Draft Beer Product and Equipment Control System for Boon Rawd Brewery Co., Ltd.

By

Ms. Dokmai Pinthong

Final Report of the Three - Credit Course
CS 6998 System Development Project

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer Information Systems
Assumption University

Novemer, 1998

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Project Title	:	Draft Beer Product and Equipment Control System For Boon Rawd Brewery Co.,Ltd. *The tittle has been changed according to the final approval the committees
Name	:	Ms.Dokmai Pinthong
Project Advisor	:	Dr.Suphamit Chittayasothorn
Academic Year	:	1998

The Graduate School of Assumption University had approved this final report of the three-credit course, CS 6998 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.

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ABSTRACT

The Draft Beer Product and Equipment Control System was developed to improve the existing function for three departments such as Transportation. Production and Store Department at Boon Rawd Brewery Co., Ltd. Presently all functions are operated manually. This could not produce timely and accurate data.

The proposed System was designed to help improving manual operation. The tools of structured analysis such as Context Diagram, Data Flow Diagram, and Data Dictionary are used for the analyses phase. The detailed design is carried out through file design, software design, screen design and report design.

The new system is designed on PC LAN network system that will share all the database to support all of the operations. Using Oracle Developer did programming. It can help to reduce the operation costs and time consuming procedures, and increase the efficiency and accuracy of the data.

ACKNOWLEDGEMENTS

This project was successfully completed with supports from several people. The author would like to acknowledge their efforts that contribution to this project.

The author wishes to express her sincere appreciation and gratitude to her project advisor, Dr. Supamit Chittayasothorn for his valuable advice, suggestions and continuous encouragement throughout the development of this project. She would also like to extend her thanks to the project committee members of Graduate of Computer Information System at Assumption University for their advice.

Furthermore, She is also appreciative of her boss, Mr. Chutinant Bhirombhakdi for his kindness in supporting her in everway.

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I. INTRODUCTION

1.1 Background of Project

At present, Draft Beer increases the production to serve the customer's demand in the market. So the equipment must be increased to serve the production need. The existing system is operated manually, and is not suitable for controlling equipment and does not update information in the decision making process of the manager.

The new system will control equipment by using bar code for each equipment. When user uses hand held equipment to read bar code, then import data and convert them into the computerized system, the other users can use this data immediately for generating report or inquiry on the screen. This system will avoid the redundancy of data, duplication of the data entry. The system is not complicated to operate.

The new system is designed to support all the expectations and requirements of the manager and user will give the up-to-date information for better decision-making and better service for the customer.

1.2 Objective of Project

The objectives of the project are as follows:

1. To study the existing system, analyze, design and develop it with available hardware configurations, which will improve efficiency and effectiveness of the system.
2. To resolve the requirement of manager and employer to improve their ability to work and also the solutions to improve the operation of the company.
3. To design a new system to solve problems of the existing system and improve the operation routines.
4. To reduce the time in handling paper work
5. To decrease the amount of employee time to complete a specific task
6. To reduce the paper work and time in managing data
7. To increase the speed of processing
8. To integrate relevant information, reduce errors and improve the accuracy of data.
9. To provide security and internal control processing system
10. To provide the management with timely, meaningful and reliable information in the decision making for planing and controlling.
11. To maintain a good business image

1.3 Scope of the Project

The project will analyse the existing system which is manual and has many problems. So the proposed system is designed to find the solutions which include:

1. Recording the detail of basic information for the system consisting of
   - Department of Container
   - Users such as the officer of the factory, the drivers, the executive, distributor, etc.
   - Determination of authorization of user
   - Province, Amphur
   - The type of customer such as factory, refrigerated truck, branch and distributor
   - Name, address and detail of factory, branch, and customer or distributor
   - The type of customer, Name, address, and the detail of customer or distributor
   - The type of the container and the detail of each container

2. Container Movement System including the status of Container in each process.
   - Receiving Beer Tank and the equipment of containers
   - Container
   - Distribution of Beer and the accessories of container
   - Repair & Maintenance Beer Tank and the equipment of container
   - Return of Beer Tank that cannot be distributed
   - Expire date of Beer Tank and the equipment of container

3. Determining Code and Printing Bar Code System consist of

- Print bar code of beer tank and the equipment of container
- Print bar code of customer and distributor

4. Transferring the data from Bar Code Reader to computer network of central program

- Can determine the code of bar code including automatic or manual and printing the bar code on label
- Can record, revise and cancel the data in the system using 2 methods

1) User reads the data by using Bar Code Reader and the program receives the data from the Bar Code Reader in order to bring the data to process in the next step

2) User inputs the code of the data that is processed directly from the program

5. Management of Containing Products System includes Printing Report System

1) Conclusion of the status of container for each type of report, consisting of

- The type of containers
- The outstanding quantity in stock
- The quantity of usage containers
- The quantity of outstanding containers
- The average age of containers

2) Detail of container report

- The type of container
- Address of Last container (Factory, branch, customer or distributor)

- The age of container
- Last status of container (damage, usage, etc.)

3) Report of Branch, Daily customer or distributor
   - Name of branch, address of customer or distributor
4) Receiving the containers report
5) Return the containers report
6) Container report
7) Repeat the container report
8) Distribution of the container report
9) Slow moving of the container report
10) Damage of the container report

II. EXISTING SYSTEM

2.1 Background of the Company

The Boon Rawd Brewery Co., Ltd is the first Thai-owned brewery, established by Phraya Bhiromphakdi since 1993. The company is the owner of "Singha" brand of the local beer. The firm has manufactured many kinds of products and tastes such as Light Beer, Draft Beer, Gold Beer, Soda and Drinking water.

Nowadays the company has seven branches in Pratumthani, Wangnoi, Chiangmai, Khonkaen, Pitsanulok and Surathani and more than three hundred distributors in many provinces in Thailand. The last product for Singha brand is Draft Beer Tank and expended centers for distributing to urban areas. Nowadays it has 20 centers and will increase more soon. So the firm finds a way to support for the growth.

Recently, the company has produced the new brand named "Leo" to the market and it is becoming popular.

The Organization Chart in Figure 2.1 shows parts of the company are concerning with the department of Draft Beer Tank product. There are three departments, which consist of

1. Store Department
2. Production Department
3. Transportation Department

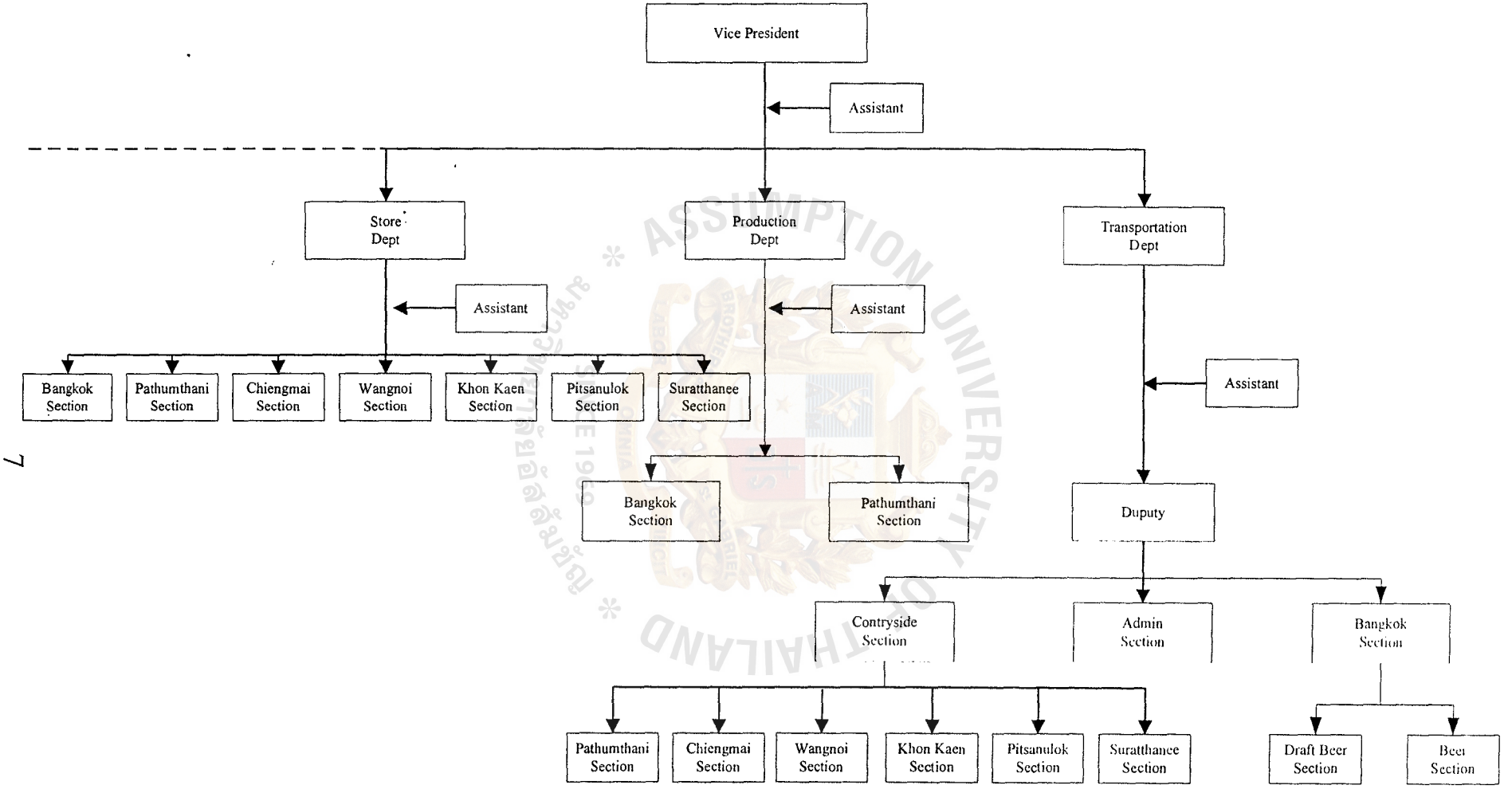

Figure 2.1. Organization Chart of Boon Rawd Brewery Co.,Ltd.

2.2 Analysis of Existing System

There are six main functions for related departments and each department is operated manually. The detail operation is shown in Figure 2.2

1. **Production of finished goods**: This function is operated by The Production Department. When they had already produced the finished goods, they will send them to the Store Department. A record of the quantities of production is made in the workbook. At the same time. the Store Department must record it also.
2. **Issuing finished goods and equipment**: The Store has issued goods and equipment to the Transportation Department for delivery to customers or centers. Both departments must record this in their books.
3. **Receiving goods and equipment**: The Store records receipt of goods from the Production Department, and at the same time the Transportation Department must record receipt of goods from the Store Department too.
4. **Service of maintenance**: The Store Department for maintaining the damaged equipment.
5. **Goods Return**: Transportation receive goods returned from customer or center and then ship them to the Store Department for storage
6. **Expire of Equipment**: The Store Department must operate this function to check equipment expired then separate it.

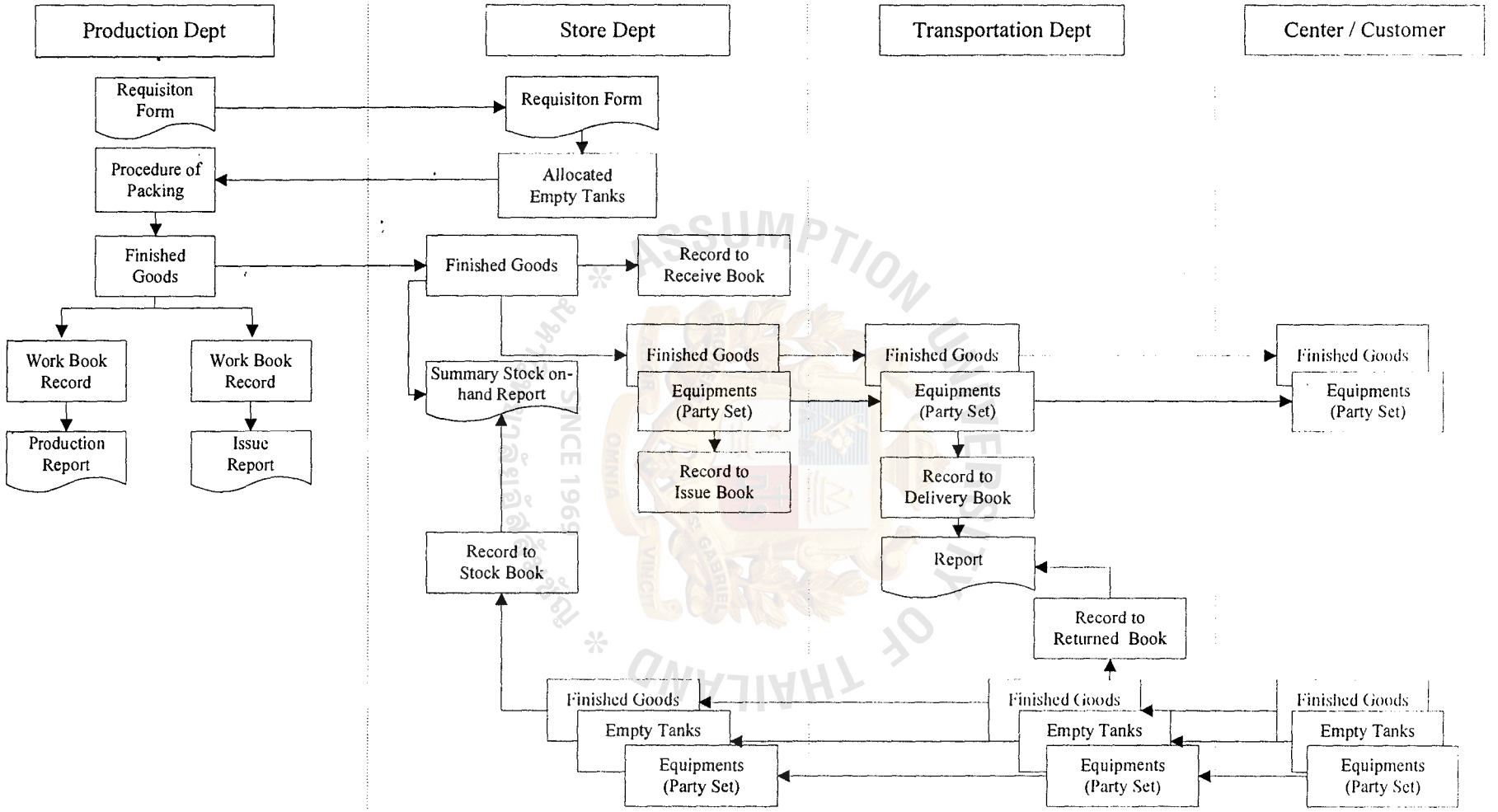

Figure 2.2. Work Flow of the Existing System (Manual)

2.3 Current Problems

From the survey of the existing system, we found that there are many problems that occurred in each operation and we can specify them as follows:

1. Time consuming recording of transaction in the workbook for each department thus duplicating jobs between departments
2. User must summarize the data from the workbook, and then put the entry to the spreadsheet for creating report, at the end of the day.
3. Difficulty in creating management report on time.
4. The lack of employee to work during best sale.
5. Difficulty in checking the expire date of equipment
6. Difficulty in checking the status of equipment, whether it is with customer or the Maintenance etc.
7. The loss of equipment can not be controlled.
8. The report between departments may not be consistent or reliable

2.4 Areas for Improvements

Improvements to systems can be verified by the changes that will result in incremental or worthwhile benefits. For the Draft Beer Product and Equipment Control system, there are many possibilities to improve. These are include:

1. Speeding up the processes.
2. Streamlining a process through elimination of duplicated steps.
3. Combining processes
4. Reducing errors in input
5. Reducing redundancy of output
6. Reducing the staff workload by using the computer system
7. Improving staff satisfaction with the computer system
8. Improving ease of the staff interaction with the customer
9. Improving in Product and Equipment Control
10. Keeping the statistical data for making the report

III. PROPOSED SYSTEM

3.1 User Requirements

The requirements of the new system are as follows:

1. The user wants to control beer tanks on hand of customer and center because the cost of beer tank is very high and the company does not request deposit from customers.
2. The benefit of the usage of beer tank is effectively related to the cost and the flow of beer tank.
3. The Production Department can know whether the quantity of the beer tanks is sufficient or not. If not, the production will call the Transportation to keep the tank from the customer and center.
4. The company wants to know the status of tank and equipment such as where it is now, whether it is good or damaged or waiting for maintenance.
5. The quantities of return, issue, receive, manufacturing of draft beer.
6. The outstanding balance of finished goods, empty tank and equipment.
7. The standard forms for keeping records input and output.
8. The systems are user-friendly for user at all level and easy to make inquiry.
9. Provide data consistency, data accuracy and on-line processing system.
10. Prepare various reports used for decision making.

