A MINICOMPUTER SYSTEM FOR THE
READY-TO-WEAR RETAILER

by

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Major Professor
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ACKNOWLEDGMENTS

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CHAPTER I
INTRODUCTION

Minicomputers have been used successfully in industry and their low cost and increasing capabilities have slowly increased their use in business data processing. With only one user, no sophisticated operating system for multi-users need exist. The equipment is physically small, has no special power, temperature or humidity requirements, and can be operated within the business itself to provide useful, timely information.

This paper explores a proposed system for a small-to-medium sized business involving two ladies ready-to-wear stores.

While the main goal is a working system for this business, and all cost justification is based on this business, it is expected that the end product can be used by and sold to other small businesses.
CHAPTER II
DESCRIPTION OF PRESENT OPERATION

2.1 OVERVIEW

Braun's Apparel is a corporation involving two ladies ready-to-wear stores, both managed by the major stockholders. The first, opened in 1962, is in a shopping center near Ellsworth Air Force Base near Rapid City, South Dakota. The second, opened in 1967, is in the downtown section of Rapid City. The two stores operate in close conjunction with each other using common bookkeeping and merchandise receiving facilities. The management takes care of the majority of the bookkeeping and a certified public accountant handles the tax matters. Total annual sales are in the neighborhood of $500,000. Most major functions of the business are currently handled by the management which allows for very efficient operations, but also places an excessive workload on a few people and severely limits ideas of expanding into more than a two store operation.

2.2 PRESENT OPERATION

2.2.1 SALES INFORMATION HANDLING

All customer-involved transactions are recorded on a special form for charges involving Master Charge and other similar charge plans. Otherwise a standard sales pad is used with a carbon copy going to the customer. On this form are recorded the customer's name and address, if the transaction is not a cash sale, the date, an indication
of cash or check, sales clerk, and finally information concerning the transaction. This information includes quantity, description, price, and tax for sales, or paid on account (POA) and the amount. About 180 items are involved in an average day's business. These forms are then used each night to update the accounts receivable and to complete summaries of that day's business. They are then filed by day/month/year for a duration of seven years.

2.2.2 ACCOUNTS RECEIVABLE

Charge accounts are maintained for customers who wish to charge with a plan other than one like Master Charge. A customer wishing such an account fills out a credit application form. If a charge account is granted, then a ledger card is made for that customer. These cards are stored alphabetically in separate files for each store, which occasionally involves extra bookkeeping if the customer shops the other store. At present free credit is given for 90 days, however interest is occasionally added for delinquent accounts. Posting the day's charge business is done on these ledger cards. Once a month cards are pulled from the files for all customers to whom it is desired to send statements. Cards held back involve customers with no balance due, or customers who have made special arrangements to suppress sending the statement. Statements will show more than one month's transactions, but a typical statement will have only about six entries from the current month. The cards which have been pulled are hand fed into a copying machine and later reinserted into the card
files. The copies are hand folded, stuffed into envelopes - occasionally with advertisements, sealed, stamped, and mailed. Handling of delinquent accounts is accomplished by either a special letter or a note on the statement itself. This process involves manual inspection of the account files and a great deal of manual labor. About 1000 accounts are maintained for each store.

2.2.3 ACCOUNTS PAYABLE

Order copies from the buying process are used to verify each shipment of merchandise, noting discrepancies in merchandise received, late receiptment, and postage and insurance. All bills are paid so as to take advantage of all possible discounts for prompt payment. Discounts are figured, allowances for returned goods or improper postage are made, and a check is written and mailed. Checks for paying employees, rent, and utilities are written on regular basis.

2.2.4 INVENTORY AND MERCHANDISE TAGGING

At present the only formal inventory taking involves a yearly physical inventory of merchandise. This procedure has worked fairly well thus far as the management is so closely tied to the total operation. Merchandise is tagged by sales help and management on color-coded-by-size tags which contain the manufacturer, style number, size, and retail price. Special smaller tags are used for items such as jewelry and scarves. Sale items retain their original tags but also are given a bright yellow tag with the sale price. Whenever
possible, tags are crocheted into the garment to keep them with the garment when it is tried on and to make tag switching difficult.

