INTERNAL USE ONLY

>>> IBM Mainframe - Year 1 <<<

Part Number	Description	Qty	Purchase Price	Price Extension	Monthly Maint	Mar Mon	Maint Ext	1st Year Maint	kBTU	kVA	Sq Ft
3083-JX2	CPU, 24MB, & 8 Channels	1	\$2,030,000	\$2,030,000	\$3,850	12	\$3,850	\$0	50.4	11.5	39.7
3083-1545	Channel Group 1st Add'l B	1	\$80,000	\$80,000	\$95	12	\$95	\$0	1.4	0.5	0.0
3082-X16	CPU Controller for 16 Channels	1	\$195,000	\$195,000	\$785	12	\$785	\$0	7.5	2.4	24.4
3089-001	Power Unit	1	\$38,000	\$38,000	\$70	3	\$70	\$630	21.8	0.0	14.3
3087-002	Coolant Dist Unit (to Air)	1	\$72,000	\$72,000	\$65	3	\$65	\$585	0.0	5.3	17.4
3278-4641	Operator's Console Keyboard	1	\$909	\$909	\$6	3	\$6	\$50			
3278-A02	Display Station	1	\$2,505	\$2,505	\$19	3	\$19	\$167			
3880-D23	Storage Control w/8MB Cache	2	\$143,750	\$287,500	\$575	3	\$1,150	\$10,350	12.4	3.8	19.8
3880-8170	2-Channel Switch Pair	2	\$6,225	\$12,450	\$11	3	\$22	\$198			
3380-AA4	2.52GB Fixed Disk w/2 Ctlr	2	\$88,780	\$177,560	\$325	3	\$650	\$5,850	12.0	4.8	19.8
3380-B04	2.52GB Fixed Disk	6	\$64,440	\$386,640	\$240	3	\$1,440	\$12,960	30.6	13.2	53.4
3803-002	Tape Controller	1	\$27,550	\$27,550	\$186	3	\$186	\$1,674	5.7	1.8	5.8
3420-008	200 IPS Tape	2	\$19,880	\$39,760	\$342	3	\$684	\$6,156	16.8	5.8	12.4
3420-6425	1600/6250 BPI Density	2	\$2,205	\$4,410	\$85	3	\$169	\$1,521			
3811-001	Printer Controller	2	\$17,685	\$35,370	\$123	3	\$246	\$2,214	11.2	3.8	11.6
3211-001	1500 LPM Printer (64 Char Set)	2	\$40,080	\$80,160	\$952	3	\$1,904	\$17,136	27.8	10.8	23.0
3216-001	Printer Train Cartridge	2	\$11,600	\$23,200	\$206	3	\$412	\$3,708			
3180-110	Display Station	484	\$2,295	\$1,110,780	\$11	3	\$5,445	\$49,005			
	Less 25% VPA at 500-999 Lvl	484	(\$574)	(\$277,695)							
3725-001	Communications Controller	2	\$75,000	\$150,000	\$213	12	\$426	\$0	13.0	3.8	18.2
3725-1561	Channel Adapter	4	\$6,750	\$27,000	\$8	12	\$32	\$0			
3725-4911	EIA RS232/CCITT V.24 Interface	16	\$2,600	\$41,600	\$2	12	\$32	\$0			
3863-002	2400/1200 Baud Modem	56	\$2,935	\$164,360	\$16	3	\$868	\$7,812			
	Less 20% VPA at 50-99 Lvl	56	(\$587)	(\$32,872)							
3864-002	4800 Baud Modem	15	\$3,925	\$58,875	\$22	3	\$330	\$2,970			
	Less 15% VPA at 25-49 Lvl	15	(\$589)	(\$8,831)							
3276-012	Control Unit Display Station	28	\$5,535	\$154,980	\$31	3	\$868	\$7,812			
	Less 25% VPA at 45-69 Lvl	28	(\$1,384)	(\$38,745)							
3276-3255	Terminal Adapter 1 (3-4)	12	\$530	\$6,360	\$2	3	\$18	\$162			
3276-3256	Terminal Adapter 2 (5-6)	4	\$589	\$2,356	\$2	3	\$6	\$54			
3276-3257	Terminal Adapter 3 (7-8)	4	\$530	\$2,120	\$2	3	\$6	\$54			
3276-3701	External Modem Interface	12	\$337	\$4,044	\$3	3	\$36	\$324			
3276-4623	Keyboard	28	\$463	\$12,964	\$3	3	\$84	\$756			
3276-5501	1200 Baud Integrated Modem	16	\$714	\$11,424	\$3	3	\$40	\$360			
3276-6301	Comm Feature w/Clock	16	\$543	\$8,688	\$3	3	\$40	\$360			
3276-6302	Comm Feature w/o Clock	12	\$365	\$4,380	\$2	3	\$24	\$216			
3274-61C	Remote Term Ctlr w/16 Lines	1	\$7,600	\$7,600	\$27	3	\$27	\$243			
3274-41A	Local Term Ctlr w/32 Lines	13	\$18,230	\$236,990	\$58	3	\$754	\$6,786			
	Less 9% VPA at 10-19 Lvl	13	(\$1,641)	(\$21,329)							
3299-001	Terminal Multiplexer	52	\$1,175	\$61,100	\$0	60	\$0	\$0			
	Less 20% VPA at 60-99 Lvl	52	(\$235)	(\$12,220)							
3814-A01	4X4 Control Unit Switch	1	\$47,480	\$47,480	\$136	3	\$136	\$1,224	4.8	1.5	10.8
Total Net H/W				\$5,214,423			\$20,924	\$141,336	215.4	69.0	270.6
3083-JX-SW Prog Supt Charge - Any O/S			1	\$0	\$0	\$1,070	1	\$1,070	\$11,770		
5665-291	MVS/SP JES Rel 2.1.2	1	\$13,500	\$13,500	\$5,750	1	\$5,750	\$63,250			
5665-284	MVS/XA DFP Rel 1	1	\$1,485	\$1,485	\$572	1	\$572	\$6,292			
5668-949	SMP/E	1	\$1,800	\$1,800	\$391	1	\$391	\$4,301			
5668-962	Assembler H Ver 2	1	\$435	\$435	\$152	1	\$152	\$1,672			
5665-285	TSO/E Rel 2	1	\$1,405	\$1,405	\$551	1	\$551	\$6,061			
5734-UT1	TSO Data Utilities	1	\$5,200	\$5,200	\$0	1	\$0	\$0			
5665-280	ACF/VTAM Ver 2 Rel 1	1	\$3,745	\$3,745	\$1,470	1	\$1,470	\$16,170			
5667-124	ACF/NCP Ver 3 for 3705/3725	1	\$2,400	\$2,400	\$535	1	\$535	\$5,885			
5735-XXA	ACF/SSP Ver 2	1	\$508	\$508	\$116	1	\$116	\$1,276			
5740-SM1	Data Facility SORT Utility	1	\$0	\$0	\$249	1	\$249	\$2,739			
5740-XXH	RACF - Access List Security	1	\$0	\$0	\$827	1	\$827	\$9,097			
5668-932	File Transfer Program V2 Rel 2	1	\$1,500	\$1,500	\$360	1	\$360	\$3,960			
5740-DB2	Database2 (DB2) Relational DB	1	\$15,000	\$15,000	\$2,850	1	\$2,850	\$31,350			
5668-972	Query Mngt Facility (QMF) Rel 1	1	\$6,000	\$6,000	\$1,055	1	\$1,055	\$11,605			
5668-973	Data Extract (DXT) Rel 1	1	\$3,600	\$3,600	\$635	1	\$635	\$6,985			
5740-XX1	CICS Ver 1 Rel 6.1	1	\$5,350	\$5,350	\$1,930	1	\$1,930	\$21,230			
5668-958	VS COBOL II Compiler & Library	1	\$6,000	\$6,000	\$1,050	1	\$1,050	\$11,550			
5668-903	VS FORTRAN Interactive Debug	1	\$1,800	\$1,800	\$325	1	\$325	\$3,575			
5748-FQ3	VS FORTRAN Compiler & Library	1	\$699	\$699	\$250	1	\$250	\$2,750			
S/W Lic Net Price				\$70,427							
S/W Maintenance							\$20,138	\$221,518			

