Equipment Bar Coding Project

Hospital Information Services
The University Of Michigan Medical Center
Ann Arbor, Michigan 48109

Winter 1989

By

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Final Draft

IOE 481 Hospital Management Services
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Note: This Project was undertaken under the sponsorship of IOE 481: Hospital Information Services, Winter 1989.
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Acknowledgements

The project team wishes to acknowledge Kurt Myers and Jim Bigwood for the excellent information, support, direction, and time that they provided us. We would also like to thank Dolorese Umar for her technical expertise and for her guidance during this project. Finally, we wish to extend our appreciation to Dr. Richard Coffey for his critique and suggestions of previous drafts and presentations which helped significantly in completing this project.

Anne Baxter
Mohan Penubarti
Charles Zebell
Executive Summary

During the winter semester of 1989 (Jan - April) an undergraduate Industrial and Operations Engineering student group was assigned to select bar code equipment and implement an electronic inventory system for the University of Michigan's Hospital Information Services department under the sponsorship of Industrial and Operations Engineering Course 481.

Hospital Information Services owns approximately two thousand pieces of computer hardware and peripherals which are located in various medical and administrative units of the University Hospital. In order to identify and keep track of existing equipment, a periodic manual inventory is conducted which is necessary both to identify equipment for depreciation of Capital Assets as well as to update various databases that contain the location and description of equipment. Manual inventory of equipment on such a large scale is both time-consuming and inefficient compared to the capabilities of present-day technology.

To improve both efficiency and accuracy of the inventory, the student group designed and implemented an electronic inventory system -- a mix of bar code scanning and automatic reconciliation of databases. For this system, it was necessary to buy a bar code scanner along with bar code label making software packages costing approximately $4,000.

Under the new system, several identification bar coded labels located on the equipment are scanned by a bar code scanner and this new information is used to update various databases. The newly implemented system significantly enhances both the identification of existing equipment and the recovery of depreciation on Capital Assets.

Anne Baxter
Mohan Penubarti
Charles Zebell

April 1989
Abstract

The primary objective of this project is design and implement an electronic inventory system for Hospital Information Services. The new procedure -- a mix of bar code scanning and automatic reconciliation of databases -- will significantly enhance both the efficiency of conducting inventories and the ease of identifying equipment.

Introduction

Hospital Information Services (HIS) is responsible for the maintenance of more than two thousand pieces of electronic equipment totalling several thousands of dollars. To efficiently manage this quantity of expensive equipment, it is imperative that an accurate method of equipment identification be maintained continuously. Under-utilization of the equipment and lower depreciation recovery of capital assets can result in lieu of an efficient tracking system.

HIS Equipment Identification

Hospital Information Services has computer hardware and peripherals located in various medical and administrative units of the University of Michigan Hospital. All equipment locations are identified by a four digit alpha-numeric code (address) placed in a plastic pocket attached to the HIS device. Each piece of equipment is also identified by a Capital Assets Tag Number and Biomedical Engineering's bar code label. In addition, the bar coded room and building number provide yet another piece of information to locate a particular device.
When equipment is purchased for HIS, all vital identification information is entered into the Capital Assets file; four digit HIS address, the tag number, and a description of the device are entered into the Problem Management file; and the price of equipment and description are entered into the Lotus Price file.¹

**Routine Maintenance**

When a maintenance problem arises with a particular piece of HIS equipment, the user calls the HIS Help Desk to report the problem. The user then identifies the hardware’s four digit alpha-numeric HIS address to the Help Desk operator. The HIS operator then enters this address into the Problem Management file to obtain specifications of the equipment including the make, model type, serial number, and connectivity information. After positive identification of the equipment has been made, the HIS operator enters a description of the problem into the Problem Management file which results in an automatic routing of the problem to the appropriate HIS maintenance unit. To minimize down-time of the equipment, the appropriate HIS unit immediately replaces the damaged equipment with a similar device. The four digit alpha-numeric HIS address on the old device is changed to the new device -- thus maintaining the same address for the location. The Problem Management file is updated with the replaced device tag number (Capital Assets unique equipment identification number) for the HIS address.

**Inventory Control**

HIS conducts periodic inventories of all its equipment. Two basic objectives of conducting these inventories is to keep track of equipment and to identify existing

¹ Information in these files includes, but is not necessarily limited to the above indicators.
equipment for depreciation purposes. Under the current inventory procedure, each piece of equipment is identified by its HIS four digit alpha-numeric address, Capital Assets Tag Number, and the room bar code label. This information is manually recorded and verified with previous information in the Problem Management File. The second objective of the inventory -- to identify existing HIS equipment for depreciation purposes -- is considerably more complex and time consuming. Under the current procedure, to achieve the second objective, one must reconcile the Problem Management file with the Lotus Price file which contains the price and description of the equipment. This file has to subsequently be reconciled with the Capital Assets file which consists the vital information on the equipment such as the Tag Number and the description of the equipment.