2.2.5 BUYING

This is another function assumed entirely by the management. Four or five trips to market in Minneapolis, Minnesota are made each year to partially accomplish this function. This form of buying is supplemented by buying from salesmen making more or less regular trips to Rapid City. As the stores have grown, this function has become more difficult due to the amount of information which must be recalled from memory, as an item inventory does not exist. All decisions are based on remembering the history of performance for all of the various lines, styles, size range breakdowns, and colors.

2.2.6 PAYROLL

Each of the approximately 15 employees has a calendar on a bulletin board in the store on which he records the number of hours worked each day. These calendars are then used every two weeks to calculate wages. Tax is then figured and payroll checks are written.

2.2.7 PERFORMANCE EVALUATION

A. STORE PERFORMANCE

Records are kept of total sales by day, accumulative for month, and accumulative for year for each store. These records are then later used for reference and for comparison purposes.
3. VENDOR AND ITEM PERFORMANCE

Although some records exist, such as order copies, this process is mainly a mental one and leaves much to be desired.

C. SALES PERSONNEL PERFORMANCE

No records are maintained, but time is spent observing the sales girls in selling and other storekeeping activities.
CHAPTER III
DESIRRED AUTOMATED SYSTEM

3.1 OVERVIEW

As Braun's Apparel has grown, the management has been forced into an ever increasing time commitment. It is desired to free them to a certain degree to give them more time for management and more time for their own. If the business is to expand beyond a two store operation, some reorganization will be necessary. It is also desired to provide readily available information concerning the business. Some of the typical questions the management would like to have answers for are:

What is the total amount of accounts receivable for store X?
Which accounts involve more than X dollars?
Which accounts are delinquent?
What is the total amount of accounts payable?
How did vendor X's merchandise perform during time Y?
How did style X perform during time Y?
How many of style X did we buy last year?
How many of style X went on sale?
What sizes and colors of style X did we buy last year?

Access to accounts receivable information should be nearly immediate.
3.2 PROPOSED OPERATION

3.2.1 SALES INFORMATION HANDLING

Charge plans such as Master Charge would continue as in the past. All other charge and cash business would be recorded on the form shown in Figure 3-1. This is a two-part form with one copy going to the customer. A portion of the merchandise tags would be removed and spindled with each store copy of all charge and cash sales. All customer credits would be recorded on a two-part form identical to the one in Figure 3-1 except that the form would have a different color, the charge, check and cash boxes would become adjustment, return and payment, and the CHARGE NO. 00000 would become CREDIT NO. 00000. These forms and tags would then be used at the end of the day to update the accounts receivable file, the inventory file, and a file summarizing the total business. A brief report of that day's business would be printed, and this report together with the forms would be filed and stored as described in 2.2.1. Two plastic cards with the customer's name, address, and account number embossed thereon will be made for all customers who have a charge account with the store. One copy of this card will be kept on a Rolodex file in each store. This card will serve two primary functions. First, it will provide an almost error free method of recording the proper customer ID on each transaction. Secondly, it will allow management to carefully control customers to whom credit is extended. For example, if an account is delinquent, the card can be simply removed from the file and the sales
<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUAN</th>
<th>DESCRIPTION</th>
<th>PRICE</th>
<th>AMOUNT</th>
</tr>
</thead>
</table>

**Charge No:** 00000

**Customer Signature:**

```
(605) 223-2205
Rango City, S.O.
Villa Parkville
```

**Payment Options:**

- [ ] Cash
- [ ] Check
- [ ] Charge

**Phone:** (605) 393-5585

**Address:**

1. Name
2. Store
3. Account Number

Information from this area will be taken from the credit card and will be included.

---
person does not have to be involved in credit decisions. An added advantage is that the customer does not have to carry the card or worry about losing it.