FOR INTERNAL USE ONLY



>>> IBM Mainframe - Year 2 <<<

Part Number	Description	Qty	Purchase Price	Price Extension	Monthly Maint	War Mon	Maint Ext	1st Year Maint	kBTU	kVA	Sq Ft
3081-KX4	2 CPUs, 48MB, & 16 Channels	1	\$1,355,000	\$1,355,000	\$1,815	12	\$1,815	\$0	2.2	6.9	0.0
3081-1550	Channel Group Add'l 8	1	\$80,000	\$80,000	\$95	12	\$95	\$0	1.4	0.5	0.0
3082-X24	CPU Controller for 24 Channels	1	\$50,000	\$50,000	\$50	12	\$50	\$0	1.6	0.5	0.0
3278-4641	Operator's Console Keyboard	1	\$909	\$909	\$6	3	\$6	\$50			
3278-A02	Display Station	1	\$2,505	\$2,505	\$19	3	\$19	\$167			
3880-E23	Storage Control w/16MB Cache	2	\$40,000	\$80,000	\$25	3	\$50	\$450	1.4	0.4	0.0
3380-AA4	2.5268 Fixed Disk w/2 Ctlr	1	\$88,780	\$88,780	\$325	3	\$325	\$2,925	6.0	2.4	9.9
3180-110	Display Station	228	\$2,295	\$523,260	\$11	3	\$2,565	\$23,085			
	Less 25% VPA at 500-999 Lvl	228	(\$574)	(\$130,815)							
3725-001	Communications Controller	1	\$75,000	\$75,000	\$213	12	\$213	\$0	6.5	1.9	9.1
3725-1561	Channel Adapter	2	\$6,750	\$13,500	\$8	12	\$16	\$0			
3725-4911	EIA RS232/CCITT V.24 Interface	8	\$2,600	\$20,800	\$2	12	\$16	\$0			
3725-7100	Storage Increment	3	\$4,375	\$13,125	\$19	12	\$57	\$0			
3863-002	2400/1200 Baud Modem	32	\$2,935	\$93,920	\$16	3	\$496	\$4,464			
	Less 20% VPA at 50-99 Lvl	32	(\$587)	(\$18,784)							
3864-002	4800 Baud Modem	10	\$3,925	\$39,250	\$22	3	\$220	\$1,980			
	Less 15% VPA at 25-49 Lvl	10	(\$589)	(\$5,888)							
3276-012	Control Unit Display Station	28	\$5,535	\$154,980	\$31	3	\$868	\$7,812			
	Less 25% VPA at 45-69 Lvl	28	(\$1,384)	(\$38,745)							
3276-3255	Terminal Adapter 1 (3-4)	12	\$530	\$6,360	\$2	3	\$18	\$162			
3276-3256	Terminal Adapter 2 (5-6)	4	\$589	\$2,356	\$2	3	\$6	\$54			
3276-3257	Terminal Adapter 3 (7-8)	4	\$530	\$2,120	\$2	3	\$6	\$54			
3276-3701	External Modem Interface	12	\$337	\$4,044	\$3	3	\$36	\$324			
3276-4623	Keyboard	28	\$463	\$12,964	\$3	3	\$84	\$756			
3276-5501	1200 Baud Integrated Modem	16	\$714	\$11,424	\$3	3	\$40	\$360			
3276-6301	Comm Feature w/Clock	16	\$543	\$8,688	\$3	3	\$40	\$360			
3276-6302	Comm Feature w/o Clock	12	\$365	\$4,380	\$2	3	\$24	\$216			
3274-61C	Remote Term Ctlr w/16 Lines	1	\$7,600	\$7,600	\$27	3	\$27	\$243			
3274-41A	Local Term Ctlr w/32 Lines	5	\$18,230	\$91,150	\$58	3	\$290	\$2,610			
	Less 9% VPA at 10-19 Lvl	5	(\$1,641)	(\$8,204)							
3299-001	Terminal Multiplexer	20	\$1,175	\$23,500	\$0	60	\$0	\$0			
	Less 20% VPA at 60-99 Lvl	8	(\$235)	(\$1,880)							
3814-A01	4X4 Control Unit Switch	1	\$47,480	\$47,480	\$136	3	\$136	\$1,224	4.8	1.5	10.8
	Total Net H/W			\$2,608,780			\$7,517	\$47,295	23.9	14.1	29.8
				=====			=====	=====	=====	=====	=====
3081-KX-SW	Prog Supt Charge - Any O/S	1			\$485	1	\$485	\$5,335			
	S/W Maintenance						\$485	\$5,335			
							=====	=====			

FOR INTERNAL USE ONLY

>>> IBM Mainframe - Year 3 <<<

Part Number	Description	Qty	Purchase Price	Price Extension	Monthly Maint	War Mon	Maint Ext	1st Year Maint	kBTU	kVA	Sq Ft
3081-KX6	2 CPUs, 64MB, & 16 Channels	1	\$650,000	\$650,000	\$650	12	\$650	\$0	23.7	1.0	0.0
3380-B04	2.52GB Fixed Disk	1	\$64,440	\$64,440	\$240	3	\$240	\$2,160	5.1	2.2	8.9
3811-001	Printer Controller	1	\$17,685	\$17,685	\$123	3	\$123	\$1,107	5.6	1.9	5.8
3211-001	1500 LPM Printer (64 Char Set)	1	\$40,080	\$40,080	\$952	3	\$952	\$8,568	13.9	5.4	11.5
3216-001	Printer Train Cartridge	1	\$11,600	\$11,600	\$206	3	\$206	\$1,854			
3180-110	Display Station	228	\$2,295	\$523,260	\$11	3	\$2,565	\$23,085			
	Less 25% VPA at 500-999 Lvl	228	(\$574)	(\$130,815)							
3725-4911	EIA RS232/CCITT V.24 Interface	9	\$2,600	\$23,400	\$2	12	\$18	\$0			
3863-002	2400/1200 Baud Modem	44	\$2,935	\$129,140	\$16	3	\$682	\$6,138			
	Less 25% VPA at 100-199 Lvl	44	(\$734)	(\$32,285)							
3864-002	4800 Baud Modem	13	\$3,925	\$51,025	\$22	3	\$286	\$2,574			
	Less 15% VPA at 25-49 Lvl	13	(\$589)	(\$7,654)							
3276-012	Control Unit Display Station	28	\$5,535	\$154,980	\$31	3	\$868	\$7,812			
	Less 30% VPA at 70-124 Lvl	28	(\$1,661)	(\$46,494)							
3276-3255	Terminal Adapter 1 (3-4)	12	\$530	\$6,360	\$2	3	\$18	\$162			
3276-3256	Terminal Adapter 2 (5-6)	4	\$589	\$2,356	\$2	3	\$6	\$54			
3276-3257	Terminal Adapter 3 (7-8)	4	\$530	\$2,120	\$2	3	\$6	\$54			
3276-3701	External Modem Interface	12	\$337	\$4,044	\$3	3	\$36	\$324			
3276-4623	Keyboard	28	\$463	\$12,964	\$3	3	\$84	\$756			
3276-5501	1200 Baud Integrated Modem	16	\$714	\$11,424	\$3	3	\$40	\$360			
3276-6301	Comm Feature w/Clock	16	\$543	\$8,688	\$3	3	\$40	\$360			
3276-6302	Comm Feature w/o Clock	12	\$365	\$4,380	\$2	3	\$24	\$216			
3274-61C	Remote Term Ctlr w/16 Lines	1	\$7,600	\$7,600	\$27	3	\$27	\$243			
3274-41A	Local Term Ctlr w/32 Lines	5	\$18,230	\$91,150	\$58	3	\$290	\$2,610			
	Less 9% VPA at 10-19 Lvl	5	(\$1,641)	(\$8,204)							
3299-001	Terminal Multiplexer	20	\$1,175	\$23,500	\$0	60	\$0	\$0			
	Less 20% VPA at 60-99 Lvl	20	(\$235)	(\$4,700)							
				\$1,610,045			\$7,161	\$58,437	48.3	10.5	26.2