3.2 System Design

3.2.1 Database Design

Database Design

The objectives in the design of data storage are as follows:

1. The data has to be available when the user wants to use it.
2. The data must be accurate and consistent (it must have integrity).
3. It is necessary for the information retrieval to be purposeful.

Databases are not merely collections of files. Instead, a database is a central source of data meant to be shared by many users for a variety of applications.

The heart of a database

The DBMS (database management system), allows the creation, modification, and updating of the database; the retrieval of data; and the generation of the report.

Good Characteristics of Database System

1. Minimum Redundancy
2. Maximum Integrity
3. Logical Centralized Control
4. High Degree of Data Independence
5. High degree of Security

Normalization

Normalization is the approach to good relational database design. The concept is to decompose a relation to a number of smaller relations by using functional dependencies:

- Decompose all data groups into two - dimensional records.
- Eliminate any relationships in which data elements do not fully depend on the primary key of the record
- Eliminate any relationships that contain transitive dependencies

1NF

A Relation is in 1NF if and only if every attribute in every row can contain only one value (No repeating group of attribute values).

2NF

A Relation is in 2NF if and only if it is in 1NF and every non-key attribute is fully on the primary key.

3NF

A Relation is in 3NF if and only if it is in 2NF and no non-key attribute is "Transitively Dependent" on the primary

BCNF

A Relation is in BCNF if and only if every determinant is a candidate key.

4NF

A Relation is in 4NF if and only if, whenever there is a MVD (Multivalued Dependency) on a determinant, all attributes are functionally dependent on the determinant.

5NF

A Relation is in 5NF if it cannot be spit into smaller relation and then rejoined without changing its facts and meanings.

The result of normalization is shown in the Tables in Appendix G and the relationship between the Tables is represented by E-R diagram in Appendix C

3.2.2 Input Design

1. Makes forms easy to fill in and screen very simple
2. Ensures that forms meet the purposes for which they are designed
3. Design forms to assure accurate completion.
4. The forms are attractive.

More details can be seen in Appendix E

3.2.3 Output Design

1. There are several objectives, these are as follows:
2. Designs output to serve the intended purpose
3. Designs output suitable for the user
4. Assures that output is where it is needed
5. Provides the output on time
6. Format is beautiful and ease to use

The description of all output can represented in Appendix G

3.3 Hardware and Software Requirements

3.3.1. Hardware Requirements

The proposed system is prepared for a more effective performance in the near future. All hardwares are listed below:

1. File Server 1 Unit

- HP NETSERVER LH PRO
- Pentium 200 MHz, RAM 64 MB
- HDD 6.0 GB , 8x CD-ROM
- HP Mouse & Keyboard
- 10/100 LAN Card Installed

2. PC Workstation 7 Units

- HP VECTRA VL5
- Pentium 133 MHz, RAM 16 MB
- 1.6 GB HDD
- HP Mouse & Keyboard
- 10/100 LAN Card Installed

3. Printer 7 Units

- NEC P8000, 24 Pins

4. Bar Code Reader 30 Units

5. Bar Code Label Printer 4 Units

6. UPS 6 Units

- EXIDE UPS 5.5 KVA

  Backup time 30 mins

7. Network Peripherals

- IBM 2210 Router 2 WAN, 1 LAN 1 Unit

- IBM 8222 Hub 10, 8 Ports

8. Wiring Job 7 Points

- UTP Cable
- RJ-45 Connector

3.3.2. Software Requirements

All software are used in the new system as listed below:

1) Windows 95 Thai Edition
2) Oracle Database and development tools
3) Window NT server for Network Operation System
4) Microsoft SQL

Software tools that are used in developing the system

The tools help in developing the application program which consumes a short time, is more efficient, easy to use, and easy for improvement in the future.

1. Oracle developer enterprise is the software that is used in the development of user interface.
   - It is the development of client server by using programs which will manage the main database that are kept on the file server and pull the data from the file server to execute on many clients including other servers in the same time. The efficiency of the system performance are not reduced according to the number of users, the speed is the same as the user on standalone.
   - To write the program, which is easy to understand, learn, and is feasible. It can solve the program in the short time and easy improved.

- To help in creating the report in different shapes such as Statistics Table, Label, Graph etc.
- When the program is already developed, it can do setup disk for easy installation in distributed applications by not wasting runtime value.

2. Microsoft SQL Server for Windows NT is the large Database Management System and suitable for distributed database which needs reliability and security during update times

3.4 DATA COMMUNICATION AND NETWORK

The new system is designed to use the Local Area Network (LAN) by the computers are linked together via UTP cable and 3Com Card Access for client. The layout of the network is shown in Figure 3.1

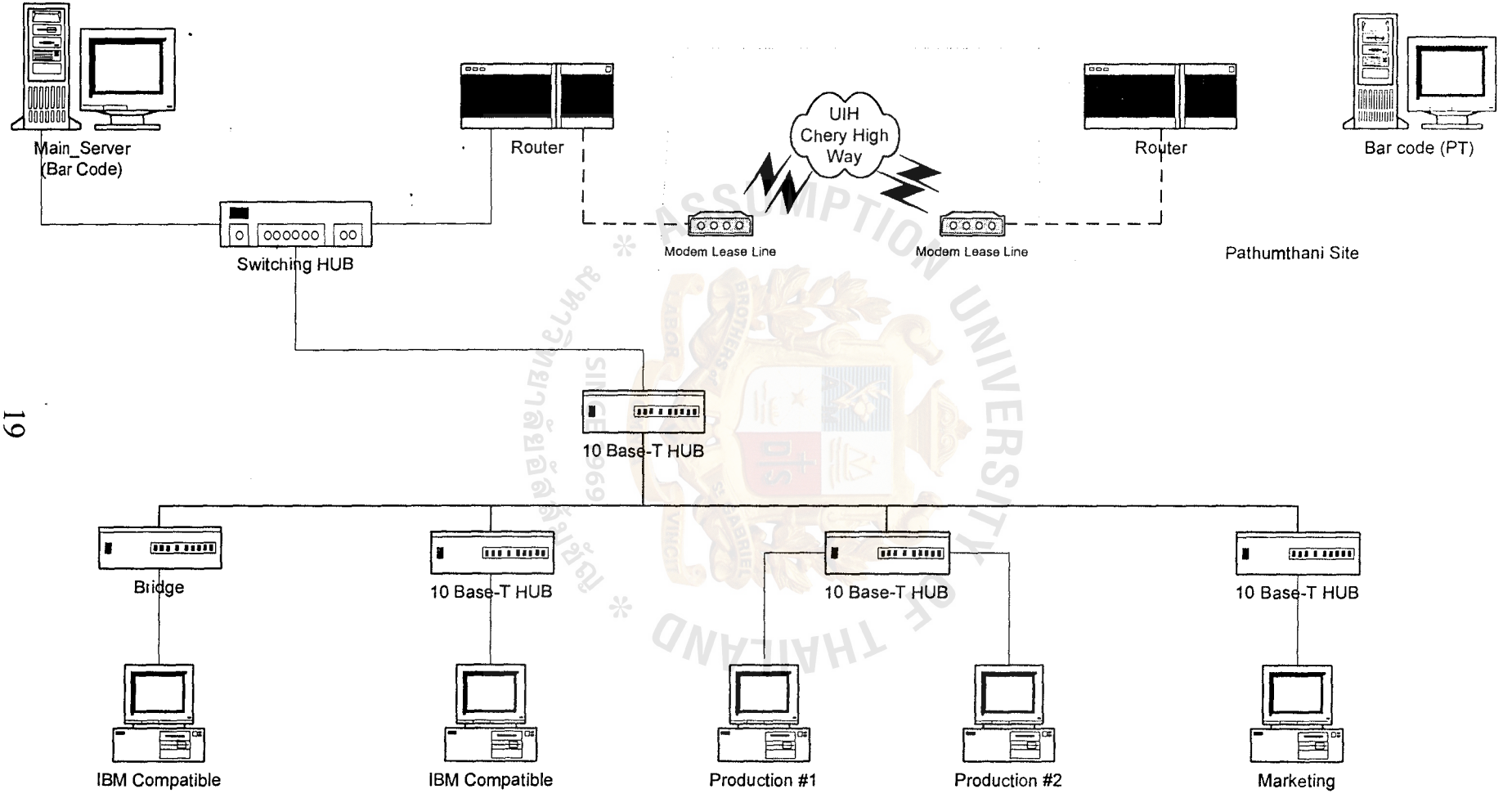

Figure 3.1. Network Configuration For the Proposed System

3.5 Security and Control

Security and Control is very important when a computer-based information system is involved. For this system, there are many security and controls approaches. These are as follows:

1. To Protect from unauthorized access.
   - Used Log-in Name and Password before entering the system
2. To assure the right function for each level users.
   - Setting menu for each user to log into the system depending on related function tasks.
3. To prevent the error or accident that may destroy the files.
   - Backup process is necessary and using to recovery any destroyed or error on files
4. To provide the report for checking accuracy of data and assure data completeness

3.5.1 The Collection of the distributed data in each factory

1. After closing the sale amount, computer of Bangkabue factory will be the main in collection of the data from other factory in order to retrieve the transaction of product of Pratumtanee factory. It will use the technique that call Remote Access data and execute all the data, update the accurate date to Pratumtanee factory at the same time.
2. After finished the process of the collection of data, Computer of Bangkabue factory will send complete message to the screen server of other factories. Each factories will know the status of the own product and issuing the reports such as.

- the quantity of product that can be used
- the quantity of accrued product
- the average age of the product
- the address of last product (factory, branch, customer or distributor unit)
- the transactions, quantity in branch, customer or distributor unit
- the last status of the product (damaged, in use, etc)
- Returned product report
- Slow moving of product report

3.6 Cost and Benefit Analysis

3.6.1 Cost Analysis

There are two major types of costs. Firstly, the startup cost includes Hardware, software and Network peripherals as shown on page 22:

Description	Unit Price	Qty	Total
File Server	151,000	1	-
- HP NETSERVER LH PRO			
- RAID - 5 6.0 GB HDD, 8x CD-ROM			
- HP Mouse & Keyboard			
- 10/100 LAN Card Installed			
PC Workstation	32,000	7	254,000
- HP VECTRA VL5			
- Pentium 133 MHz, RAM 16 Mb			
- 1.6 GB HDD			
- HP Mouse & Keyboard			
- 10/100 LAN Card Installed			
Printer	29,500	6	177,000
- NEC P8000, 24 Pins			
UPS	-	1	-
- EXIDE UPS 5.5 KVA			
Backup time 30 mins			
Network Peripherals	-	-	-
- IBM 2210 Router 2 WAN, 1 LAN			
- IBM 8222 Hub 10, 8 Ports			
Bar Code Peripherals			
Bar Code Reader (Hand Held)	130,000	10	1,300,000
Bar Code Reader (small)	60,000	20	1,200,000
Bar Code Label Printer	20,000	2	40,000
			10,000
Wiring Job			
- UTP Cable		-	
- RJ-45 Connector		4	
Grand Total			2,981,000

Figure 3.2. Cost Analysis

In Figure 3.2, some equipment does not show value because the propose developed is based on the current equipment to save the investment cost.

Secondly, the ongoing cost includes maintenance staff. System Maintenance, backup system, training cost, cost of supplies and utilities, An extra cost would incur any upgrading to the equipment to insure compatibility.

Labor reduction saving would not be a cost-saving ideal for any companies. However, the major benefits are through the accuracy, timeliness and accessibility of information provided by this proposed system. These benefits are in the form of intangible benefits

3.6.2 Benefit Analysis

Benefit analysis is used to evaluate the proposed system for the decision whether to continue or not. The benefit can be separated into two viewpoints as follows:

Intangible Benefits are the benefits that are hard but not impossible to determine as monetary value. These benefits are:

1. Maintaining a good business image.
2. Becoming more competitive in customer service.
3. Enhancing accuracy of data.
4. Increasing job satisfaction for employees by elimination tedious tasks.
5. Smoothing of operation.
6. Improving the decision-making process.
7. Providing fast report for ad-hoc meeting.
8. Reducing data entry and collection time.
9. Improving Management Planning, Controlling and better selection plan.
10. Providing better communication between management and staffs.

Tangible Benefits are the benefits that can be determined in monetary value. In this case, the saving between operating costs of the current system and the proposed system can be calculated as follows:

- Reduction of the working hours (30 persons)	180,000
- Reduction of the paper work	30,000
- Reduce the area for keeping paper	24,000
- Reduce the utilities cost (air, electric, etc.)	120,000
- Reduce the cost of Beer Tank and Equipment	1,000,000
- Reduce the lost of income (can delivery on time)	540,000
Approximate annual saving	1,894000

3.6.3 Cost/Benefit Analysis

Payback Period

The Payback period method determines the length of time of operation that the proposed system needs to pay back the cost of investing before it is profitable. The payback period formula is shown as follows:

P	=	I/((1-T)R)
I	=	Investment Cost
	=	Bht 2,981,000
T	=	Tax (Corporate tax in percent)
	=	30%
R	=	Annual Saving realized by investment
	=	Bht 1,894,000

= 2.981,000 /((1-0.3) 1.894.000)

Payback Period = 2.25 years

Table 3.1 shows the costing of manual system and computerized system. The investment of computerized system in the first year is higher than the investment of the manual system but in the long term the total cost, after a few years of the computerized system is lower than the cost of the manual system.

Table 3.1. Cost Comparison between the Computerized and the Manual System

List of Requirements	1998	1999	2000	2001
Manual				
Personel Computer (6 units)	240,000	288,000	345,600	414,720
Software Cost	100,000	120,000	144,000	172,800
Printer (3 Units)	240,000	288,000	345,600	414,720
Paper (20 % increase)	100,000	120,000	144,000	165,600
Cabinet & Area	80,000	96,000	115,200	138,240
OT (Avg 10%)	300,000	330,000	353,100	377,817
Utilities Costs	120,000	132,000	145,200	159,720
Other Expense	30,000	31,500	34,650	36,383
Total Cost	1,210,000	1,405,500	1,627,350	1,880,000
Commulative Cost	1,210,000	2,615,500	4,242,850	6,122,850
Computerize				
Hardware/Software Cost and Related	2,981,000	-	-	-
Maintenance Cost		30,000	30,000	30,000
Utilities Costs	60,000	63,000	66,150	69,458
Other expense	20,000	21,000	22,050	23,153
Total Cost	3,041,000	114,000	118,200	122,610
Commulative Cost	3,061,000	3,175,000	3,293,200	3,415,810