3.2.2 ACCOUNTS RECEIVABLE

Credit applications will function as at present. If an application is accepted an entry will be made into the customer file. With the plastic cards described above, the total credit picture will be more centralized, with a smoother handling of customers shopping between stores. Free credit will be extended for the current month with interest automatically computed and added on thereafter. Decisions for suppressing a customer statement generation will be retained. Statements will be printed on a monthly basis on a pre-printed form as shown in Figure 3-2. The message referred to on the back of the form will explain the interest computation. After the entire system is in operation, postage meters and mailing machines will be studied to perhaps further automate sending statements. Statements requiring special attention will be printed as a group separate from the others, allowing a speed-up of handling delinquent accounts. If an account has more transactions during a month than are possible to print on one form, two will be used. Posting will be done by entering the information from the tags and forms at the console. This will speed up the present method by eliminating the search and replacement of ledger cards and entering coded rather
than full information. Search programs will be available to retrieve specific information from this file and generate reports.

3.2.3 ACCOUNTS PAYABLE

Bills for rent and utilities will be handled as at present. Checks for employees will be done with a payroll program. Bills from merchandise vendors will be processed in connection with the inventory system.

3.2.4 INVENTORY AND MERCHANDISE TAGGING

Merchandise tags will be three-part and machine printed as shown in Figure 3-3. At the time of the sale, one part will be removed and spindled with the sales form. If an item is returned, one part of the remaining two will be spindled with the credit form. The third portion will be used to generate a new tag. To begin with, a machine to produce a print only tag will be used. A print/punch tag will probably be used eventually to speed up posting and reduce errors. An average of about 180 items are sold and returned in one day, and it is felt the print/punch ticket and a reader for it are not justified at this time. The tag will retain the present color coding for the size system presently used. Some special merchandise, such as jewelry, will retain present tagging methods and will not be included in the inventory. Until print/punch tickets are used, sale tags will consist of a yellow adhesive tag placed in the area indicated in Figure 3-3. These tags will be easy to apply and
Figure 3-3 MERCHANDISE TAG
difficult to switch. The color code for the merchandise itself is shown in Figure 3-4. The coding for the item breakdown of the merchandise will consist of three characters. Some merchandise needs a three-level breakdown and will be handled by a single digit to express the item number, such as 1 to indicate fall and winter coats; a letter to show a subdivision, such as C to indicate leather; and finally a digit to show a further subdivision, such as 1 to indicate a length of 30" to 36". Most items require only a two-level breakdown, and will have a two-digit number to express the item number, and a letter to show a subdivision. A chart for this has been agreed upon, but is too lengthy to be shown in full. Style numbers are four-digit numbers defined by the manufacturer, and the vendor number will be assigned by a simple numerical scheme. Information from the order copy obtained in the buying process will be used to update an on-order file. This file will contain the vendor, a start shipment date, a complete shipment date, style number, color breakdown, size breakdown, item description, wholesale price, total wholesale price, due date to receive discount, discount rate, returns, and postage and insurance adjustments. As shipments are received, this file will be updated. As checks are written to pay for the merchandise, entries will be deleted, and the order copies filed. Also as shipments are received an inventory file will be updated. This file will contain all merchandise tag information, the date of entry, the quantity in stock, quantity sold this month, quantity sold
<table>
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<tr>
<th>SOLIDS MAJOR COLORS</th>
<th>SOLIDS MINOR COLORS</th>
<th>SOLIDS MINOR COLORS</th>
<th>CHECKS</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>PLAIDS</th>
<th>DOTS</th>
<th>STRIPES</th>
<th>PRINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>40. Assorted</td>
<td>50. Assorted</td>
<td>60. Assorted</td>
<td>70 Assorted</td>
</tr>
<tr>
<td>43. Red</td>
<td>53. Red</td>
<td>63. Red</td>
<td>73. Red</td>
</tr>
<tr>
<td>44. Blue</td>
<td>54. Blue</td>
<td>64. Blue</td>
<td>74. Blue</td>
</tr>
<tr>
<td>46. Yellow</td>
<td>56. Yellow</td>
<td>66. Yellow</td>
<td>76. Yellow</td>
</tr>
<tr>
<td>48. Purple</td>
<td>58. Purple</td>
<td>68. Purple</td>
<td>78. Purple</td>
</tr>
<tr>
<td>49. Orange</td>
<td>59. Orange</td>
<td>69. Orange</td>
<td>79. Orange</td>
</tr>
</tbody>
</table>

Figure 3-4  COLOR CHART
this year, and the quantity put on sale. Programs will be available to search these files for specific information and to generate reports.