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>>> IBM Mainframe - Year 4 <<<

Part Number	Description	Qty	Purchase Price	Price Extension	Monthly Maint	War Mon	Maint Ext	1st Year Maint	kBTU	kVA	Sq Ft
3084-QXC	4 CPUs, 132MB, & 48 Channels	1	\$3,245,000	\$3,245,000	\$5,925	12	\$5,925	\$0	90.1	29.4	41.0
3082-X48	CPU Controller for 48 Channels	1	\$245,000	\$245,000	\$835	12	\$835	\$0	9.1	2.9	24.8
3089-001	Power Unit	1	\$38,000	\$38,000	\$70	3	\$70	\$630	21.8	0.0	14.3
3087-002	Coolant Dist Unit (to Air)	1	\$72,000	\$72,000	\$65	3	\$65	\$585	0.0	5.3	17.4
3278-4641	Operator's Console Keyboard	2	\$909	\$1,818	\$6	3	\$11	\$99			
3278-A02	Display Station	2	\$2,505	\$5,010	\$19	3	\$37	\$333			
3880-E23	Storage Control w/16MB Cache	2	\$183,750	\$367,500	\$600	3	\$1,200	\$10,800	13.8	4.2	19.8
3880-8170	2-Channel Switch Pair	2	\$6,225	\$12,450	\$11	3	\$22	\$198			
3380-AA4	2.52GB Fixed Disk w/2 Ctlr	1	\$88,780	\$88,780	\$325	3	\$325	\$2,925	6.0	2.4	9.9
3380-B04	2.52GB Fixed Disk	1	\$64,440	\$64,440	\$240	3	\$240	\$2,160	5.1	2.2	8.9
3420-008	200 IPS Tape	1	\$19,880	\$19,880	\$342	3	\$342	\$3,078	8.4	2.9	6.2
3420-6425	1600/6250 BPI Density	1	\$2,205	\$2,205	\$85	3	\$85	\$761			
3811-001	Printer Controller	2	\$17,685	\$35,370	\$123	3	\$246	\$2,214	11.2	3.8	11.6
3211-001	1500 LPM Printer (64 Char Set)	2	\$40,080	\$80,160	\$952	3	\$1,904	\$17,136	27.8	10.8	23.0
3216-001	Printer Train Cartridge	2	\$11,600	\$23,200	\$206	3	\$412	\$3,708			
3180-110	Display Station	456	\$2,295	\$1,046,520	\$11	3	\$5,130	\$46,170			
	Less 25% VPA at 500-999 Lvl	456	(\$574)	(\$261,630)							
3725-001	Communications Controller	1	\$75,000	\$75,000	\$213	12	\$213	\$0	6.5	1.9	9.1
3725-1561	Channel Adapter	2	\$6,750	\$13,500	\$8	12	\$16	\$0			
3725-4911	EIA RS232/CCITT V.24 Interface	17	\$2,600	\$44,200	\$2	12	\$34	\$0			
3725-7100	Storage Increment	5	\$4,375	\$21,875	\$19	12	\$95	\$0			
3863-002	2400/1200 Baud Modem	68	\$2,935	\$199,580	\$16	3	\$1,054	\$9,486			
	Less 25% VPA at 100-199 Lvl	68	(\$734)	(\$49,895)							
3864-002	4800 Baud Modem	21	\$3,925	\$82,425	\$22	3	\$462	\$4,158			
	Less 15% VPA at 25-49 Lvl	21	(\$589)	(\$12,364)							
3276-012	Control Unit Display Station	56	\$5,535	\$309,960	\$31	3	\$1,736	\$15,624			
	Less 30% VPA at 70-124 Lvl	56	(\$1,661)	(\$92,988)							
3276-3255	Terminal Adapter 1 (3-4)	24	\$530	\$12,720	\$2	3	\$36	\$324			
3276-3256	Terminal Adapter 2 (5-6)	8	\$589	\$4,712	\$2	3	\$12	\$108			
3276-3257	Terminal Adapter 3 (7-8)	8	\$530	\$4,240	\$2	3	\$12	\$108			
3276-3701	External Modem Interface	24	\$337	\$8,088	\$3	3	\$72	\$648			
3276-4623	Keyboard	56	\$463	\$25,928	\$3	3	\$168	\$1,512			
3276-5501	1200 Baud Integrated Modem	32	\$714	\$22,848	\$3	3	\$80	\$720			
3276-6301	Comm Feature w/Clock	32	\$543	\$17,376	\$3	3	\$80	\$720			
3276-6302	Comm Feature w/o Clock	24	\$365	\$8,760	\$2	3	\$48	\$432			
3274-61C	Remote Term Ctlr w/16 Lines	2	\$7,600	\$15,200	\$27	3	\$54	\$486			
3274-41A	Local Term Ctlr w/32 Lines	10	\$18,230	\$182,300	\$58	3	\$580	\$5,220			
	Less 9% VPA at 10-19 Lvl	10	(\$1,641)	(\$16,407)							
3299-001	Terminal Multiplexer	40	\$1,175	\$47,000	\$0	60	\$0	\$0			
	Less 20% VPA at 60-99 Lvl	40	(\$235)	(\$9,400)							
3814-A01	4X4 Control Unit Switch	1	\$47,480	\$47,480	\$136	3	\$136	\$1,224	4.8	1.5	10.8
				\$6,047,841			\$21,737	\$131,567	204.6	67.3	196.8
				=====			=====	=====	=====	=====	=====
3084-QX-SW	Prog Supt Charge - Any D/S	1			\$1,020	1	\$1,020	\$11,220			
	S/W Maintenance						\$1,020	\$11,220			
							=====	=====			

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>>> IBM Mainframe - Year 5 <<<