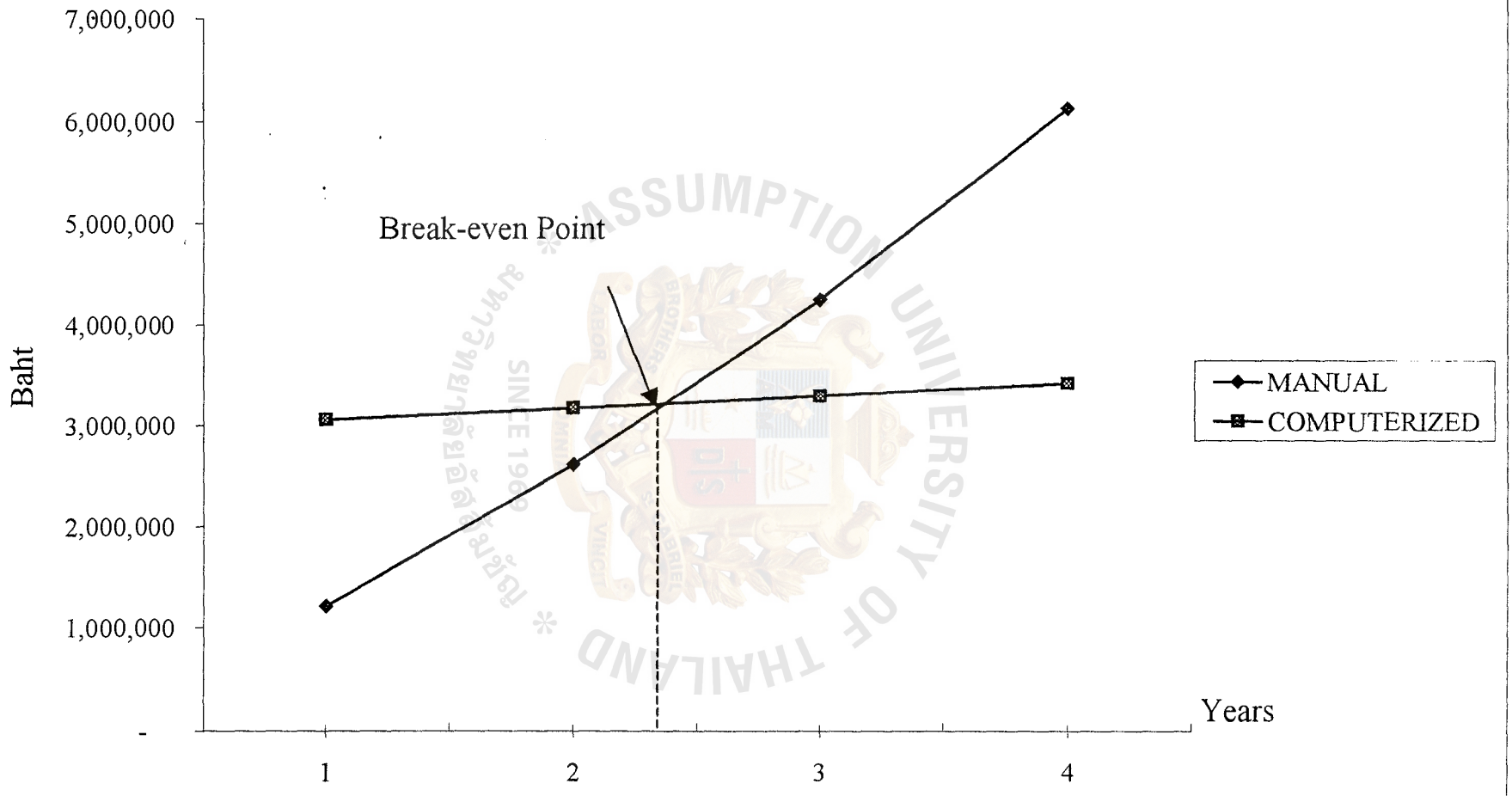

Figure 3.3. Cost Comparison between the Existing and the Proposed System

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

The Project implementation includes all those activities that take place to convert from the old system to the new. The successful implementation may not guarantee improvement in the organization using the new system, but improper installation will prevent it. The project implementation consists of the activities that are show in Figure 4.1.

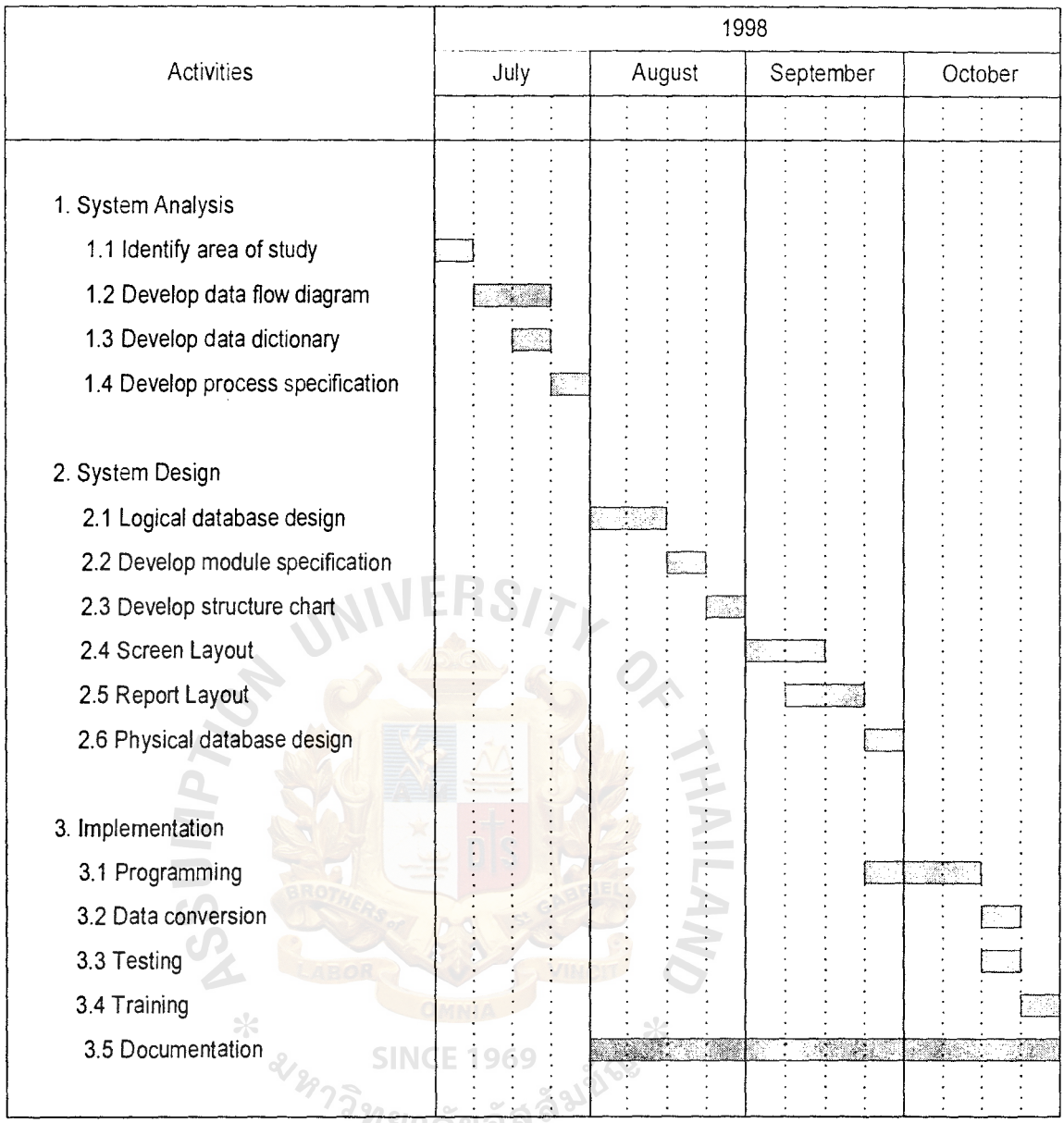

Figure 4.1. Project Implementation Scheduled

4.1.1 Training

Training should be separated into two groups of training as follows:

Operation Training

The Training will involve the person who has responsible for providing the necessary support service or introduce the application to end-user. The cause should cover the handling of all possible operations, and the performance of routine operations.

User Training

For the user, training should be specific to the operations. Training for the routine jobs that are the basic features of the system are:

- How to use Hand Held for each operation
- Step to dump data into system
- How to handle the tools
- How to use the program for each menu
- Etc.

4.1.2 Conversion

Conversion is the process of change from the old system to the new system. The proposed system can skip the step of conversion because the old system was operated manually after which a summary is sent to spreadsheet for printing the report to the management.

4.2 Testing and Results

Testing is the necessary step to ensure the project completeness, correctness, reliability and maintainability. It means to turn up heretofore unknown problems, not to demonstrate the perfection of the program. System testing is performed to determine how well the system will perform and whether it meets the original specifications.

The results of testing has many revisions according to the requirement of the user. When they had confirmed the correctness already, the new system is completed. However, when the new system is implemented, there may still be problems with Hand Held because the user is not used to it.

Now, the system runs smoothly. The users are very happy and satisfied. The Drivers are comfortable when they ship goods to customers. The system controls goods on the way for each vehicle and reduces error.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The purpose of this system development project is to analyze, design and implement the Draft Beer Product and Equipment Control System for Boon Rawd Brewery Co., Ltd. It will replace the existing system (Manual System) to enhance the effectiveness, efficiency and accuracy of data, to increase the productivity of users, increase advantages over competitors and provide better business images. It also provides accurate, timely and up-to-date information in the form of inquiry screen and reports. The proposed system is an online system, which is an immediate update data.

The propose system is developed by using the existing tools and network that the company has used with the others project. This project saves some parts of the hardware and software so it does not involve more investment and does not require the user who has more knowledge because the system is not complicate and is easy to use. The proposed system development project mainly includes the data flow diagram, the structure chart, the process specification, the data dictionary, the entity-relationship diagram, the table design, the input screens and the output reports.

The new system was developed on client server. There is a development of Graphic User Interface (GUI) which guides the program to work with Microsoft Window 95. The program has been developed with graphic, which will have better competitive advantage in the sense of being friendly user, especially for computer illiterate users.

Moreover, the new system will spend less time and cost than the existing system as an example below

	Existing System	**Proposed System**
Task	Summary Report for each department	Same
Method	Manual	Computer
Personnel	Supervisor	Computer Operator
Cost/Hour (Baht)	160	40
When and How	Daily: Receive, Production and issue for each department Monthly: Summarizes daily records using calculator and keying in spread sheet for prepares report	Daily : run program that totals receive and issue and write to disk Monthly: runs program that summarizes and prints reports
Human Time Requirements	Daily : 40 minutes Monthly : 20 hours	Daily : 10 minutes Monthly : 5 hours
Computer Time Requirements	Daily : 20 minutes Monthly : 10 hours	Daily : 10 minutes Monthly : 5 hours

5.2 Recommendations

This project has many factors to implement successfully. However committee members must discuss how effective the new system is before decisions are made to further develop the system. The sooner the new system is implemented and tested for efficiency, the sooner will time be saved and investment costs reduced.

The proposed system has many steps to implement. Computerization also takes time to develop completely to accommodate the user's requirements. So it cannot avoid numerous revisions until the system is suitable for the present requirements. In the future, requirements may have changed or increased so this project must be developed in the next phase. In addition, with improved technology, the system may again be changed for more efficiency and higher performance.

The new system should have the ability to interface with future database systems.

BIBLIOGRAPHY

1. Kendall, Kenneth E. and Kendall, Julie E. System Analysis and Design Second Edition, Singapore: Mc Graw-Hill Book Company, 1989.
2. Kendall, Penny A. Introduction to Systems Analysis and Design. Allynand Bacon, Inc., Massachusetts, 1987
3. Senn, Janex A. Analysis and Design of Information System. Second Edition, Singapore : Mc Graw-Hill Book Company, 1989.
4. Yourdon, Edward. Modern Structured Analysis. Englewood cliffs, New Jersey: Prentice-Hill, Inc, 1989.