The current procedure of manual inventoring and reconciliation of databases is inefficient when compared to present-day bar code scanning capabilities. All of the necessary information can be gathered and automatically reconcile the appropriate databases with far greater accuracy and efficiency. The objective of this project is to design and implement an efficient, time-saving bar-coded inventory system for HIS equipment.

*Modified Inventory Control*

The future inventory procedure of HIS equipment will involve two steps. The first is to bar code all HIS addresses (see Appendix A) and to scan this label, the Capital Assets tag number, Biomedical Engineering bar code label, and the door frame's bar code label. This information will then be used to reconcile the Problem Management file, the Lotus Price file, and the Capital Assets file (see diagram in Appendix B). These two procedures will result in an updated Problem Management file as well as an identification of all existing equipment in the Capital Assets file.
Requirements And Approach

In order to set up the new inventory system, it is essential to transform the present HIS four digit alpha-numeric address into a bar code form as well as to acquire an appropriate bar code scanner and peripheral hardware and software. This section will detail the criteria used in the purchase of hardware and software, and the alternatives examined.

Hardware Requirements And Criteria

A bar code scanner is essential in order to scan the four bar code labels. While the scope of this report precludes a detailed examination into the types and merits of different scanners, a few words, however, are in order.

"Several types of bar code readers are available to the consumer. Hand-held wands using solid-state LED light sources are the most common and least expensive. However, with the continued reduction in cost of laser light source scanners, the quicker input and ability to read an entire label at the same time as opposed to having to scan a label from end to end, makes laser readers more desirable in most situations where the cost isn't an extremely critical factor. When trying to determine the labor cost per item of having a person scan a label with an LED versus a laser scanner, the cost of productivity is usually much less when the person uses a laser scanner."1

Due to the advantages of the non-contact laser scanner indicated above, the clients and the project team decided to opt for non-contact laser scanner. In order to fulfill the requirements of this project, the scanner should must be compatible with the present bar code labels installed by Capital Assets and Biomedical Engineering. Hence, the scanner...

---

1 Society of Manufacturing Engineers (1988). Encyclopedia of Manufacturing, Chapter on Bar Coding.
• Must read Code 3 of 9 format used by Capital Assets and Biomedical Engineering.

• Must be able to read through the thin plastic pocket which contains the HIS four digit alpha-numeric address.

• Must be able to read high, medium, and low density and resolution bar code labels.

• Must be able to read both carbon and non-carbon based labels.

For a complete list of criteria used in the selection of the non-contact laser scanner, please refer to the bar code scanner checklist in Appendix B.

Based on these criteria, several products from different manufacturers were examined. The final two scanners deemed most suitable for the HIS project are listed below in Table #1. The final recommendations are indicated in the following section.

**Table #1**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>INTERMEC</th>
<th>HAND HELD PRODUCTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price (complete package)</td>
<td>Trakker 9444 $2,950</td>
<td>Laser Wand $3,540</td>
</tr>
<tr>
<td>Max. distance can read barcode label</td>
<td>10 inches</td>
<td>10 inches</td>
</tr>
<tr>
<td>Memory</td>
<td>64K (45K available for storage)</td>
<td>128K (100K available for storage)</td>
</tr>
<tr>
<td>Programming language</td>
<td>PC-IRL (Menu driven, with simulation capability)</td>
<td>UDL (Pascal like language, line by line programming)</td>
</tr>
<tr>
<td>Weight</td>
<td>24 oz.</td>
<td>17 oz.</td>
</tr>
<tr>
<td>Keypad Flexibility</td>
<td>Easier to use than Laser Wand (no shifting to get letters or #)</td>
<td>Immediate</td>
</tr>
<tr>
<td>Delivery</td>
<td>2-4 weeks</td>
<td>Rechargable batteries</td>
</tr>
<tr>
<td>Number of Units</td>
<td>one</td>
<td>one</td>
</tr>
<tr>
<td>Support Services</td>
<td>For a Fee</td>
<td>10 day turnaround</td>
</tr>
<tr>
<td>Good scan beep?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Comments</td>
<td>Will give on-site demo; forerunner in business; reputable dealer</td>
<td>Programming could be tedious; compact design; located in North Carolina; no demonstration available</td>
</tr>
</tbody>
</table>
Hardware And Software Recommendations

Based on the information acquired from the manufacturers, consumer reports, demonstrations, and client preferences, the project team has recommended the following hardware and software packages. These were approved and subsequently purchased. For a detailed listing of the specifications for these models, see Appendices B and C.