Part Number	Description	Qty	Purchase Price	Price Extension	Monthly Maint	War Mon	Maint Ext	1st Year Maint	kBTU	kVA	Sq Ft
3380-804	2.526B Fixed Disk	4	\$64,440	\$257,760	\$240	3	\$960	\$8,640	20.4	8.8	35.6
3420-008	200 IPS Tape	1	\$19,880	\$19,880	\$342	3	\$342	\$3,078	8.4	2.9	6.2
3420-6425	1600/6250 BPI Density	1	\$2,205	\$2,205	\$85	3	\$85	\$761			
3811-001	Printer Controller	1	\$17,685	\$17,685	\$123	3	\$123	\$1,107	5.6	1.9	5.8
3211-001	1500 LPM Printer (64 Char Set)	1	\$40,080	\$40,080	\$952	3	\$952	\$8,568	13.9	5.4	11.5
3216-001	Printer Train Cartridge	1	\$11,600	\$11,600	\$206	3	\$206	\$1,854			
3180-110	Display Station	456	\$2,295	\$1,046,520	\$11	3	\$5,130	\$46,170			
	Less 20% VPA at 250-499 Lvl	456		(\$459)							
				(\$209,304)							
3725-4771	Line Attachment Base - Type A	4	\$19,000	\$76,000	\$16	12	\$64	\$0			
3725-4911	EIA RS232/CCITT V.24 Interface	16	\$2,600	\$41,600	\$2	12	\$32	\$0			
3725-7100	Storage Increment	4	\$4,375	\$17,500	\$19	12	\$76	\$0			
3863-002	2400/1200 Baud Modem	80	\$2,935	\$234,800	\$16	3	\$1,240	\$11,160			
	Less 20% VPA at 50-99 Lvl	80		(\$587)							
				(\$46,960)							
3864-002	4800 Baud Modem	23	\$3,925	\$90,275	\$22	3	\$506	\$4,554			
	Less 9% VPA at 10-24 Lvl	23		(\$353)							
				(\$8,125)							
3276-012	Control Unit Display Station	56	\$5,535	\$309,960	\$31	3	\$1,736	\$15,624			
	Less 25% VPA at 45-69 Lvl	56		(\$1,384)							
				(\$77,490)							
3276-3255	Terminal Adapter 1 (3-4)	24	\$530	\$12,720	\$2	3	\$36	\$324			
3276-3256	Terminal Adapter 2 (5-6)	8	\$589	\$4,712	\$2	3	\$12	\$108			
3276-3257	Terminal Adapter 3 (7-8)	8	\$530	\$4,240	\$2	3	\$12	\$108			
3276-3701	External Modem Interface	32	\$337	\$10,784	\$3	3	\$96	\$864			
3276-4623	Keyboard	56	\$463	\$25,928	\$3	3	\$168	\$1,512			
3276-5501	1200 Baud Integrated Modem	32	\$714	\$22,848	\$3	3	\$80	\$720			
3276-6301	Comm Feature w/Clock	32	\$543	\$17,376	\$3	3	\$80	\$720			
3276-6302	Comm Feature w/o Clock	24	\$365	\$8,760	\$2	3	\$48	\$432			
3274-61C	Remote Term Ctlr w/16 Lines	2	\$7,600	\$15,200	\$27	3	\$54	\$486			
3274-41A	Local Term Ctlr w/32 Lines	10	\$18,230	\$182,300	\$58	3	\$580	\$5,220			
	Less 9% VPA at 10-19 Lvl	10		(\$1,641)							
				(\$16,407)							
3299-001	Terminal Multiplexer	40	\$1,175	\$47,000	\$0	60	\$0	\$0			
	Less 15% VPA at 30-59 Lvl	40		(\$176)							
				(\$7,050)							
				\$2,152,397			\$12,618	\$112,010	48.3	19.0	59.1
				=====			=====	=====	=====	=====	=====

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## COMPUTER ROOM LAYOUTS

## Appendix C Notes:

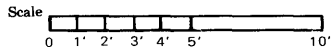
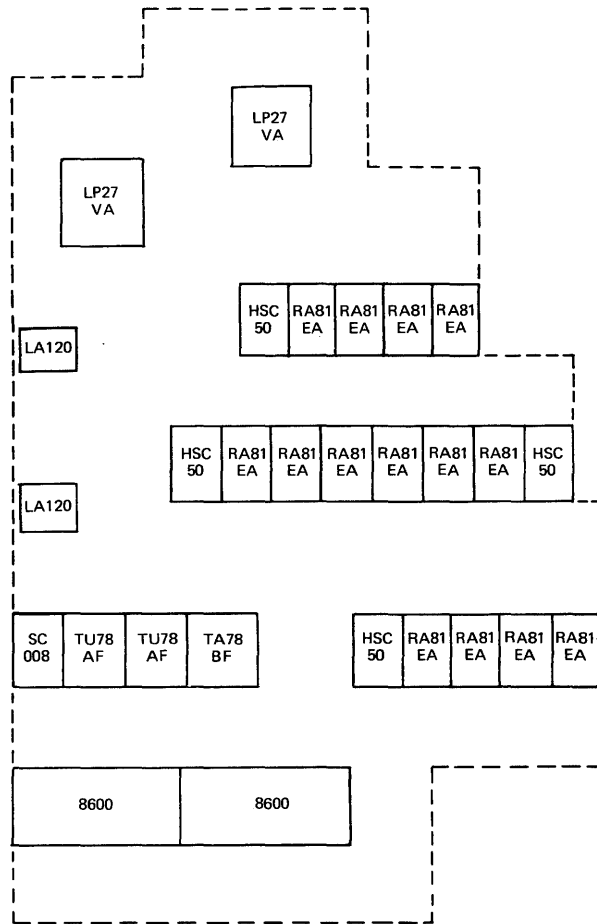
This appendix contains pictorial representations of the computer room layouts for the five-year growth scenarios. Although originally drawn to scale, duplication for publication may distort some dimensions. Areal calculations were made from measurements taken on the original, to scale, drawings. The original layouts were done using a scale of 3/16" equal to 1'. The purpose of creating actual computer room layouts is to allow for service clearance overlaps between the various hardware components installed.

For the VAXcluster it was assumed that communications multiplexers and modems would not be located in the computer room proper but rather in a separate communications room. A similar assumption was made for the IBM mainframe in that modems and locally attached 3274 terminal controllers would be located outside the computer room.

The IBM mainframe was positioned using the minimum 308X CPU to 3082 Processor Controller clearances allowed. The relational positioning of these two hardware items is predefined by IBM and not at the discretion of the computer room designer.

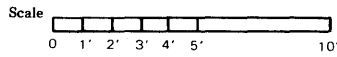
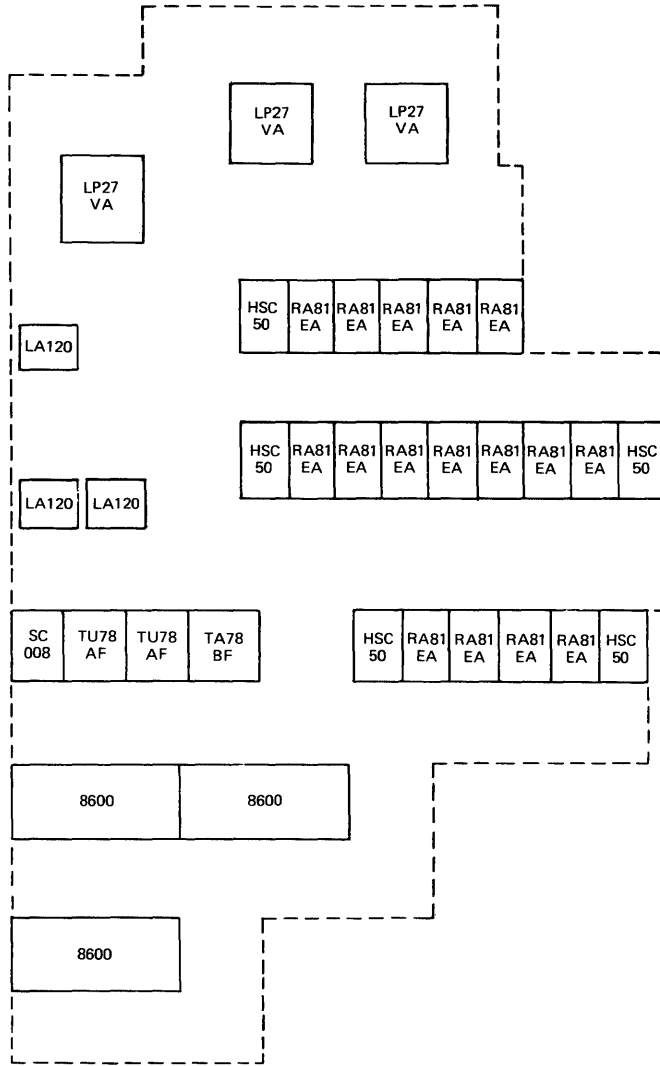
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VAXcluster - Year 1  
596.2 Sq Ft