APPENDIX A

Context Diagram

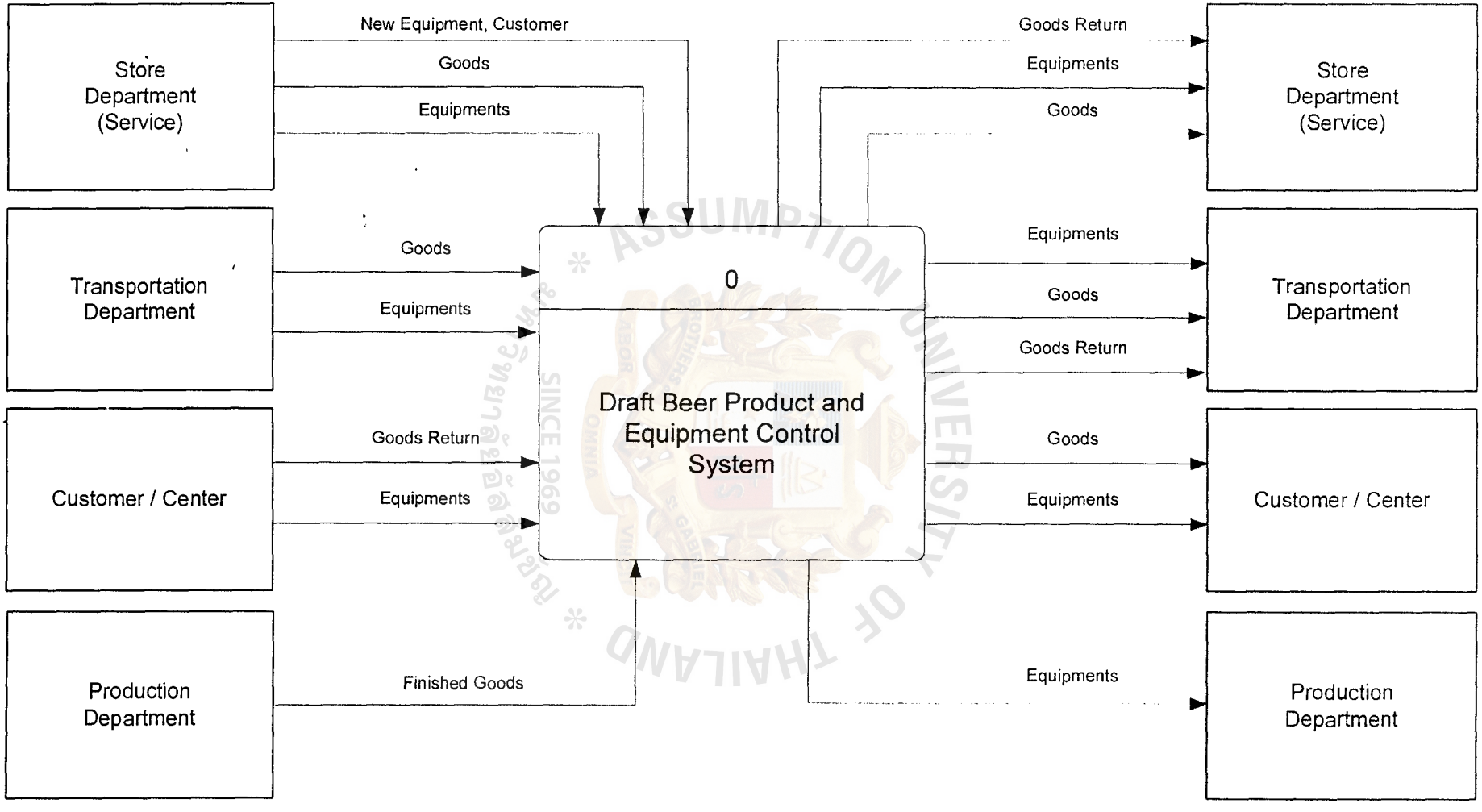

Figure A.1. Context Diagram of the Proposed System

APPENDIX B

Data Flow Diagram

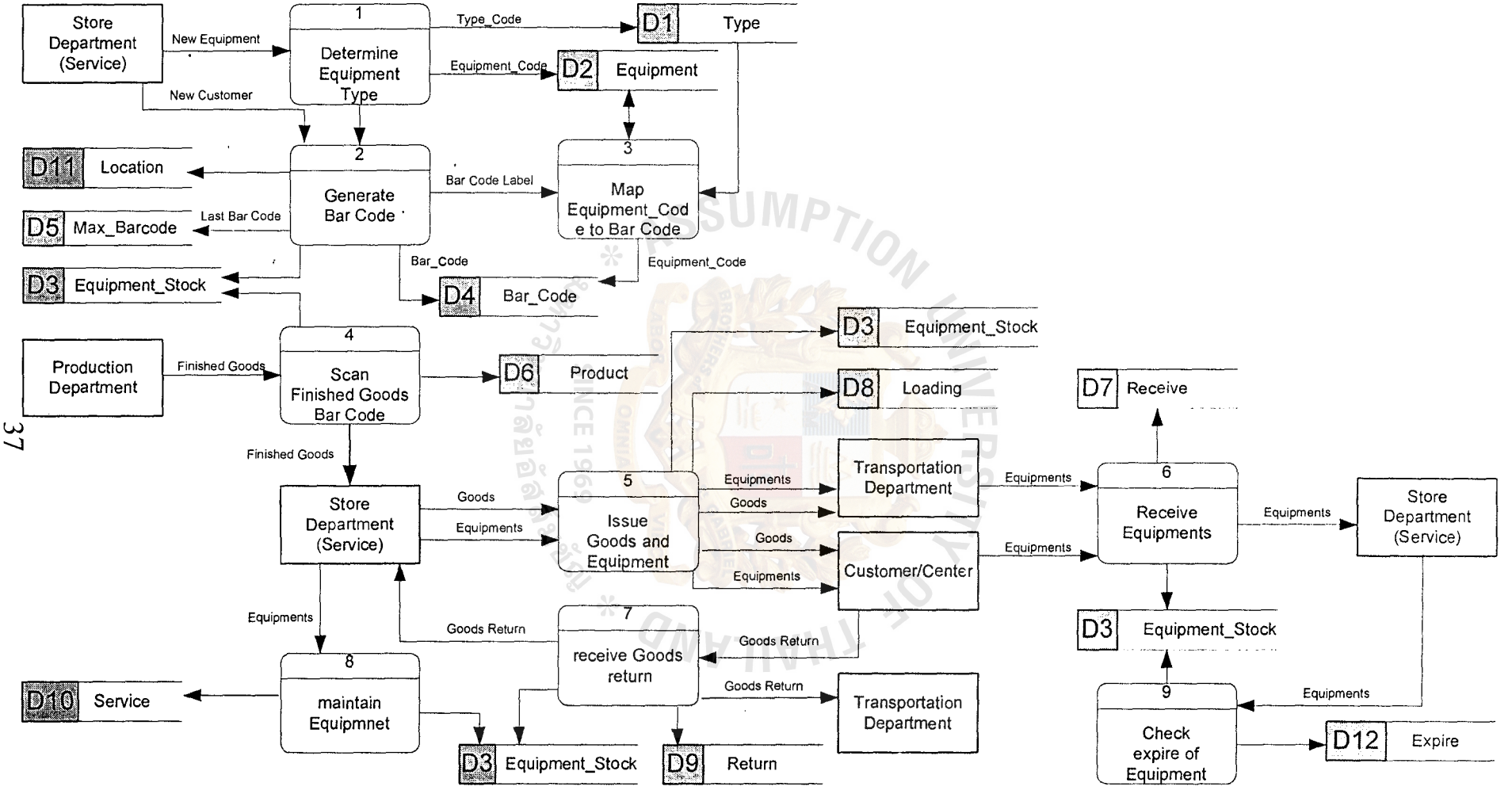

Figure B.1. Level 0 Data Flow Diagram

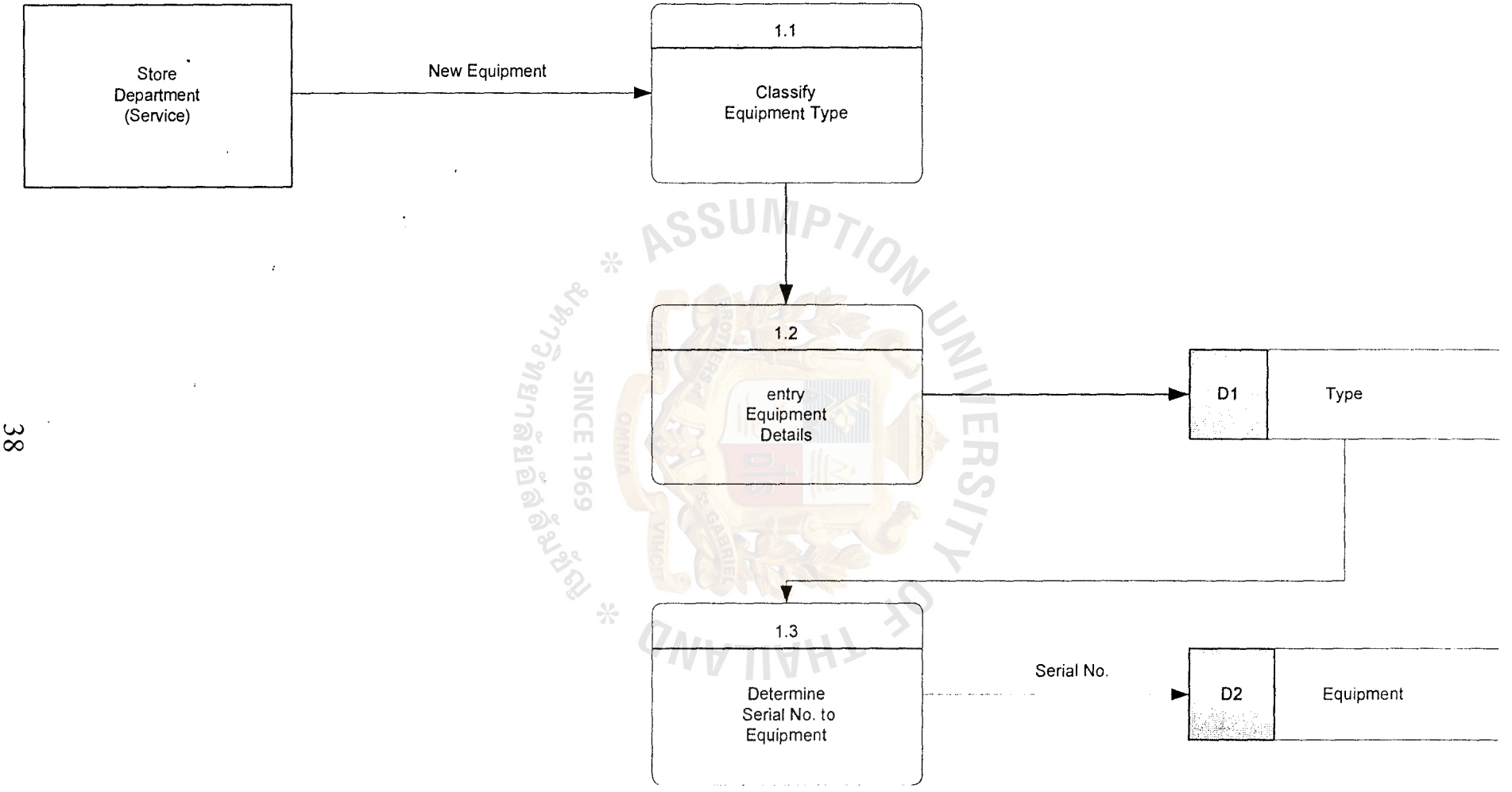

Figure B.2. Level 1 Data Flow Diagram of Process 1.0

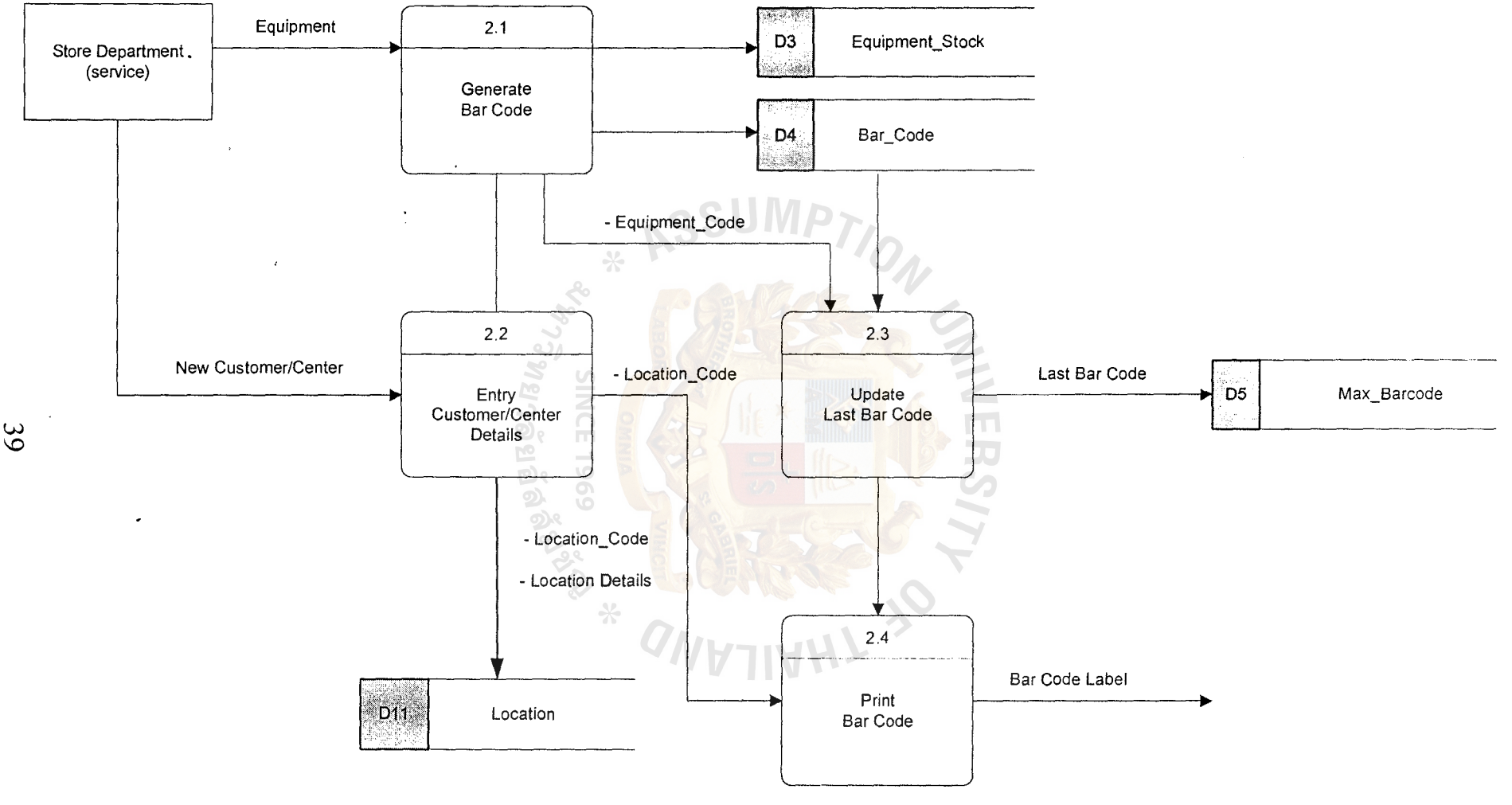

Figure B.3. Level 1 Data Flow Diagram of Process 2.0

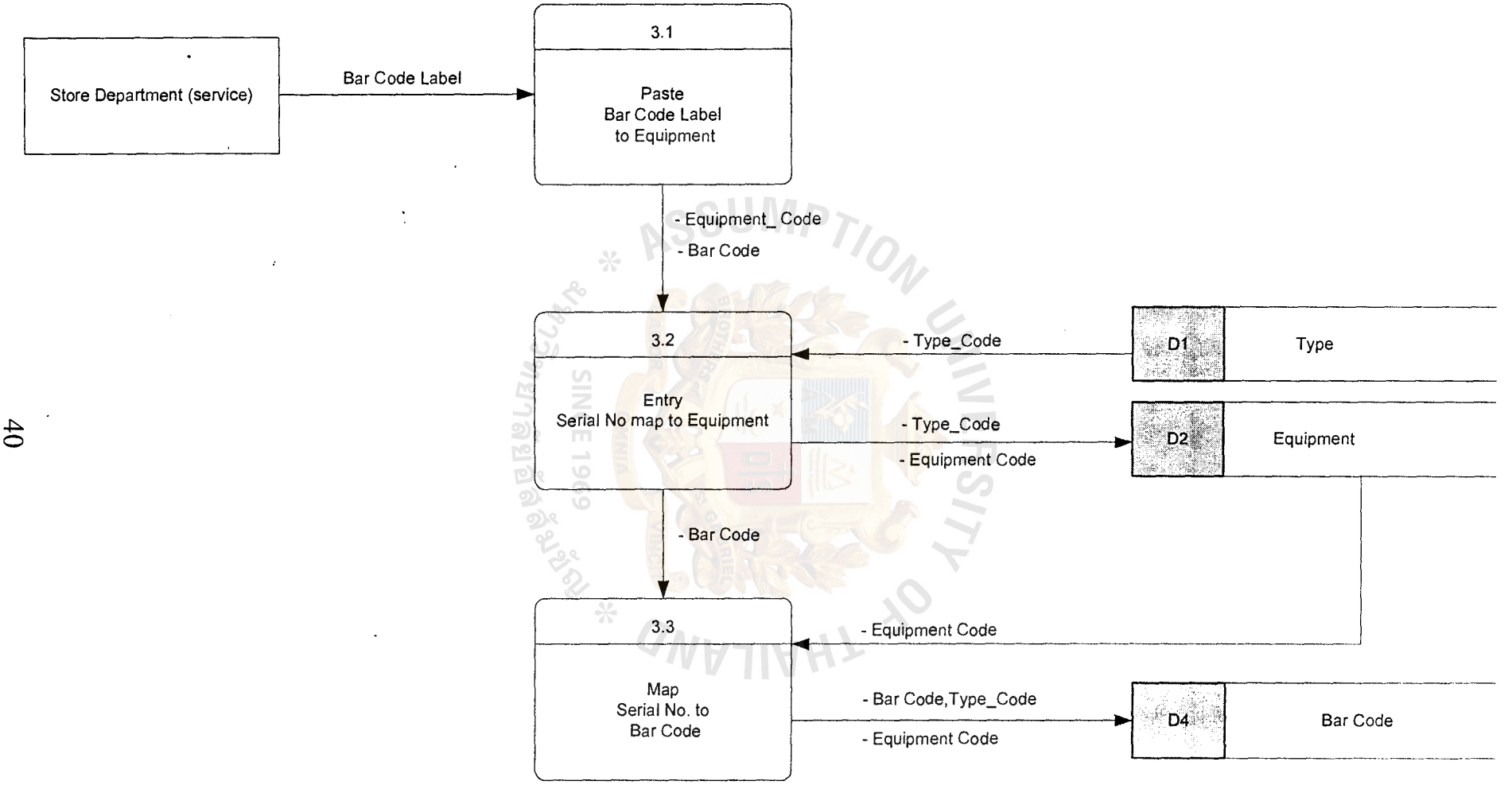

Figure B.4. Level 1 Data Flow Diagram of Process 3.0

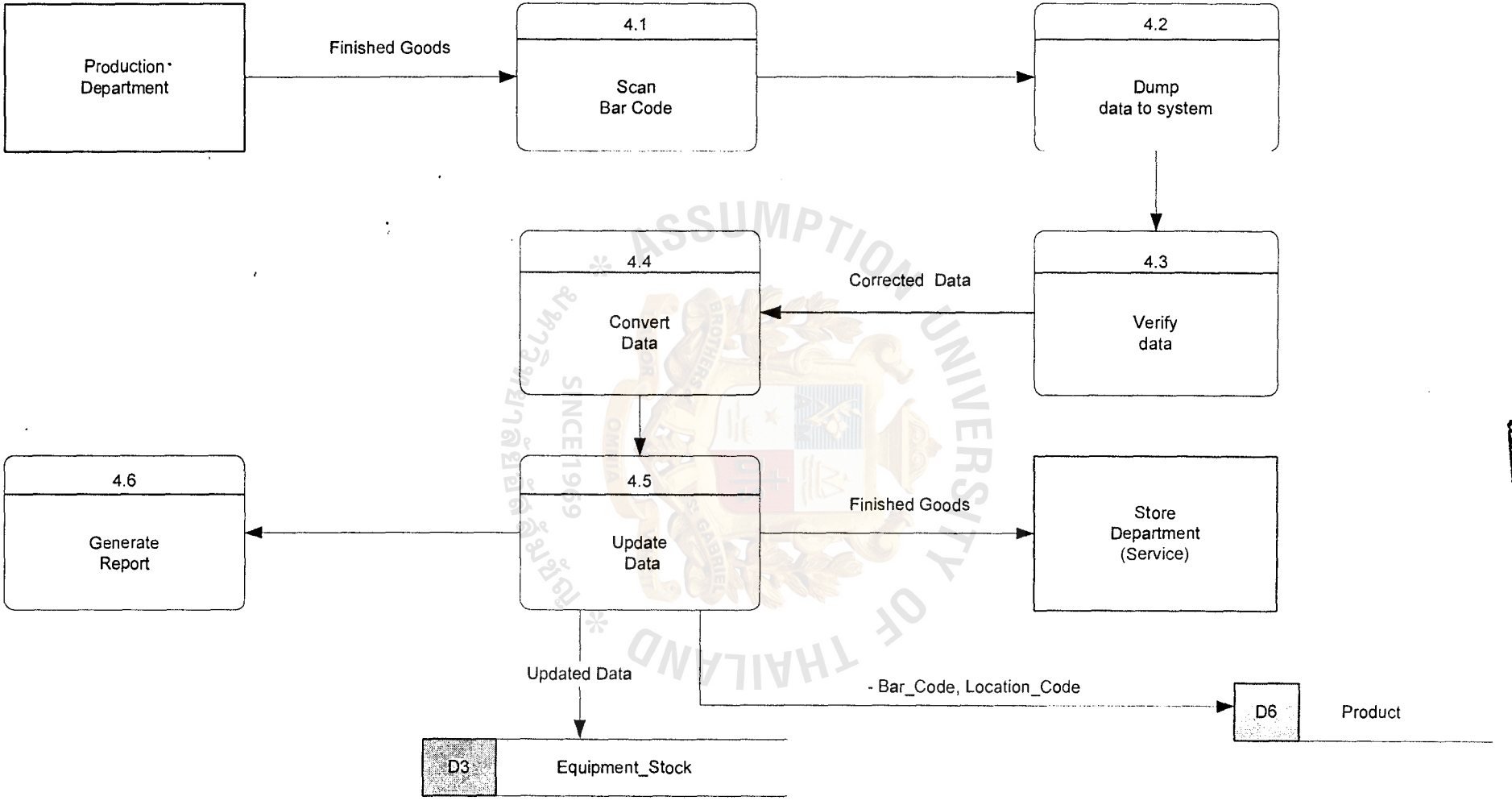

Figure B.5. Level 1 Data Flow Diagram of Process 4.0

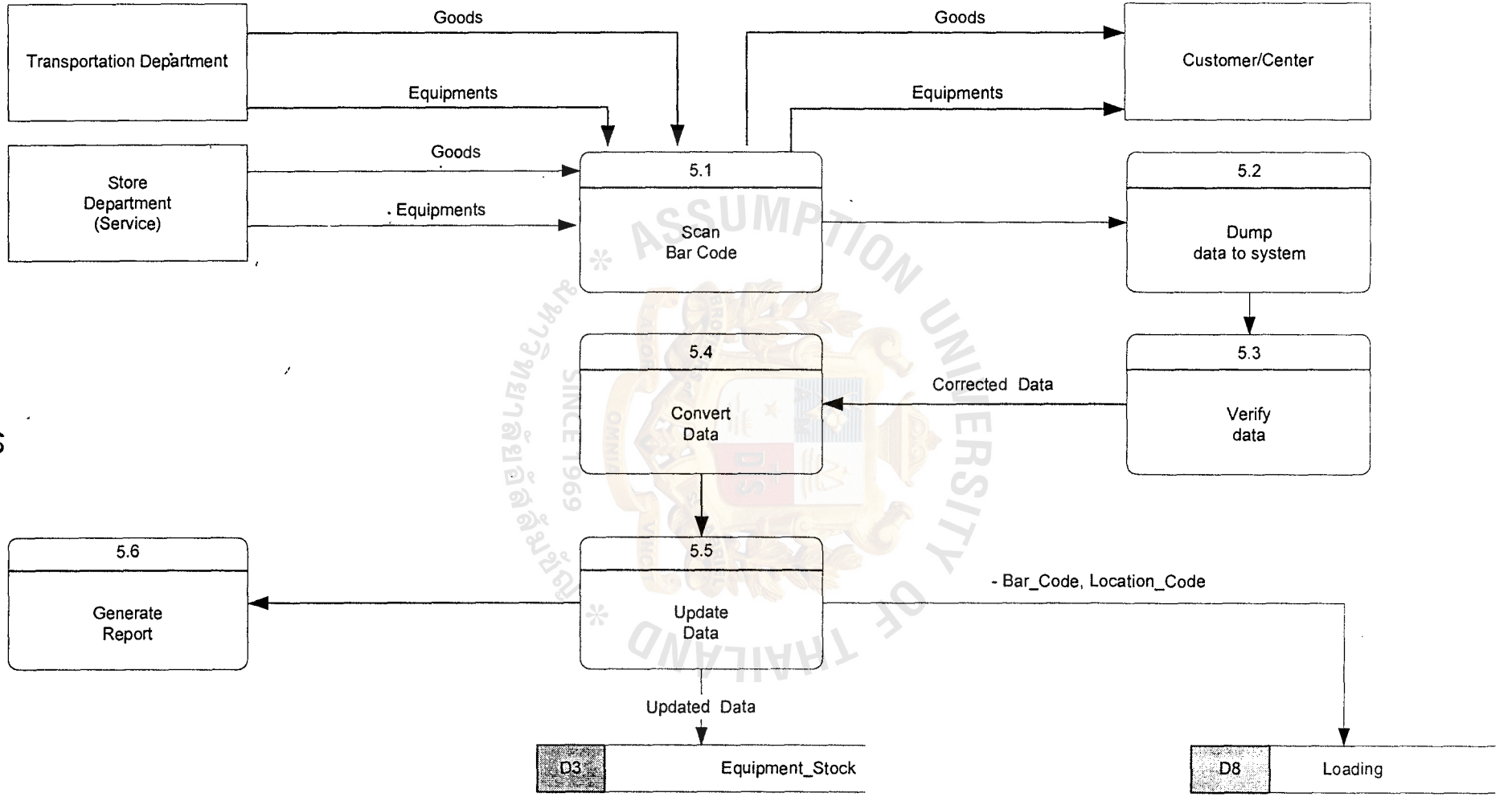

Figure B.6. Level 1 Data Flow Diagram of Process 5.0

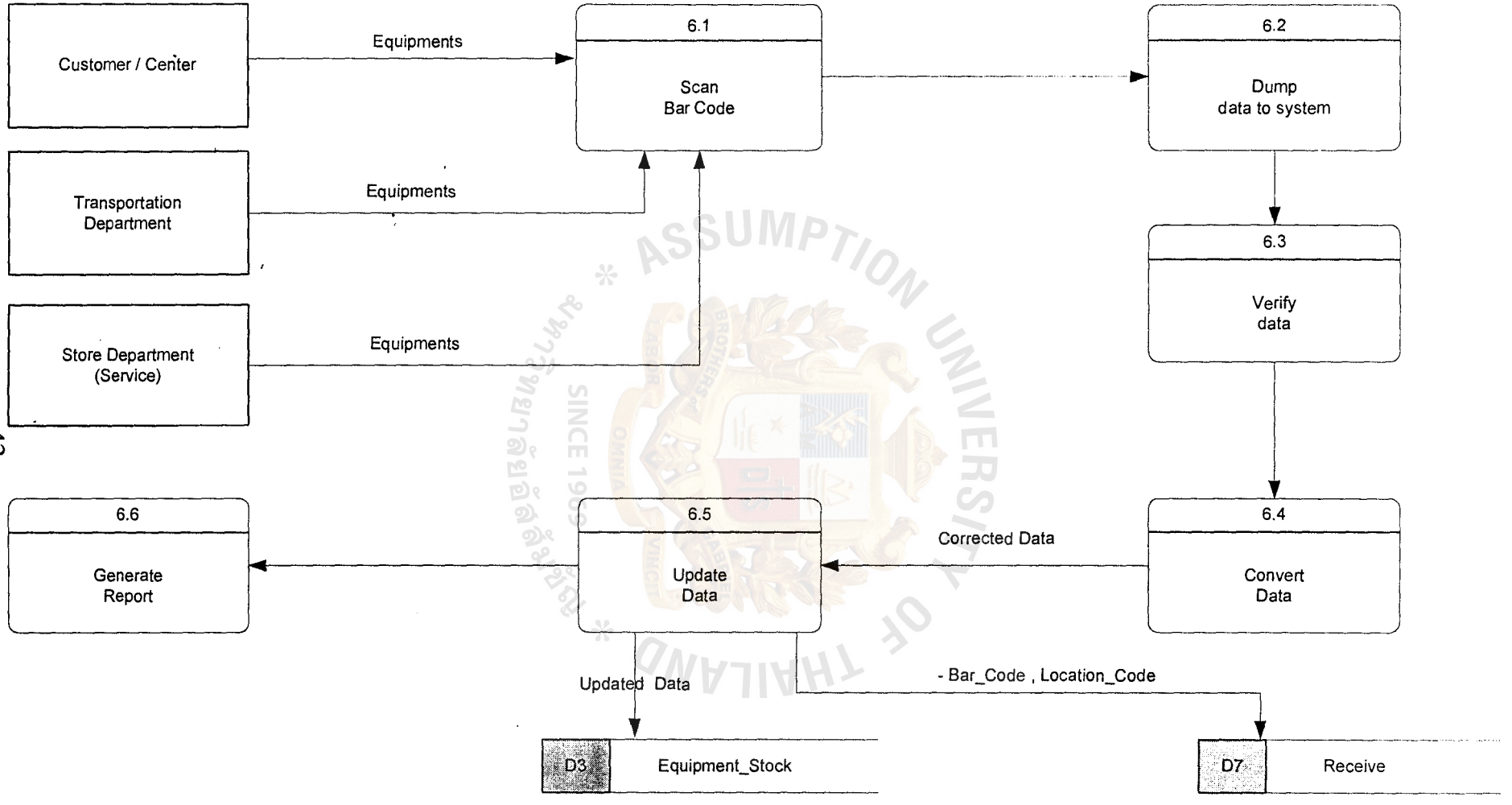

Figure B.7. Level 1 Data Flow Diagram of Process 6.0

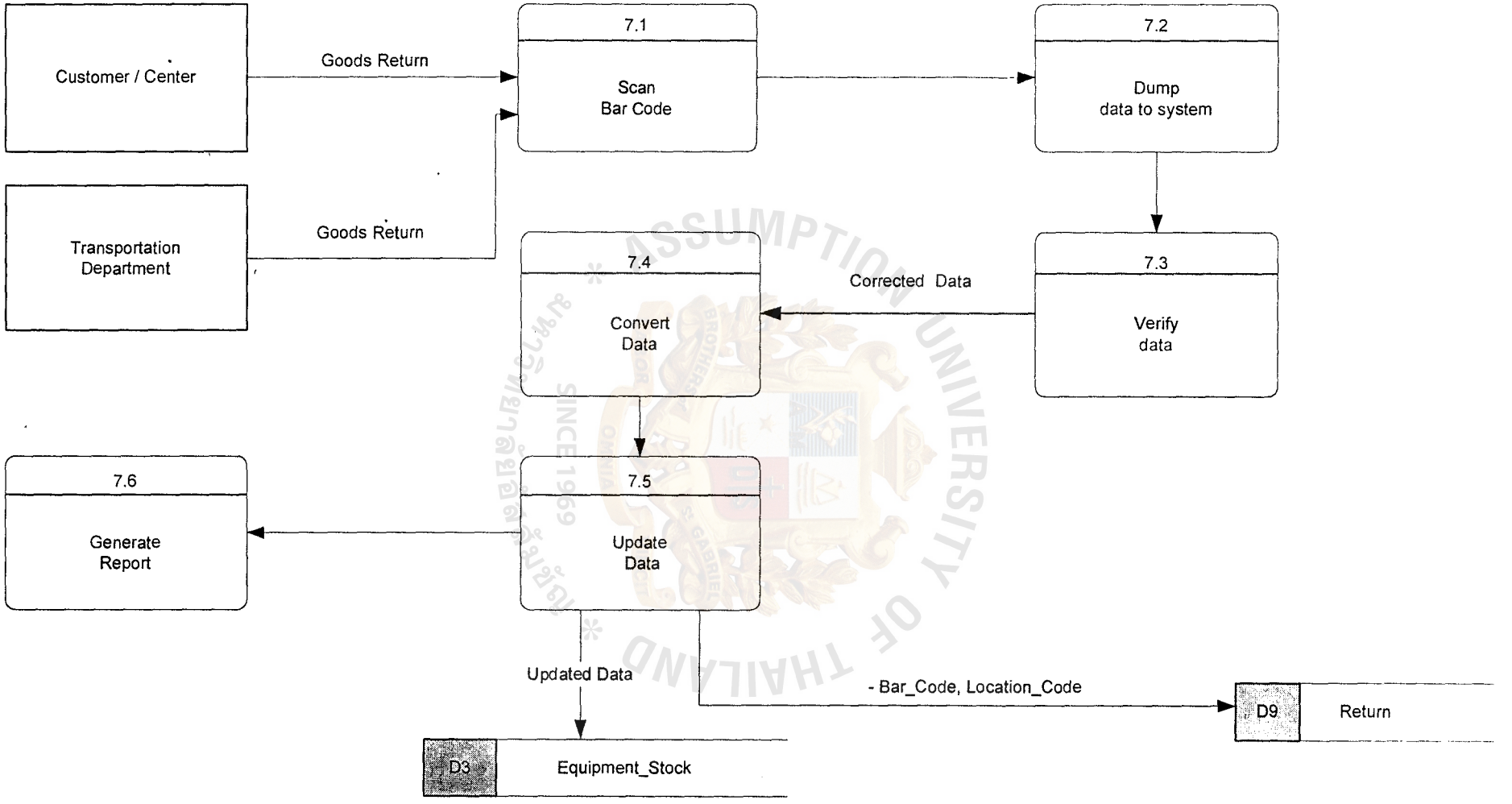

Figure B.8. Level 1 Data Flow Diagram of Process 7.0

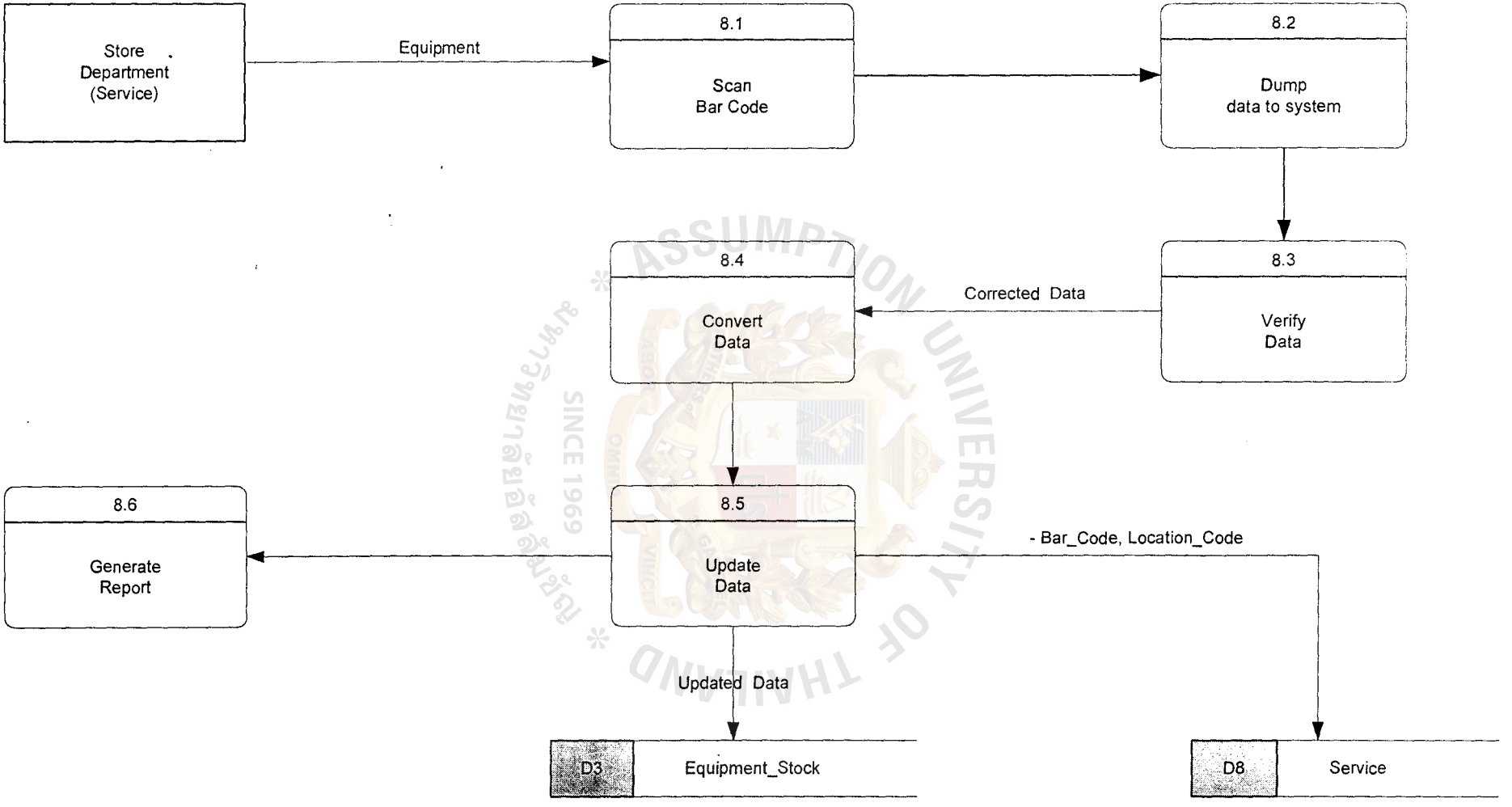

Figure B.9. Level 1 Data Flow Diagram of Process 8.0

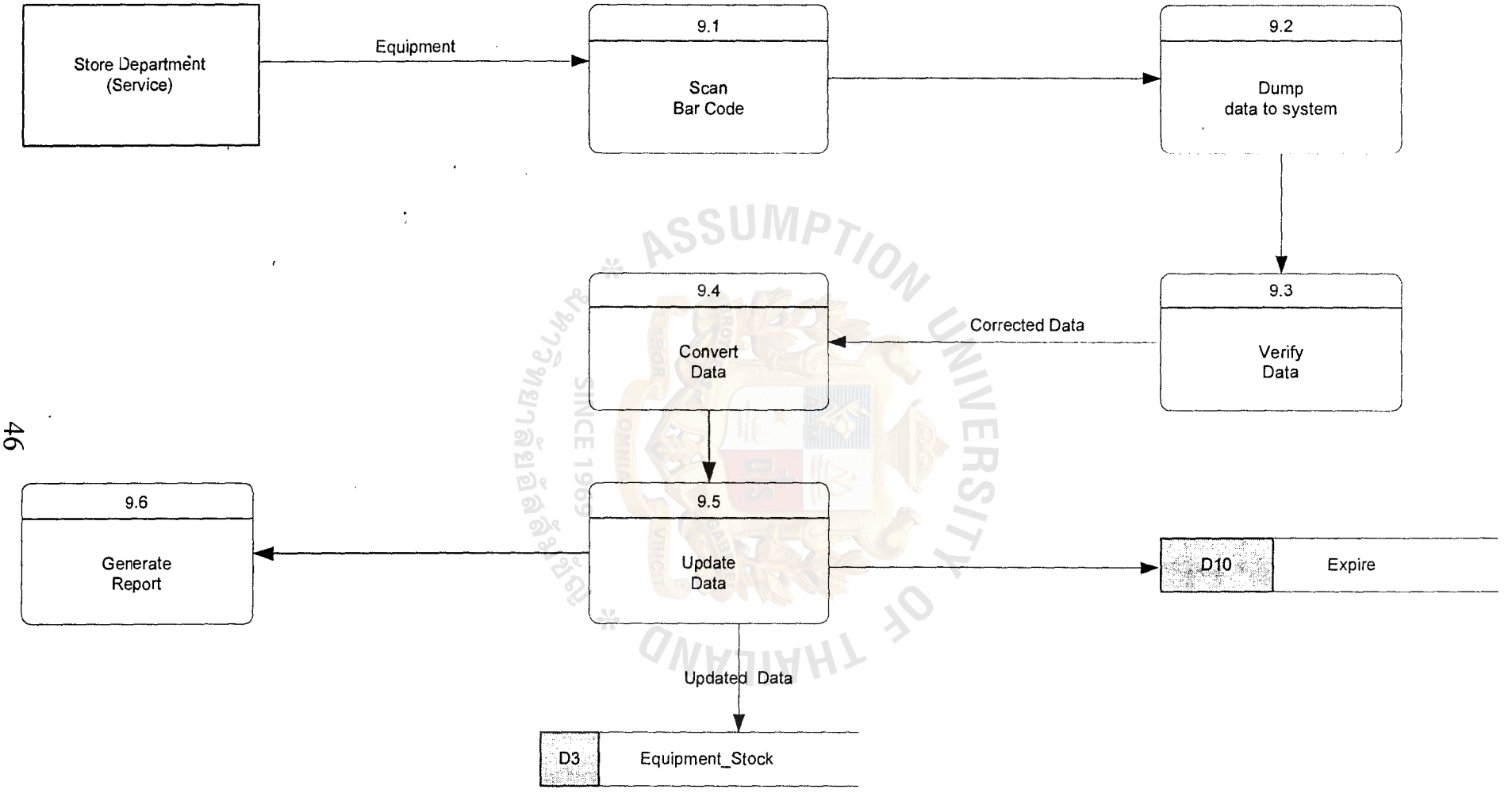

Figure B.10. Level 1 Data Flow Diagram of Process 9.0

APPENDIX C

Entity Relationship Diagram

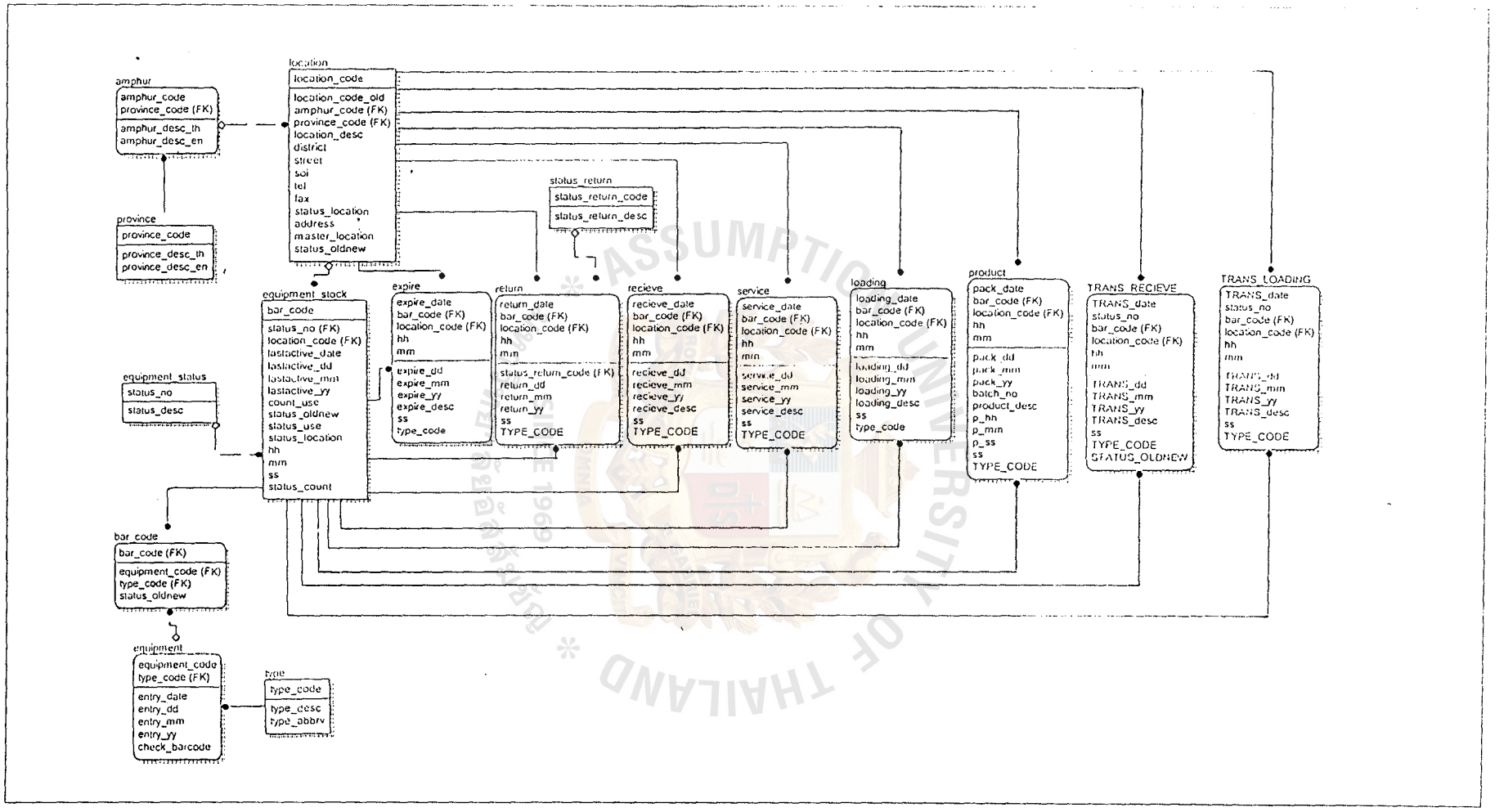

Figure C.1. Entity Relationship Diagram

APPENDIX D

Process Specifications

Process 1.1 Determine Equipment

```
BEGIN
    GET new equipment
    GET type_code from Type record
    IF not found THEN create new type
        RECORD new type code to Type File
        GO TO Process 1.2 Entry Equipment
    END IF
END
```

Process 1.2 Entry Equipment Details

```
BEGIN
    RECORD equipment details
    SEND equipment details, Type_Code to Equipment File
END
```

Process 2.1 Generate Bar Code

```
BEGIN
    IF new equipment THEN generate new bar_Code
        SEND Bar_Code to Bar_Code File
        UPDATE Equipment on hand to Equipment_Stock File
        GO TO Process 2.3 Update Last Bar Code
    END IF
END
```

Process 2.2 Entry Customer Details

```
BEGIN
    IF new customer THEN
        RECODE new customer details
        UPDATE Location_Code, Location Details to Location File
        SEND Location_Code to Process 2.4 Print Bar Code
    ENDIF .
END
```

Process 2.3 Update Last Bar Code

```
BEGIN
    GET Equipment_code and Bar_Code
    UPDATE Last Bar Code to Max_Barcode File
    GO TO Process 2.4 Print Bar Code
    END IF
END
```

Process 2.4 Print Bar Code

```
BEGIN
    GET Bar_Code, Location_Code
    PRINT Bar_Code Label
END
```

Process 3.1 Past Bar Code Label to Equipment

```
BEGIN
    GET Bar Code Label
    RECORD Equipment_Code and Bar Code
    GO TO PROCESS 3.2 ENTRY EQUIPMENT _CODE AND DETAILS
END
```

Process 3.2 Entry Equipment_Code and Details

```
BEGIN
    GET Equipment_Code, Bar Code and Type_Code