- Intermec 9440 Trakker® Bar Code Scanner¹
- W.H. Brady Bar Code® Software

Procedures For Implementation

Upon acquisition of the Intermec non-contact bar code scanner and the Brady label making software package, the following steps need to be performed in order to implement the objectives of the improved inventory system.

Software Implementation

Bar Coding Of HIS Address

- HIS four digit alpha-numeric address is presently not bar coded. In order for the scanner to read this label, this address needs to be bar coded. The software package purchased to accomplish this task is Brady Bar Code Software™. The software package is user-friendly and menu driven. Custom format labels can be produced using this software

¹ Although Trakker 9444 was recommended initially, upon an on-site demonstration it was decided that Trakker 9440 was better suited for HIS needs and the recommendation was revised.
and Hewlett-Packard LaserJet®. For more information, please refer to the software manual.

- The specifications of the HIS bar coded address are listed in Appendix A. Presently, the HIS address in the non-bar coded form is inserted in a plastic pocket at the front of the equipment. This procedure will be retained for the bar coded HIS address. In order to print the bar coded labels, it is necessary to acquire appropriate perforated paper. It was decided that the HIS address should be as conspicuous as possible for easy identification and hence perforated Yellow Astrobrite card stock was purchased from Great Copy in Ann Arbor.¹

**Hardware Implementation**

- **Programming Of Bar Code Scanner**
  - The bar code scanner has to be programmed in order to read the bar code labels in the desired format. Once programmed, the scanner can read the bar code labels in the desired sequence and then upload the stored information into the appropriate Mainframe file. The appropriate databases could subsequently be reconciled. For more information on the programming of the scanner, please refer to the Intermec™ PC-IRL Manual.

**Computer Programming**

- **Computer Programs To Reconcile Databases**
  - Once the software and the hardware have been set up to produce custom HIS address labels and scan and store them respectively, a series of computer command files need to be written to read and reconcile various databases. The primary databases that need

¹ For more information, see *Future Support Services for Scanner and Software*. 
to be updated with the new inventory information are the Problem Management file, the Lotus Price file, and the Capital Assets file.

Once the above steps have been implemented, Hospital Information Services should have a far superior inventory and equipment tracking system.
Future Support Services For Scanner And Software

Manufacturer Support

- Intermec Bar Code Scanner
  Manufacturer: Intermec Inc.
  27650 Franklin Road
  Southfield, Michigan 48034
  (313) 352-9300
  Contact Agent: Eric Freeburg
  (313) 352-9300
  Support: 1 year return to depot warranty
  Customer service contract options available for a fee
  for repair call customer service dept. @ (313) 352-9300

- Brady Bar Code Software
  Manufacturer: W.H. Brady Co.
  Distributor: McNaughton–McKay Electric Co.
  3756 Plaza Drive
  Ann Arbor, MI 48108
  Contact Agent: John Mc Callion
  Support: Customer Hotline: 1 (800) 537-8791

- Perforated Card Stock For HIS Bar Code Labels
  Manufacturer: Great Copy Paper
  110 E. Washington
  Ann Arbor, Michigan 48104
  (313) 994-0222
  Contact Agent: Bill Ternes
Project Team Support

You may contact the project team members should any questions arise at the following addresses for at least a period of one year.

- Anne Baxter
  95 Lenox Ave.
  Lynbrook, NY 11563
  (516) 593-9841

- Mohan Penubarti
  536 South Forest, #1809
  Ann Arbor, Michigan 48104
  (313) 663-7285