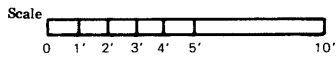
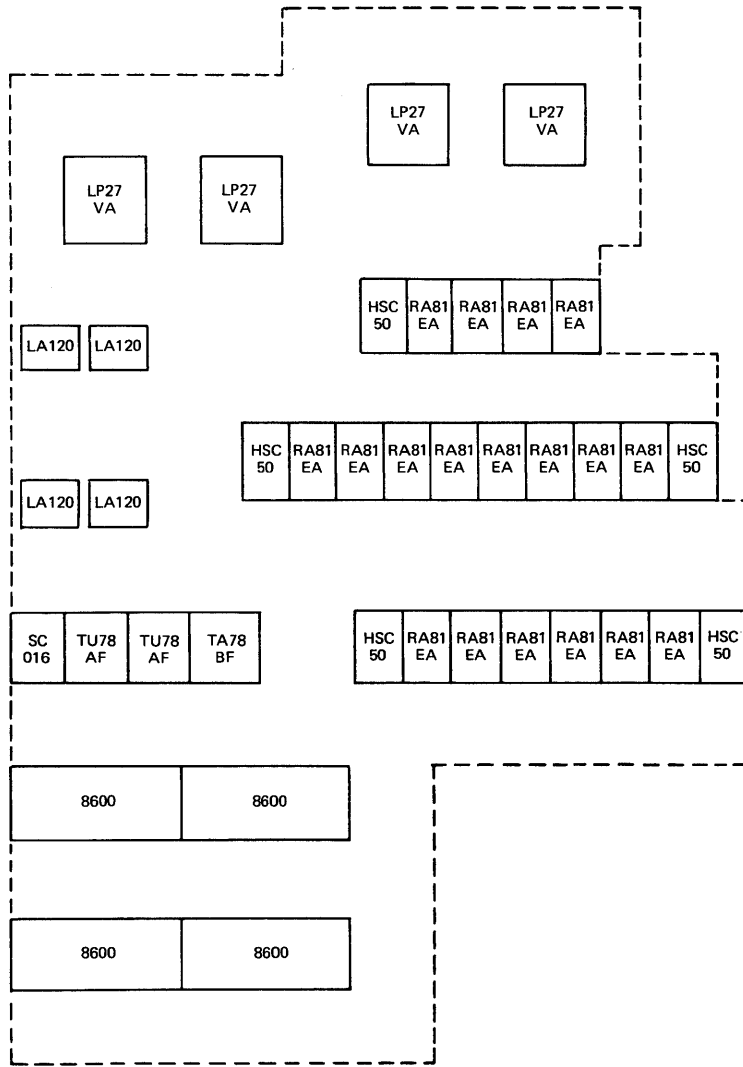
FOR INTERNAL USE ONLY

# VAXcluster - Year 2 722.0 Sq Ft



FOR INTERNAL USE ONLY

# VAXcluster - Year 3 831.0 Sq Ft

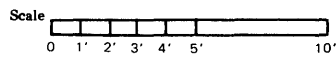
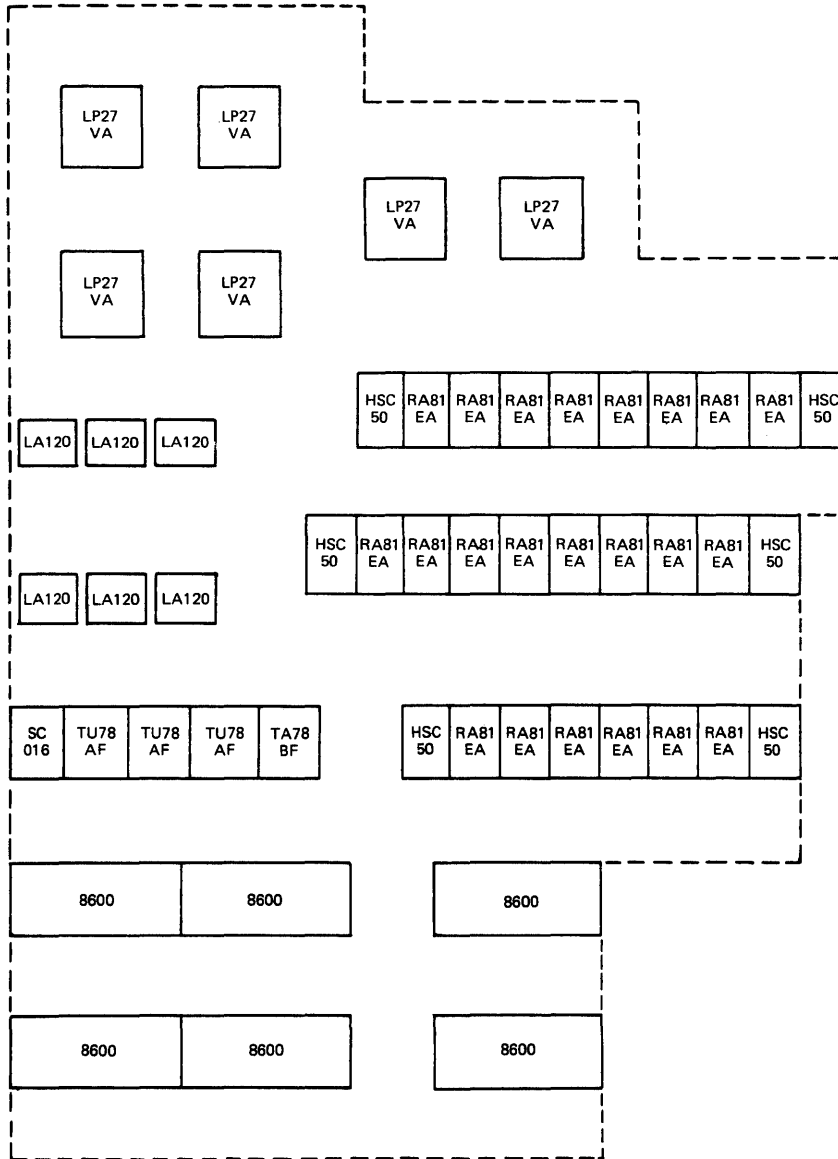