3.2.5 BUYING

This function will be changed only in that the information from the inventory will be available.

3.2.6 PAYROLL

This function will remain about the same except for a simple program to do the calculations.

3.2.7 PERFORMANCE EVALUATION

A. STORE PERFORMANCE

The business summary file will allow retrievals of the information on a daily and monthly basis.

B. VENDOR AND ITEM PERFORMANCE

Programs in the inventory section will provide the information.

C. PERFORMANCE OF EMPLOYEES

The daily posting would include a posting to a file of total sales for each person. The file could be searched at will for individual cases or for periodic report generation.
CHAPTER IV
SOFTWARE SPECIFICATION

4.1 INFORMATION FILES

4.1.1 OVERVIEW

The main structure used for file organization will be linked lists. This will allow reasonably easy updating while retaining a given order, such as alphabetical, and capability of dynamic allocation and freeing of file storage areas for efficient storage management. The links will be simply record numbers which when used with a beginning address of the file will hash into a physical address of the record. Wherever such dynamic ordering capabilities are not needed, files will be structured as simple arrays. The total size requirements for these files is estimated to be 535,000 16-bit, 2-byte words.

4.1.2 ACCOUNTS RECEIVABLE

A. CUSTOMER FILE

This file is actually composed of two separate files. The first, the account number file, will be stored in simple array fashion of two words per entry which will consist of the account number and a link to the rest of the information for that number. Space will be reserved for 2000 entries and this file will require 4000 words. The second is the main customer file which will need 2000 entries of 40 words each for a total of 80,000 words. 35 words
will be used for the customers name and address. A carriage return will be used to delimit fields within this area and a special character, such as an asterisk, will terminate the information. Thus a total of 67 characters of information will be available for the name and address. Two words will be used for the previous balance, and one word each will be used for the account number which will be recorded as a negative if that customer has made arrangements for having no statement sent, a link to that customers first entry in the transaction file, and a link to the next entry in this file.

B. TRANSACTION FILE

It is estimated that each customer will have an average of six entries in this file per month. Each entry will need five words, thus this file requires \((2000)(6)(5) = 60,000\) words. Entries will consist of two words for the store where the transaction occurred and the three-byte item number or other transaction description such as POA, and one word each for the date (month/day), the amount (negative indicates a return), and a link to the next transaction for that customer.

4.1.3 INVENTORY

A. ON-ORDER FILE

At any given time up to 100 orders can be outstanding. The on-order file is composed of three separate levels, where individual orders are stored on the first level, items at the second level, and
color and size combinations at the third level. The 100 nodes at the first level will consist of 12 words each for a total of 1200 words. Each node will contain eight bytes for the order copy number, one word each for a start shipment date, a complete shipment date, a due date, an adjustment for returns, an adjustment for postage, and a link to the next order, and one byte each for the vendor number and the discount rate. At the second level, eight words each will be used for a maximum of 2500 nodes of item information for a total of 20,000 words. Two words will hold the item code and the vendor number, one word each will be used for the style number, the retail price, a link to the first related entry at the third level, a link to the next entry at the second level with the same item code, a link to the next entry at the second level with the same vendor number, and a link to the next entry at the second level with the same order number. The third level will have room for 25,000 entries of three words each for a total of 75,000 words. One byte each for size, color, number ordered, number received, and one word as a link to the next entry at the third level with the same style number will be used.

B. INVENTORY FILE

This will be a two-level file with room for 20,000 nodes of seven words each at the first level and 50,000 nodes of 4 words each at the second level for a total of 340,000 words. Nodes at the first level will have two words for the item codes and vendor number, and
one word each for the style, the retail price, a link to the first color-size combination at the second level, a link to the next entry at the first level with the same item code, and a link to the next entry at the first level with the same vendor number.