- Charles Zebell
  1695 Broadway #104
  Ann Arbor, MI 48105
  (313) 769-4843
APPENDICES
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ranking</strong></td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>NONE</td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td>$2,950</td>
<td>$3,500</td>
<td>$3,540</td>
<td>$3,400</td>
<td>$3,700</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Working Range</strong></td>
<td>10 inches</td>
<td>24 inches, 45 deg.</td>
<td>10 inches</td>
<td>25 inches</td>
<td>12-15 inches</td>
<td>18 inches</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>24 oz.</td>
<td>2.7 lb.</td>
<td>17 oz.</td>
<td>16 oz.</td>
<td>&gt; 3 lbs.</td>
<td>34 oz for both</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>64 K:14K to turn on, 5K for program (45K available)</td>
<td>42 K</td>
<td>128 K</td>
<td>48 K: 24K for program, 24K</td>
<td>≤ 1 MB RAM</td>
<td>64 K</td>
</tr>
<tr>
<td><strong>Programming Language</strong></td>
<td>Memi Driven (Keypad/PC)</td>
<td>Interactive (Keyboard)</td>
<td>UDL Must Program</td>
<td>Menu Driven</td>
<td>TCAL: Telxon Common App. Program. Lang.</td>
<td>UBASIC-similar to basic/ prog. on PC</td>
</tr>
<tr>
<td><strong>Keypad Flexibility</strong></td>
<td>Rank: 1</td>
<td>Rank: 2</td>
<td>Rank: 3</td>
<td>Rank: 4</td>
<td>Rank: 5</td>
<td>Rank: none</td>
</tr>
<tr>
<td><strong>Delivery</strong></td>
<td>2-4 Weeks</td>
<td>2 Weeks</td>
<td>Immediate Delivery</td>
<td>30 Days Maximum</td>
<td>4 weeks</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Power Supply</strong></td>
<td>Battery/Rechargeable</td>
<td>Battery/Rechargeable</td>
<td>NiCad Battery</td>
<td>Battery/Rechargeable</td>
<td>Battery Recharg.</td>
<td>Battery Recharg.</td>
</tr>
<tr>
<td><strong># Of Units</strong></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Support Services</strong></td>
<td>For A Fee</td>
<td>10 Days Support</td>
<td>None</td>
<td>User Hotline</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Scan (Beep)</strong></td>
<td>Yes (Beeps For Good Scan)</td>
<td>No (Visual Indication)</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Comments</strong></td>
<td>Will Give On-Site Demo; Bulky; Helium-Neon Laser; Former Name In Business; Reputable</td>
<td>Bulky; Must Program; Immediate Delivery; Very Convenient Compact</td>
<td>Larger Working Range</td>
<td>Larger Work. Range; Less Bulky; Inflexible Keypad</td>
<td>Bulky/ Heavy 2 piece unit</td>
<td>Sales rep. was difficult to contact and did not send our requested info.</td>
</tr>
</tbody>
</table>

APPENDIX B: BAR CODE SCANNER CHECKLIST
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Black Box</th>
<th>FormMaker</th>
<th>InterMac+</th>
<th>Computype</th>
<th>Burr Brown</th>
<th>Weber+</th>
<th>Computype +</th>
<th>Butterfield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranking</td>
<td>4</td>
<td>2*</td>
<td>A</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Horizontal Reading</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Code 39</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Custom Labels (Contract)</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (only)</td>
</tr>
<tr>
<td>Print On LaserJet II</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Menu Driven</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Flexible Label Formatting</td>
<td>No</td>
<td>Yes</td>
<td>n/a</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>Support Services</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>$495</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Comments</td>
<td>Very Difficult To Program; Menu Driven</td>
<td>Menu Driven; Package Easy To Implement</td>
<td>Must Purchase Printer; No Software for HP LaserJet</td>
<td>Portable Thermal Printer. Software Not Compatible With HP</td>
<td>Must purchase hardware to print the labels</td>
<td>Vendor for printed labels only *Delivery time too long</td>
<td>Not an on-site label making vendor</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: * THE VENDOR'S MATERIAL IS NOT SUITABLE FOR OUR NEEDS  
+ HARDWARE MUST BE PURCHASED TO PRINT LABELS
MEMORANDUM

TO: Will Penpraze  
    Senior Buyer, Purchasing

FROM: Kurt C. Myers  
    Assistant Director, Operations

DATE: March 20, 1989

SUBJECT: BARCODE SCANNING EQUIPMENT.

Dr Coffey has provided three Management System Students for a semester project ending in April, to evaluate and recommend hardware and software to record the BAR CODE information for HIS to keep track of their equipment for maintenance and inventory purposes. Using the BAR CODE data, the student are to write SAS programs to reconcile this data with HIS data bases.

HIS is submitting these purchase requisitions for obtaining the scanning equipment and software for printing the device labels. The scanning device will be used to read the BAR CODES on the room's door jam and on the equipment. The scanning device will allow for keying in additional information.