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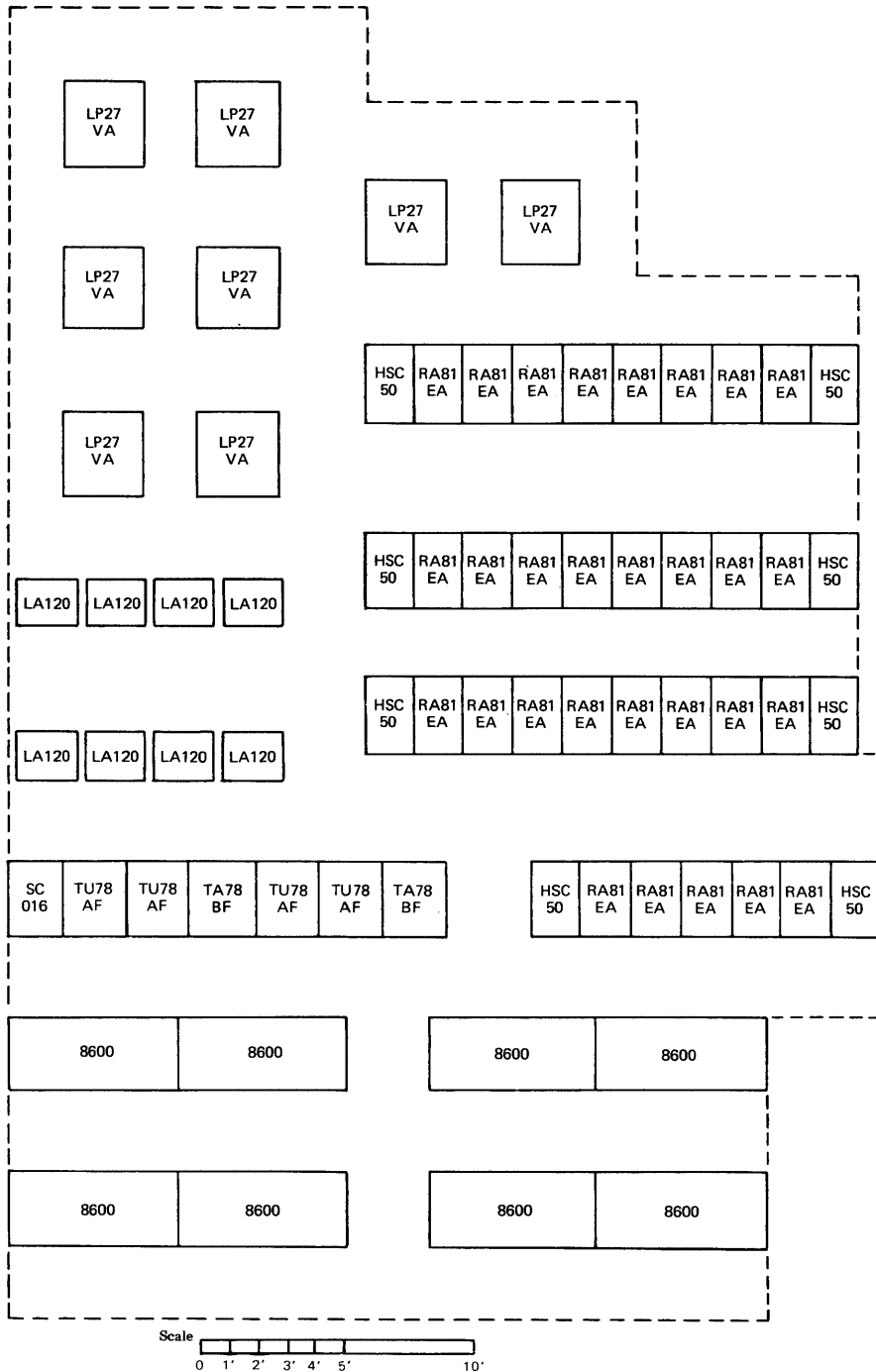
# VAXcluster - Year 4

## 1077.5 Sq Ft



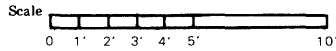
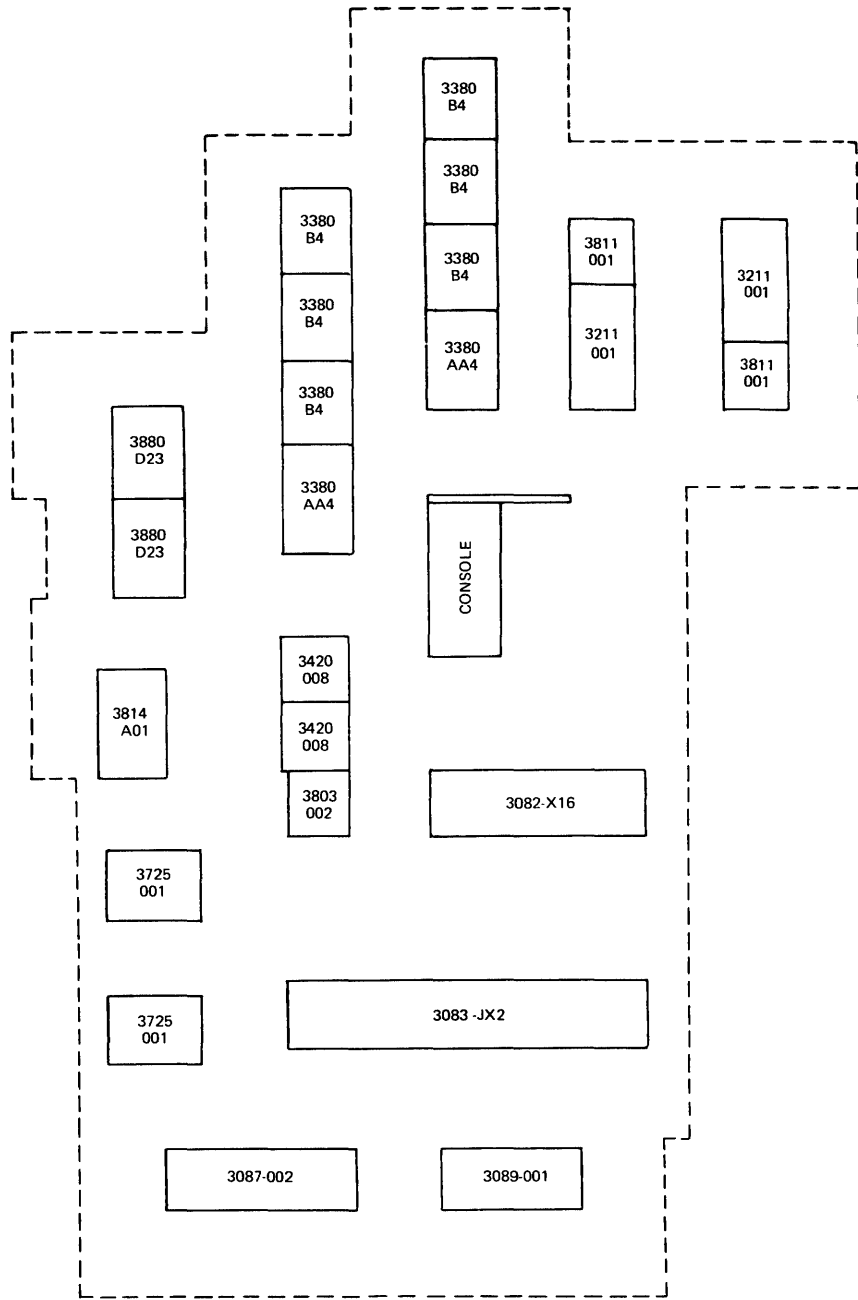
FOR INTERNAL USE ONLY