C. ITEM DESCRIPTION FILE

This file will have 300 entries of eight words each for a total of 2400 words. Three bytes will hold the item description or POA, nine bytes will have the description of the item, and one word each will be used for the link to the first entry for this item in the on-order file and the inventory file.

D. COLOR CODE TO COLOR FILE

This file will have 80 entries of six words each for a total of 480 words. The file will be an array of 12 bytes description for each color, with the color number serving as an index into the array.

E. VENDOR CODE TO VENDOR FILE

This file will have 200 entries of seven words each for a total of 1400 words. The file will be an array where the vendor number is an index into the array, and each element has ten bytes for the vendor name and one word each for links to the first entry in the on-order file and the inventory file with that vendor number.
4.1.4 BUSINESS SUMMARY FILE

This file will consist of two parts. The first will be a simple array storing the amount of cash sales, charge sales and POA for each of the two stores for the current day, week and year. Thus 24 entries of two words each and a total of 48 words are needed. The second will be an array storing the cash, charges and POA for each day of the month. Thirty entries of eight words for a total of 240 words will be used, using one word each for the date, cash charges and POA for each store.

4.1.5 EMPLOYEE FILE

Each of a maximum of twenty employees will have a twenty word entry for a total of 400 words. Four words for their employee ID, two words each for cash this month, cash this year, charges this month, charges this year, returns this month, returns this year, and one word each for the number of hours this month and number of hours this year will be necessary. The last word will contain their hourly wage.

4.2 PROGRAMS

4.2.1 OVERVIEW

It is estimated that storage for all the programs in the system will require about 100,000 words with about 4000 words for the largest program. As the entire machine will be devoted to this system, it is not expected that time or speed considerations will be prime factors
except in two cases. First, the program to retrieve information from a particular charge account must be able to do its job rapidly since the request will often come via a telephone call with a customer and/or a salesperson waiting for the answer. Secondly, programs like the statement printing program and the inventory report printing program will involve large amounts of printing. This can be done in overnight runs, but a fairly fast printer would be desirable.

4.2.2 ACCOUNTS RECEIVABLE PROGRAMS

A program will be needed to update the customer file by either adding or deleting entries and adjusting the appropriate links. A posting program will be needed at the end of each business day to update the transaction file. This posting will be done by account number. A report program will be used to dump full, partial or summary information for a particular account, or all of the accounts for a store. As this will not require printing on pre-printed forms, or decisions, this program will be separate from the statement printing program.

4.2.3 INVENTORY PROGRAMS

As merchandise is ordered, a program to update the on-order file will be necessary. As it is received, this file will again need revision as well as the inventory file. A third program to generate reports on the on-order file will be necessary. This report will be used in writing checks to the merchandise vendors. Nightly
posting will require that the inventory file be changed. The program doing this job will be the same one as the one used in posting to the accounts receivable file. An inventory report generation program will be required. The inventory file is structured such that it is searchable by item number or vendor in order to give buyers better information at market time.

4.2.4 BUSINESS SUMMARY PROGRAMS

After each night's posting, a brief report of cash, charges and POA for each store will be generated and filed with that day's sales tickets. At the end of each month a similar report showing these figures over the entire month will be printed for future comparisons.

4.2.5 EMPLOYEE PROGRAMS

A program to give sales summary information on particular employees and to print hour, rate, deductions, and wage information for evaluation and payroll information will be required.

4.2.6 MISCELLANEOUS PROGRAMS AND ROUTINES

A variety of routines used by the various programs will exist. These routines will include input/output drivers, hashing routines, math routines, and a program to make backup copies of the information files.
CHAPTER V
HARDWARE SPECIFICATION

5.1 OVERVIEW

Due to the geographical location of Rapid City, South Dakota (Denver, Colorado is the closest big city and is 400 miles away), quality and reliability are key considerations. Likewise, the cost of on-site service will also be important. Although this study has assumed a word length of 16 bits, this figure is not a requirement. It was used only because it is fairly standard and it was necessary to specify size requirements in some manner. The room in mind for hardware installation is air-conditioned by means of the unit serving the entire store, but the hardware should not require narrow limits on temperature and humidity.