    FIND Type_Code from Type File
    RECORD Equipment_Code and Details
    UPDATE Type_Code, Equipment Code to Equipment File
    GO TO Process 3.3 Map Equipment_Code to Bar Code
END
```

Process 3.3 Map Equipment_Code to Bar Code

```
BEGIN
    GET Bar_Code and Equipment_Code
    MATCH Equipment_Code to Bar_Code
    UPDATE Equipment_Code, Bar_Code and Type_Code to Bar Code file
END
```

Process 4.1 Scan Bar Code

```
BEGIN
    DO Until End
    READ Bar_Code from Finished Goods
    END DO
    GOTO Process 4.0 Dump Data to System
END
```

Process 4.2 Dump Data to System

```
BEGIN
    DO Until End
    GET Data from Hand Held
    END DO
    SEND TO Process 4.3 Verify Data
END
```

Process 4.3 Verify Data

```
BEGIN
    GET Data record
    VERIFY data record in text file
    IF all Field Correct THEN
            GOTO Process 4.4 Convert Data
    ELSE MODIFY Field to Correct
    END IF
END
```

Process 4.4 Convert Data

```
BEGIN
    DO Until EOF
    GET Corrected data
    CONVERT data to Data system format
    END DO
    GO TO Process 4.5 Update Data
END
```

Process 4.5 Update Data

```
BEGIN
    GET Converted data
    UPDATE data to Equipment_Stock File
    UPDATE Bar_Code, Location Code to Product File
    GO TO Process 4.6 Generate Report
END
```

Process 4.6 Generate Report

```
BEGIN
    GET Production record
    PRINT Production Report
END
```

Process 5.1 Scan Bar Code

```
BEGIN
    DO UNTIL END
    READ Bar_Code from Goods and Equipments
    END DO
END
```

Process 5.2 Dump Data to System

```
BEGIN
    DO UNTIL END
    GET Data from Hand Held
    END DO
    SEND TO PROCESS 5.3 VERIFY DATA
END
```

Process 5.3 Verify Data

```
BEGIN
    GET Data record
    VERIFY data record in text file
    IF all Field Correct THEN
        GOTO Process 5.4 Convert Data
    ELSE MODIFY Field to Correct
    END IF
END
```

Process 5.4 Convert Data

```
BEGIN
    DO UNTIL EOF
    GET Corrected data
    CONVERT data to Data system format
    END DO
    GO TO Process 5.5 Update Data
END
```

Process 5.5 Update Data

```
BEGIN
    GET Converted data
    UPDATE data to Equipment_Stock File
    UPDATE Bar_Code, Location Code to Loading File
    GO TO Process 5.6 Generate Report
END
```

Process 5.6 Generate Report

```
BEGIN
   GET Loading record
   PRINT Issue Report
END
```

Process 6.1 Scan Bar Code

```
BEGIN
   DO Until End
   READ Bar_Code from Equipments
   END DO
END
```

Process 6.2 Dump Data to System

```
BEGIN
   DO UNTIL END
   GET Data from Hand Held
   END DO
   SEND TO PROCESS 6.3 VERIFY DATA
END
```

Process 6.3 Verify Data

```
BEGIN
    GET Data record
    VERIFY data record in text file
            IF all Field Correct THEN