# VAXcluster - Year 5 1375.9 Sq Ft



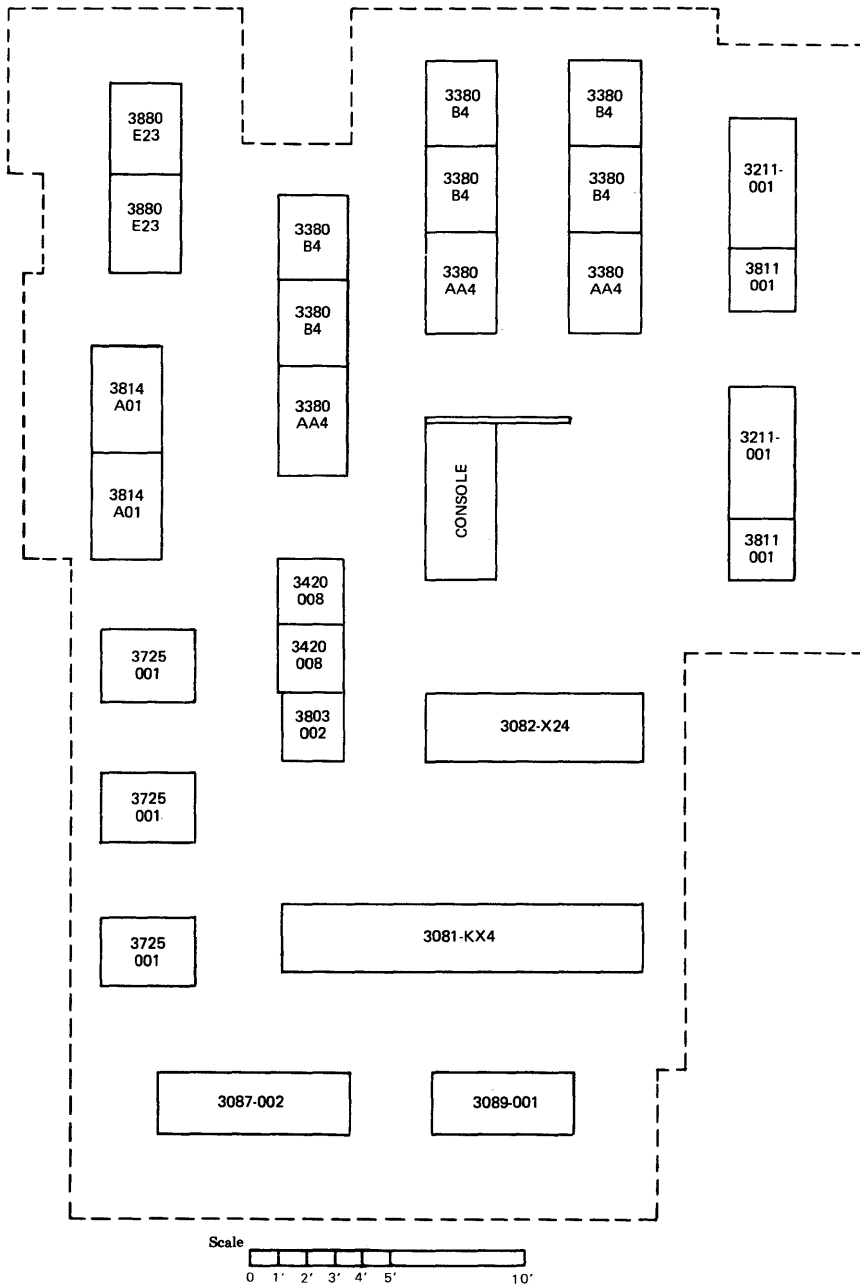
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# IBM Mainframe - Year 1 1068.0 Sq Ft



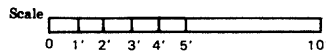
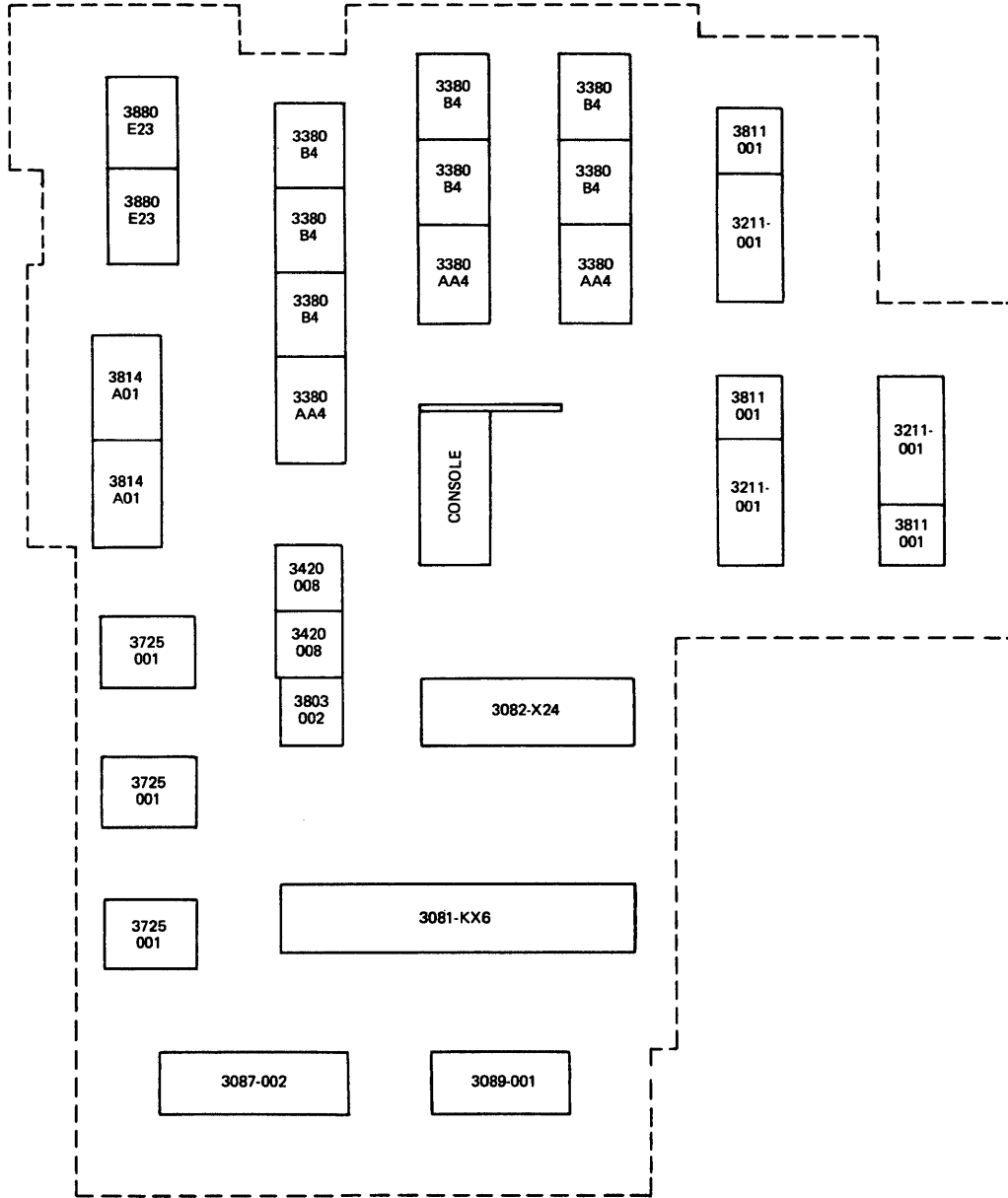
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**IBM Mainframe - Year 2  
1158.4 Sq Ft**