5.2 CENTRAL PROCESSING UNIT

The primary consideration here is one of programming ease. It is expected that programming will be done at the assembly language level and some of the desirable features would be easy byte manipulation, powerful input/output instructions, a variety of addressing techniques including relative, base-displacement, and indirect, a number of general purpose registers, register-storage instructions, and an easy to use interrupt handling system. Availability of good peripherals will also be important although the buying of hardware will not necessarily be restricted to one
vendor. Core size will depend on a number of the above considerations as well as word length. Manufacturer supplied software will be an additional consideration. Thus primary considerations will be reliability, serviceability, programming ease, and cost.

5.3 BULK STORAGE

It is estimated that information files will occupy somewhat in excess of 500,000 words and programs another 100,000 words. Bulk storage is one area that will need room for growth, and it is desired to be able to store all of the information as one unit. This would simplify operation of the system and allow easier production of backup copies. In this respect, either magnetic tape or disk storage could do the job. Due to the random structure of the files, the storage device must be able to provide random access. Given enough time, tape could do the job, but at an inconvenience to the operator. For example, most of the time spent posting would be in waiting for the proper spot on the tape. Copying would require two drives, increasing cost and maintenance. Disk gives the advantages of random access, high data transfer rates and lower error rates. Again, production of the backup copies requires two separate recording media, but hybrid disk drives offer a solution by providing one fixed disk and one removable cartridge on the same drive. Copying is then a procedure of copying to the fixed disk, removing the master cartridge and inserting the backup cartridge, and copying from the fixed disk to the backup. Most drives
of this nature offer 1.2 million words on the fixed disk and another
1.2 million words on the removable cartridge. This would allow
room for the initial system as well as room for future growth.

5.4 CONSOLE

It is expected that all input/output can be done with one
terminal. Basic requirements of this terminal are that it includes
a keyboard and a printer. A cathode ray tube for rapid display
would be a desirable feature, but would not be essential. The paper
feed mechanism must be of the pin-feed type as opposed to simply
friction-feed so as to prevent misalignment while doing mass printing
of pre-printed forms. Printing must be by impact so that ordinary
paper can be used and carbon copies produced if desired. Quality,
reliability and speed are prime considerations. The five by seven dot
matrix printers seem to meet these criteria. They print at a rate of
30 or more characters per second, and have very few moving parts.

5.5 MISCELLANEOUS EQUIPMENT

Additional equipment required will include Rolodex files for
storing the plastic charge cards, possibly a machine to emboss these
cards, a machine to produce the printed merchandise tags, and a few
of the guns used in attaching the tags.
CHAPTER VI
COST JUSTIFICATION

6.1 OVERVIEW

In 6.2, comparisons of time spent in performing the various functions manually as opposed to an automated system are shown in chart form. The figures show some speed-up but not enough to justify the new system, whose estimated cost is explained and shown in 6.3. The main justification comes not from a direct cost savings, but in providing functions previously not realizable and in freeing the management. It is estimated that the business can afford to spend about five to seven percent of sales for the services and information which the proposed system would offer. Using the $500,000 annual sales figure, this amounts to a $25,000 to $35,000 budget for a computer system.

6.2 TIME COMPARISONS

Figure 6-1 shows that an estimated 71½ hours can be saved monthly. At $2.00 per hour, this would mean a savings of about $1700 per year.

6.3 COST OF AUTOMATED SYSTEM

6.3.1 EQUIPMENT COSTS

Figure 6-2 shows estimated equipment costs for the proposed system. Spreading this cost over five years gives an equipment
cost of roughly $4300 per year. Adding $1000 for maintenance brings the total to roughly $5300 per year.

6.3.2 PERSONNEL COSTS

It is estimated that for a developmental period of two to three years, one additional position to handle programming and operating at a salary of about $12,000. After the system is fully operational, this position would reduce to a clerical position with a salary of about $4,000.