                    GOTO Process 6.4 Convert Data
            ELSE MODIFY Field to Correct
            END IF
END
```

Process 6.4 Convert Data

```
BEGIN
    DO UNTIL EOF
    GET Corrected data
    CONVERT data to Data system format
    END DO
    GO TO Process 6.5 Update Data
END
```

Process 6.5 Update Data

```
BEGIN
    GET Converted data
    UPDATE data to Equipment_Stock File
    UPDATE Bar_Code, Location Code to Receive File
    GO TO Process 4.6 Generate Report
END
```

Process 6.6 Generate Report

```
BEGIN
    GET Receive record
    PRINT Receive Report
END
```

Process 7.1 Scan Bar Code

```
BEGIN
    DO UNTIL END
    READ Bar_Code from Goods Return
    END DO
END
```

Process 7.2 Dump Data to System

```
BEGIN
    DO UNTIL END
    GET Data from Hand Held
    END DO
    SEND TO Process 7.3 Verify Data
END
```

Process 7.3 Verify Data

```
BEGIN
    GET Data record
    VERIFY data record in text file
    IF all Field Correct THEN
        GOTO Process 7.4 Convert Data
    ELSE MODIFY Field to Correct
    END IF
END
```

Process 7.4 Convert Data

```
BEGIN
    DO Until EOF
    GET Corrected data
    CONVERT data to Data system format
    END DO
    GO TO Process 7.5 Update Data
END
```

Process 7.5 Update Data

```
BEGIN
    GET Converted data
    UPDATE data to Equipment_Stock File
    UPDATE Bar_Code, Location Code to Return File
    GO TO Process 7.6 Generate Report
END
```

Process 7.6 Generate Report

```
BEGIN
    GET Return record
    PRINT Return Report
END
```

Process 8.1 Scan Bar Code

```
BEGIN
    DO UNTIL END
    READ Bar_Code from Equipments
    END DO
END
```

Process 8.2 Dump Data to System

```
BEGIN
    DO UNTIL END
    GET Data from Hand Held
    END DO
    SEND TO Process 8.3 Verify Data
END
```

Process 8.3 Verify Data

```
BEGIN
    GET Data record
    VERIFY data record in text file
    IF all Field Correct THEN
        GOTO Process 8.4 Convert Data
    ELSE MODIFY Field to Correct
    END IF
END
```

Process 8.4 Convert Data

```
BEGIN
    DO Until EOF
    GET Corrected data
    CONVERT data to Data system format
    END DO
    GO TO Process 8.5 Update Data
END
```

Process 8.5 Update Data

```
BEGIN
    GET Converted data
    UPDATE data to Equipment_Stock File
    UPDATE Bar_Code, Location Code to Service File
    GO TO Process 8.6 Generate Report
END
```

Process 8.6 Generate Report

```
BEGIN
    GET Service record
    PRINT Service Report
END
```

Process 9.1 Scan Bar Code

```
BEGIN
    DO Until End
    READ Bar_Code from Expire Equipments
    END DO
END
```

Process 9.2 Dump Data to System

```
BEGIN
    DO UNTIL END
    GET Data from Hand Held
    END DO
    SEND TO Process 9.3 Verify Data
END
```