The following are the scanning devices which were reviewed by the students:

<table>
<thead>
<tr>
<th>VENDOR</th>
<th>DEVICE</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERMEC</td>
<td>TRAKKER 9444</td>
<td>$3,156</td>
</tr>
<tr>
<td>BURR BROWN</td>
<td>TM 8465/8500</td>
<td>$3,500</td>
</tr>
<tr>
<td>HAND HELD PROD</td>
<td>INFRARED LASER</td>
<td>$3,540</td>
</tr>
<tr>
<td>LOWRY</td>
<td>LS 7000 II LASER</td>
<td>$3,400</td>
</tr>
</tbody>
</table>

The INTERMEC TRAKKER 9444 was selected as best fitting our requirements with respect to ease of programming, keypad layout, and being compact. The scanning equipment will read various formats of BAR CODES. This device is available only through the Intermec office in Southfield.

The other part of this proposal is the software needed to print the BAR CODED labels to be placed on the equipment. The label will have the BAR CODE, identification field, along with other printed information. This software will run on the current PCs and laser printers.
The following are the software packages reviewed:

<table>
<thead>
<tr>
<th>VENDOR</th>
<th>COMMENTS</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERMEC</td>
<td>Software not compatible on HP Laser Jet II Printer</td>
<td>$***</td>
</tr>
<tr>
<td>BLACK BOX</td>
<td>Very difficult programming</td>
<td>$305</td>
</tr>
<tr>
<td>BRADY</td>
<td>Menu driven, easy to program and implement.</td>
<td>$595</td>
</tr>
<tr>
<td></td>
<td>Money back guarantee.</td>
<td></td>
</tr>
<tr>
<td>BURR BROWN</td>
<td>Software not compatible on HP Laser Jet II Printer</td>
<td>$***</td>
</tr>
<tr>
<td>FOREMAKER</td>
<td>Menu driven, easy to program and implement.</td>
<td>$495</td>
</tr>
<tr>
<td></td>
<td>No money back guarantee.</td>
<td></td>
</tr>
</tbody>
</table>

BRADY BAR CODE software was selected due to ease of use, providing flexible display formats and can operated on the current equipment. The software is available through their Ann Arbor office.

This system would be applicable for use by other departments.

Please call if you need additional information.
Dear Mr. Freeburg:

This is a letter of intent to purchase the following Intermec equipment:

<table>
<thead>
<tr>
<th>Item Code</th>
<th>Description</th>
<th>Quantity</th>
<th>Original Price</th>
<th>Discounted Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>9440A0101</td>
<td>TRAKKER CODE 39 W/NICAD PACK AND 64K RAM</td>
<td>1</td>
<td>$1339</td>
<td>$1004.25</td>
</tr>
<tr>
<td>1620A</td>
<td>LASER SCANNER</td>
<td>1</td>
<td>$1395</td>
<td>$1046.25</td>
</tr>
<tr>
<td>40D001</td>
<td>40D COMM. DOCK</td>
<td>1</td>
<td>$200.00</td>
<td></td>
</tr>
<tr>
<td>40LM01</td>
<td>LASER INTERFACE MODULE</td>
<td>1</td>
<td>$140.00</td>
<td></td>
</tr>
<tr>
<td>048668</td>
<td>25-25 PIN 7-WIRE 6' CABLE TO PC</td>
<td>1</td>
<td>$60.00</td>
<td></td>
</tr>
<tr>
<td>049461</td>
<td>CARRYING CASE FOR 9440 WITH LM</td>
<td>1</td>
<td>$50.00</td>
<td></td>
</tr>
<tr>
<td>042684</td>
<td>120 VAC 50/60HZ AC ADAPTER/POWERPACK</td>
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<td>$30.00</td>
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<td>IRL VERSION 2.1 PROG. REF. MANUAL</td>
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<td>049268</td>
<td>COMMUNICATIONS DESK MANUAL</td>
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**TOTAL** $3155.50

A Requistition #137240 is being submitted to purchasing which will take three weeks for processing.

All equipment includes a one year warranty.

We would like to take delivery of the equipment for a thirty (30) day test period as soon as possible.

Sincerely,

Kurt C. Myers  
Asst. Director  
Operations
Dear Mr. McCallion,

This is a letter of intent to purchase the Brady Bar Code Software which is priced at $595.00. A requisition #137244 is being submitted to Purchasing which will take three weeks for processing.

We would like to take delivery of this software for a thirty (30) day test period as soon as possible.

Sincerely,

Kurt C. Myers
Asst. Director
Operations

KCM/mlg
APPENDIX F:

HIS BAR CODING PROJECT

3 REQUIRED SAS PROGRAMS

1. BAR CODE INFORMATION
   CAPITAL ASSETS DATA
   SAS #1

2. BAR CODE INFORMATION
   PROBLEM MGMT. FILE
   SAS #2

3. BAR CODE INFORMATION
   LOTUS PRICE FILE AND TAG #
   SAS #3