6.3.3 SUPPLIES AND ELECTRICITY

Necessary supplies will include plastic charge cards, blank computer paper, and pre-printed charge, credit and statement forms. Not all of the expense for this will be new expense, as sales forms and statement paper already involve a business expense. An estimate of new additional expense for these supplies is $200 yearly.

Figuring an average of 1000 watts for a 60 hour week at two cents per kilowatt-hour, an estimated $60 per year will be required for electricity.

6.4 TOTAL COST

It is estimated that the new system would save about $1700 per year, but would cost an additional $17,560 for the first two to three years and $9560 thereafter, resulting in a difference of $15,860 for the developmental period and $7860 thereafter.
In addition, the system should provide benefits whose value is difficult to measure. Included in this category are collecting interest on overdue accounts, reduction of overdue accounts, more intelligent merchandise buying, fewer customers dissatisfied because of improper inventory, and a reduction in loss of sales due to stock deficiencies.
### Figure 6-1 Time Comparisons

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PRESENT (hrs.)</th>
<th>PROPOSED (hrs.)</th>
<th>DIFFERENCE (hrs.)</th>
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</thead>
<tbody>
<tr>
<td>Bookkeeping</td>
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<td>40</td>
</tr>
<tr>
<td>Posting</td>
<td>50</td>
<td>15</td>
<td>35</td>
</tr>
<tr>
<td>Statements</td>
<td>20</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>Delinquent Accts.</td>
<td>5</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Paying Bills</td>
<td>16</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Inventory</td>
<td>3</td>
<td>24</td>
<td>-21</td>
</tr>
<tr>
<td>Tagging</td>
<td>160</td>
<td>160</td>
<td>0</td>
</tr>
<tr>
<td>Buying</td>
<td>60</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>Payroll</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Store Performance</td>
<td>unknown</td>
<td>$\frac{1}{2}$</td>
<td>$-\frac{1}{2}$</td>
</tr>
<tr>
<td>Employee &quot;</td>
<td>unknown</td>
<td>1</td>
<td>-1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>367</strong></td>
<td><strong>295\frac{1}{2}</strong></td>
<td><strong>71\frac{1}{2}</strong></td>
</tr>
</tbody>
</table>

### Figure 6-2 Hardware Costs

<table>
<thead>
<tr>
<th>ITEM</th>
<th>COST ESTIMATE</th>
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</thead>
<tbody>
<tr>
<td>CPU</td>
<td>$6000</td>
</tr>
<tr>
<td>Bulk Storage</td>
<td>$10,000-$12,000</td>
</tr>
<tr>
<td>Console</td>
<td>$3000</td>
</tr>
<tr>
<td>Rolodex Files</td>
<td>$100</td>
</tr>
<tr>
<td>Plastic Card Embosser</td>
<td>$600</td>
</tr>
<tr>
<td>Tag Printing Machine</td>
<td>$1000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$20,700-$22,700</strong></td>
</tr>
</tbody>
</table>
CHAPTER VII

SUMMARY

In this study, it was found that there were two main areas in which automation could result in an improvement. The first, accounts receivable, is one which currently functions quite well, but is time consuming and could do a better job of being more thorough in debt collection and in adding interest to delinquent accounts. The second, inventory, is a function which has been done mentally in the past and is in need of some improvement.

In addition, several other areas appeared as candidates for automation. Included in this category are business summary evaluations, store evaluations, employee evaluations and payroll.

The cost of the proposed system is well within the allowable five to seven percent of sales figure. It appears that the desired aspects of a computerized system are realizable, and its implementation is recommended.
A MINICOMPUTER SYSTEM FOR THE READY-TO-WEAR RETAILER

by

WAYNE LEROY BRAUN

B.A., Augustana College, 1965

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Computer Science

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1973
This paper is a presentation of a feasibility study of automating a ladies ready-to-wear business with a minicomputer.

The present mode of operation is presented, followed by a proposal for an automated version of the present operation with the inclusion of some additional capabilities. Software is outlined by examining file structure and necessary programs. This is followed by a discussion of the necessary hardware, and a cost justification completes the study.