Process 9.3 Verify Data

```
BEGIN
    GET Data record
    VERIFY data record in text file
    IF all Field Correct THEN
        GOTO Process 9.4 Convert Data
    ELSE MODIFY Field to Correct
    END IF
END
```

Process 9.4 Convert Data

```
BEGIN
    DO UNTIL EOF
    GET Corrected data
    CONVERT data to Data system format
    END DO
    GO TO Process 9.5 Update Data
END
```

Process 9.5 Update Data

```
BEGIN
    GET Converted data
    UPDATE data to Equipment_Stock File
    UPDATE Bar_Code to Expire File
    GO TO Process 9.6 Generate Report
END
```

Process 9.6 Generate Report

```
BEGIN
    GET Expire record
    PRINT Expire Report
END
```

APPENDIX E

Input Screen Design

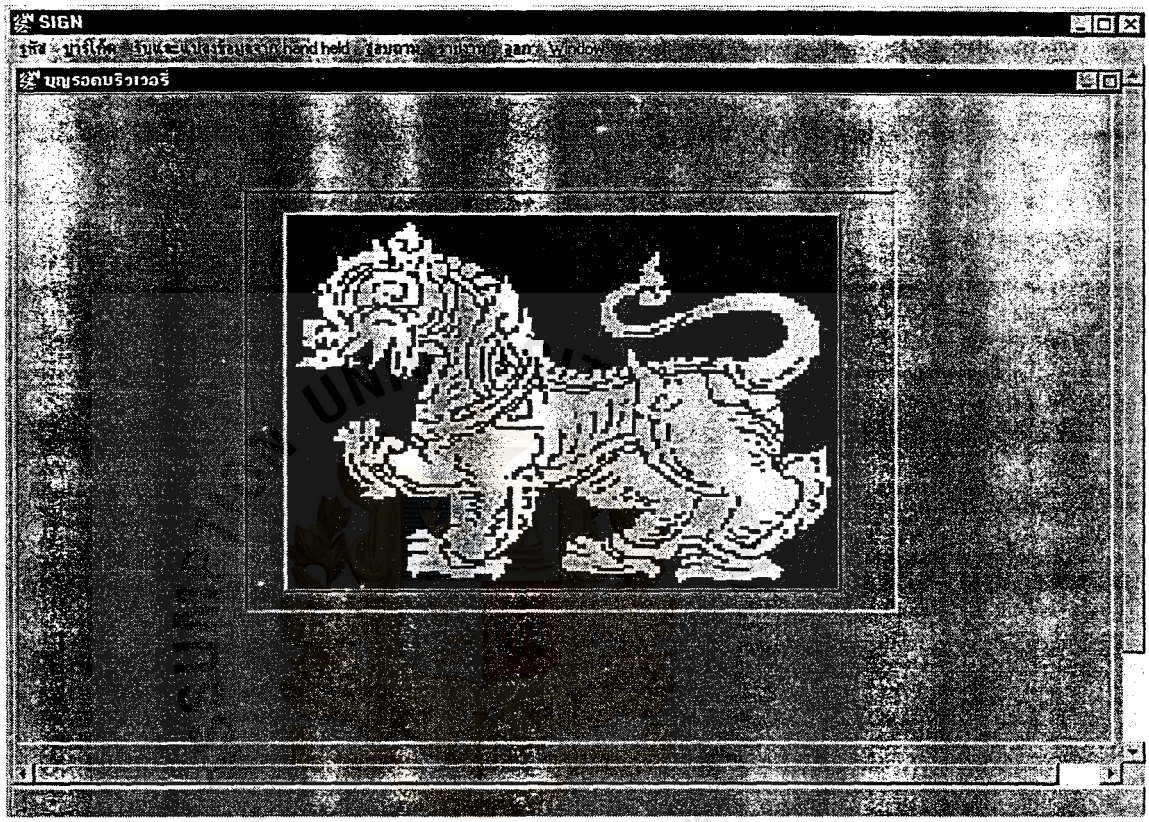

Figure E.1. Starting Screen

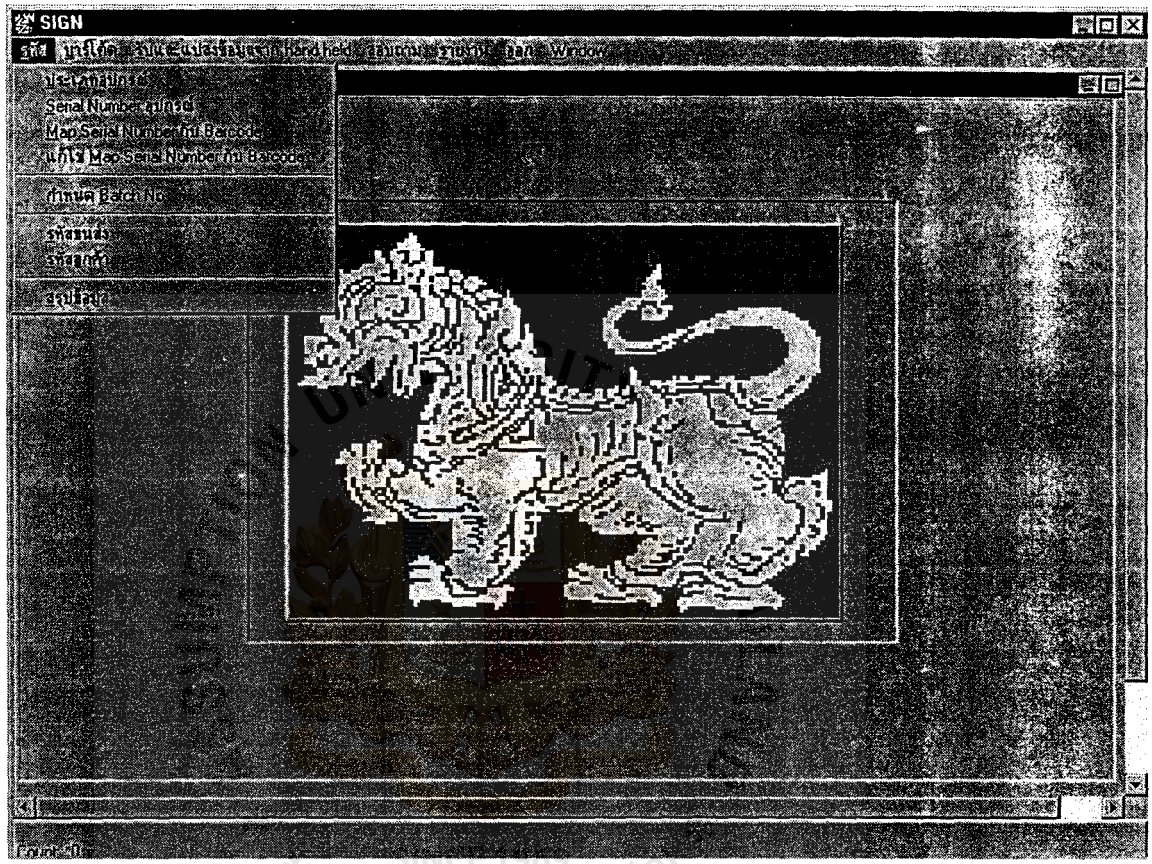

Figure E.2. Define Code Menu

Figure E.3. Type of Equipment

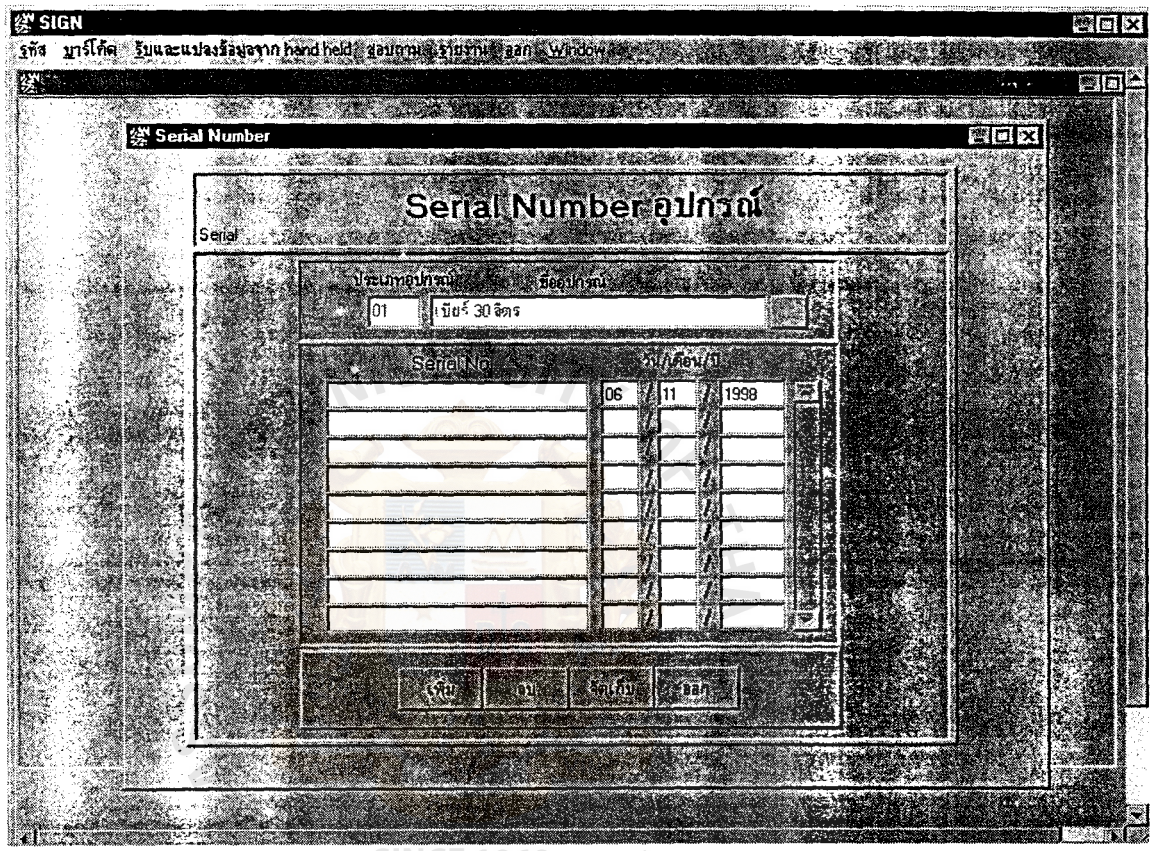

Figure E.4. Determine Serial No.