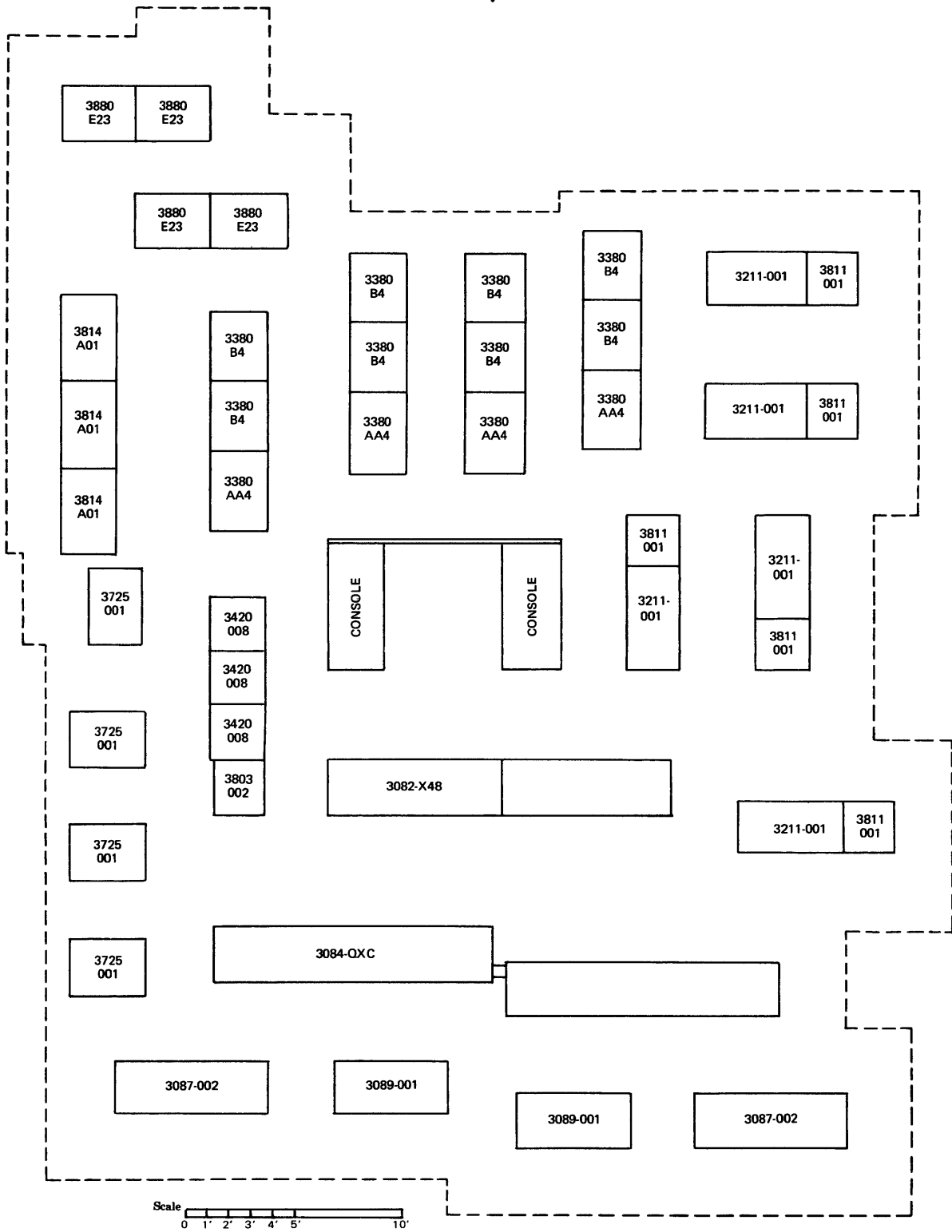
FOR INTERNAL USE ONLY

# IBM Mainframe - Year 3 1309.3 Sq Ft



FOR INTERNAL USE ONLY

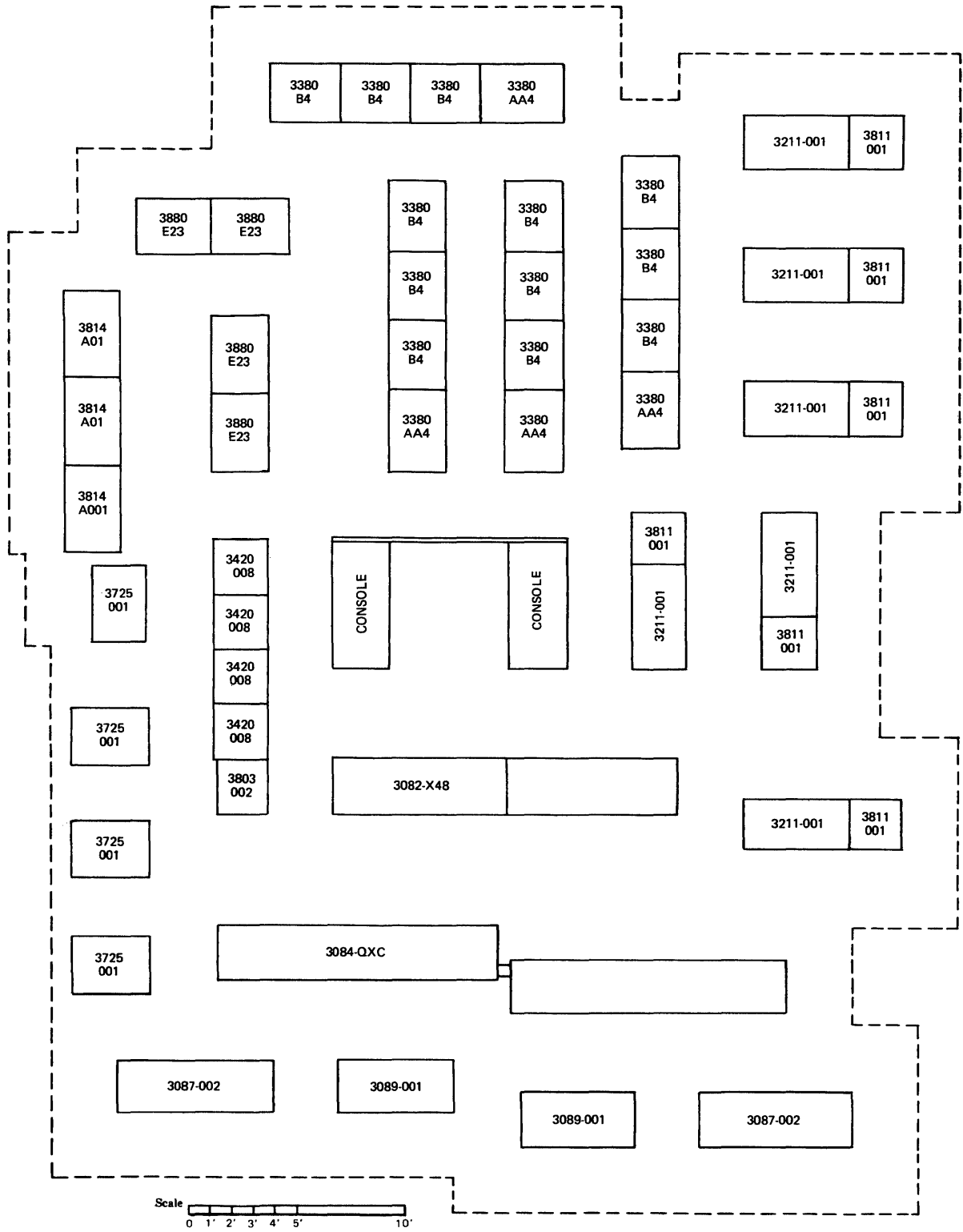
# IBM Mainframe - Year 4 1952.7 Sq Ft



FOR INTERNAL USE ONLY

# IBM Mainframe - Year 5

## 2137.3 Sq Ft



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