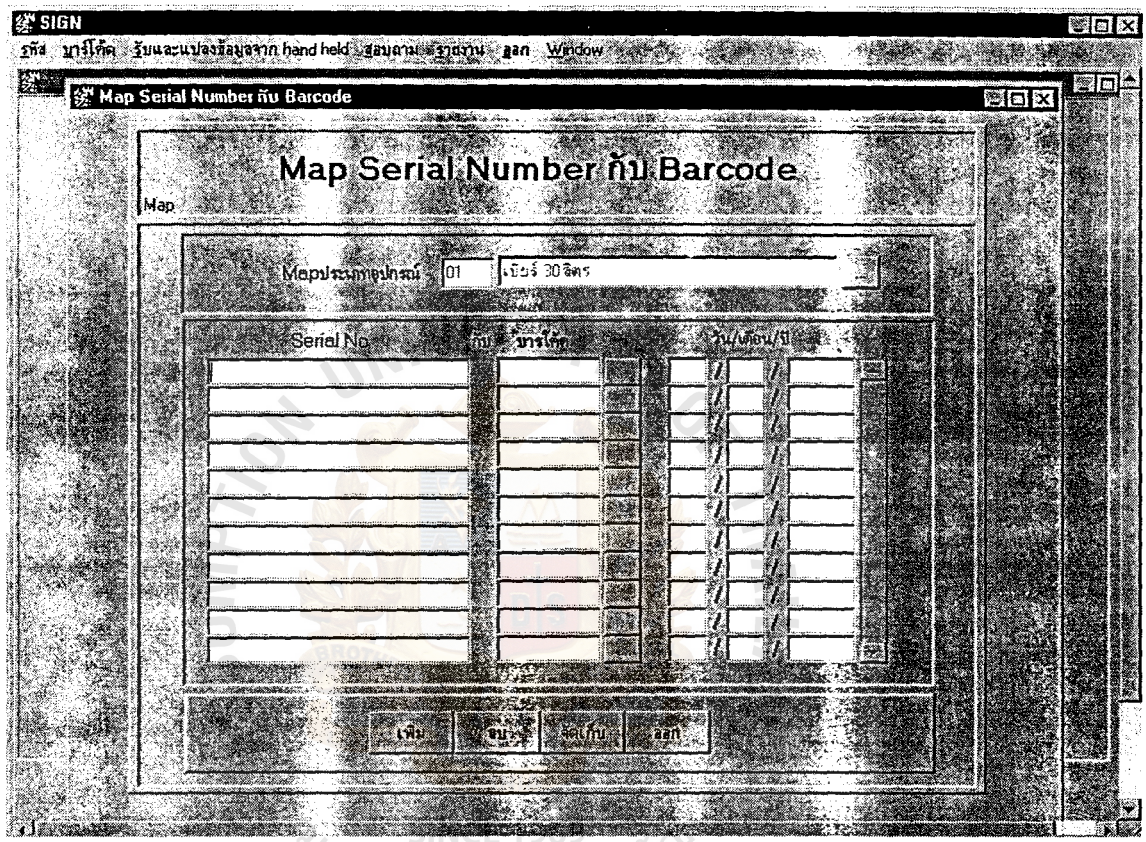

Figure E.5. Map serial number with Bar Code

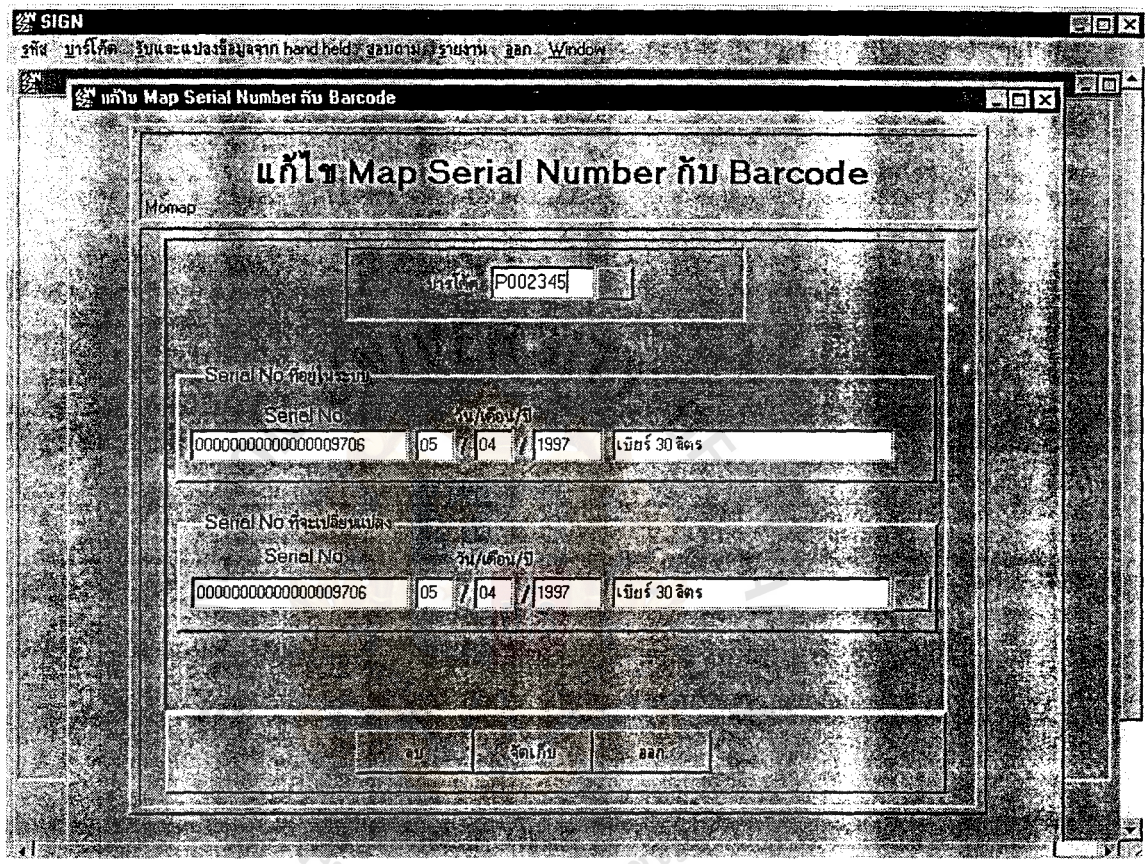

Figure E.6. Modify Map Serial Number with Bar Code

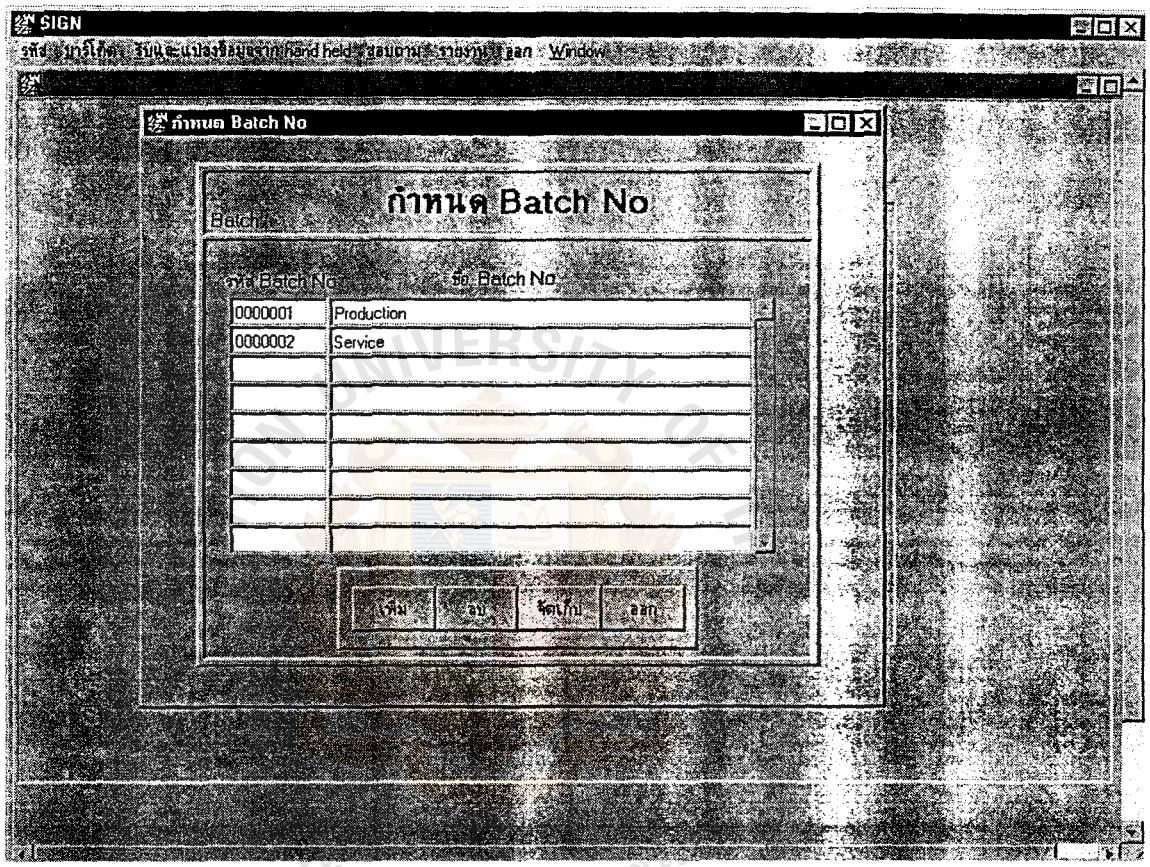

Figure E.7. Determine Batch No.

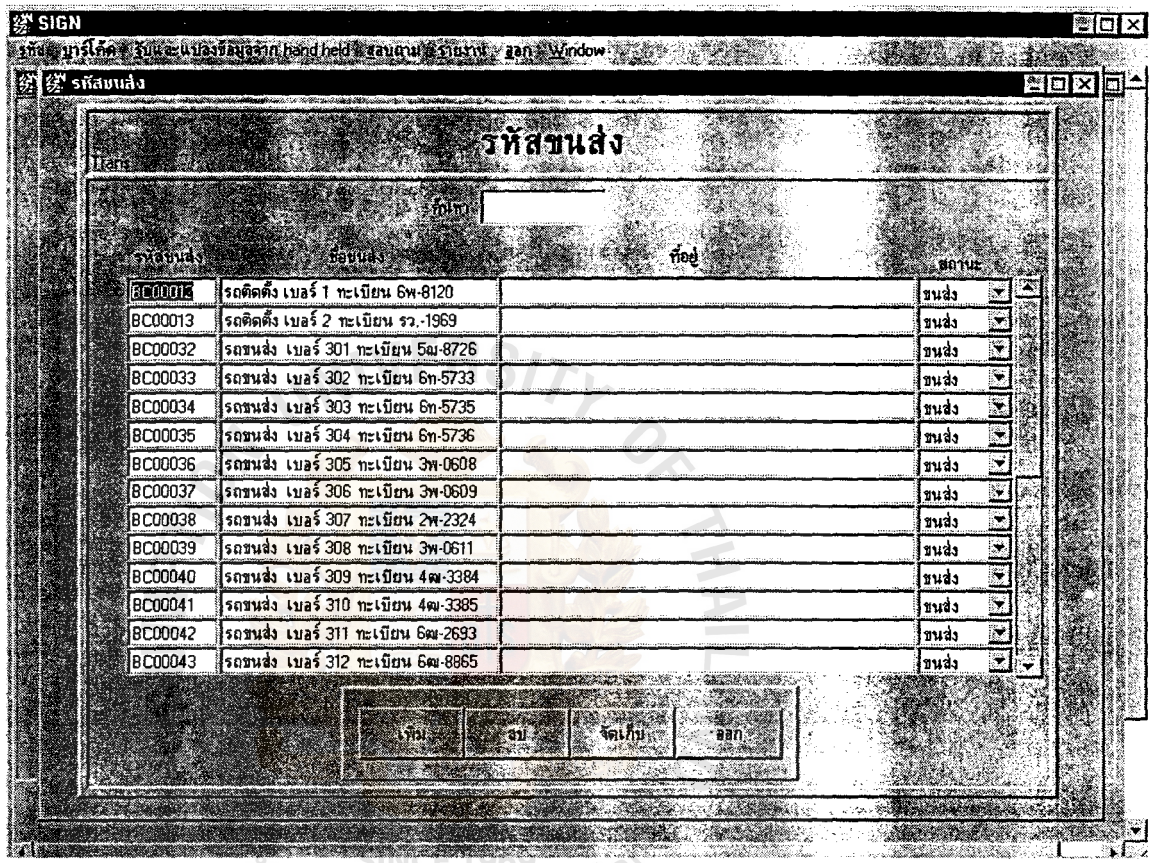

Figure E.8. Determine Transportation Code

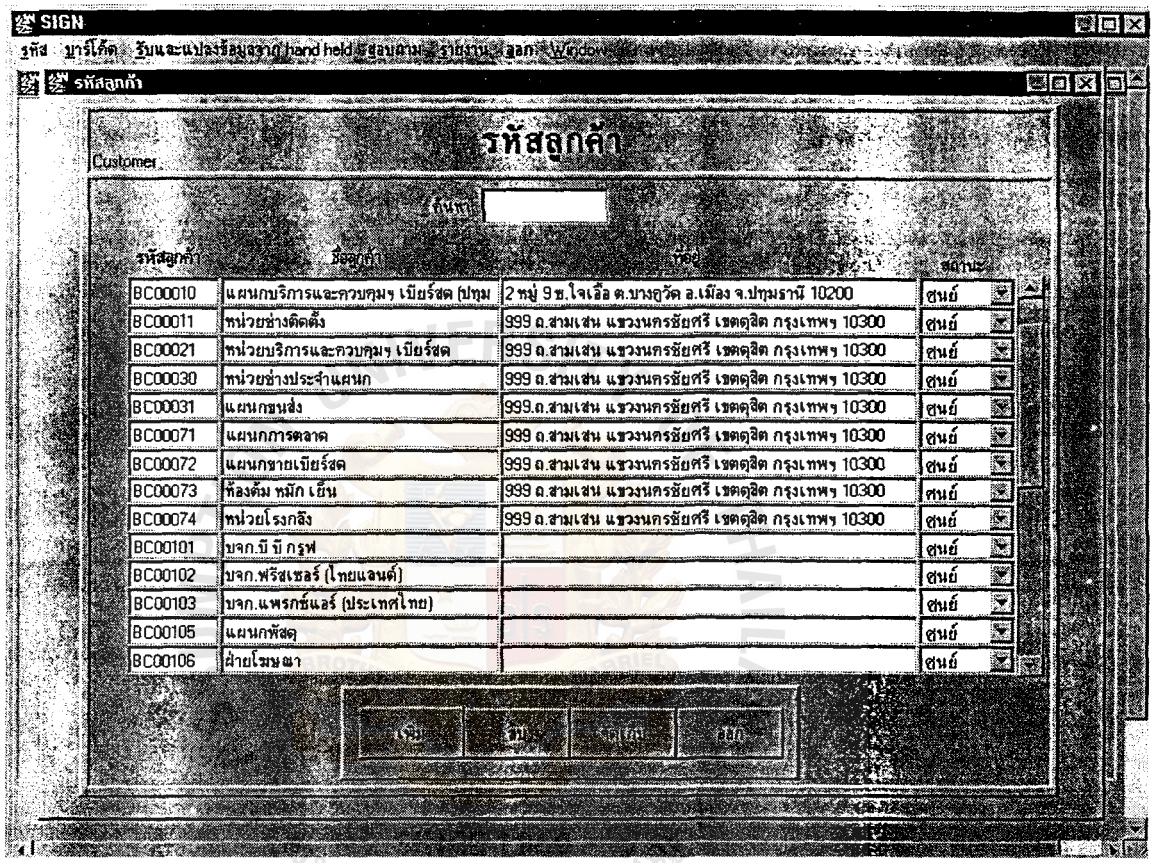

Figure E.9. Determine Customer Code

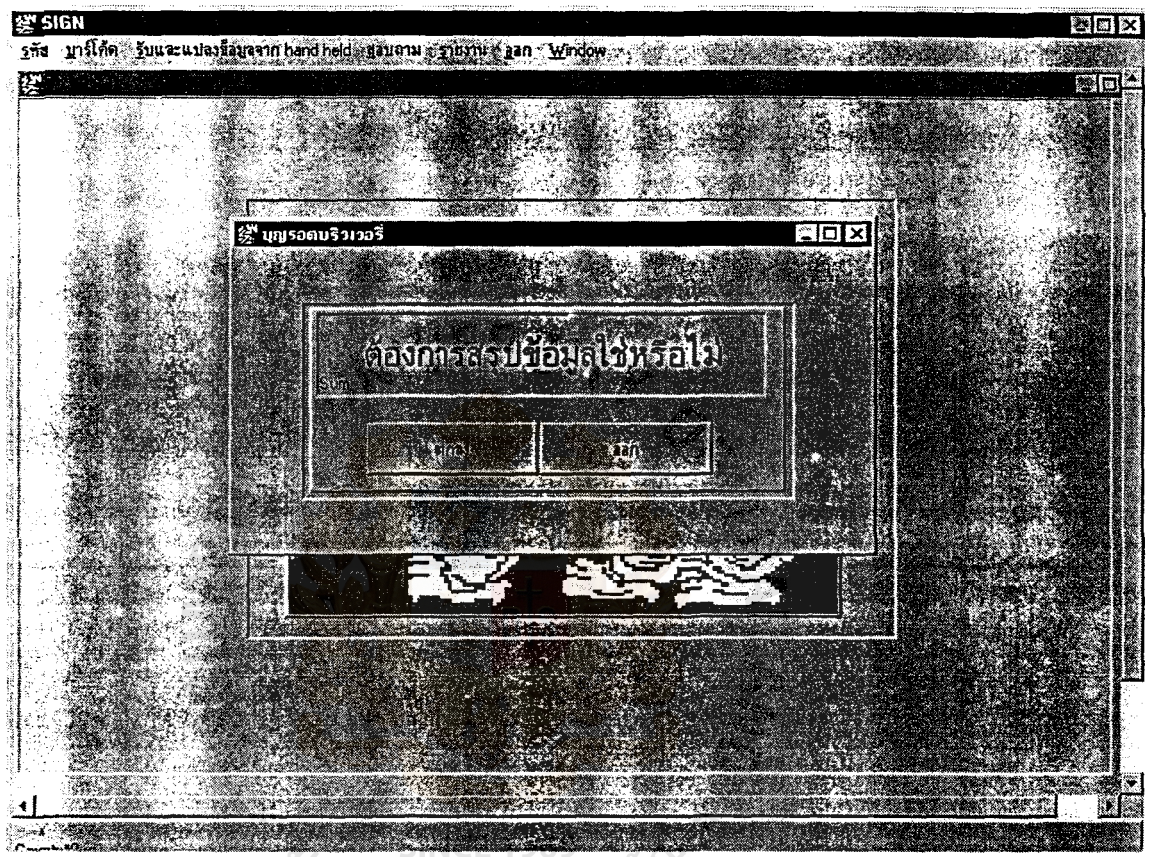

Figure E.10. Summary Data

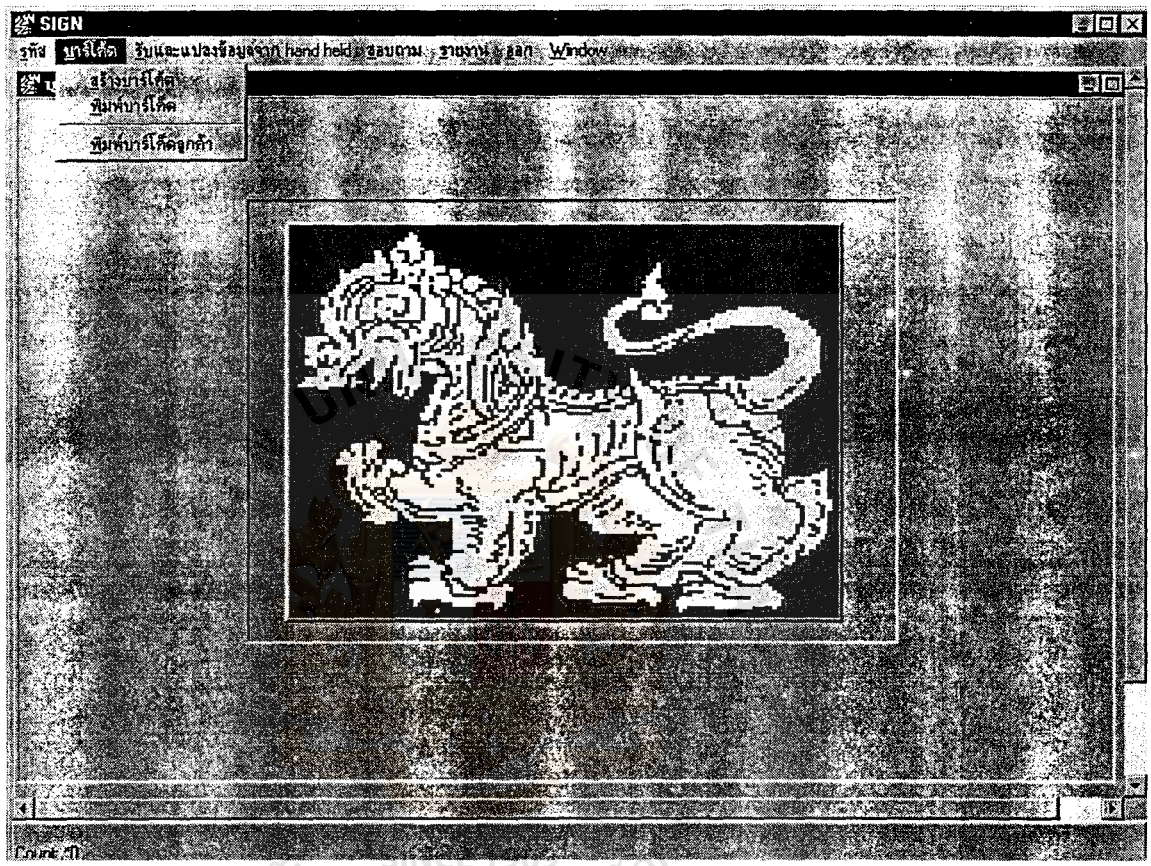

Figure E.11. Generate and Print Bar Code

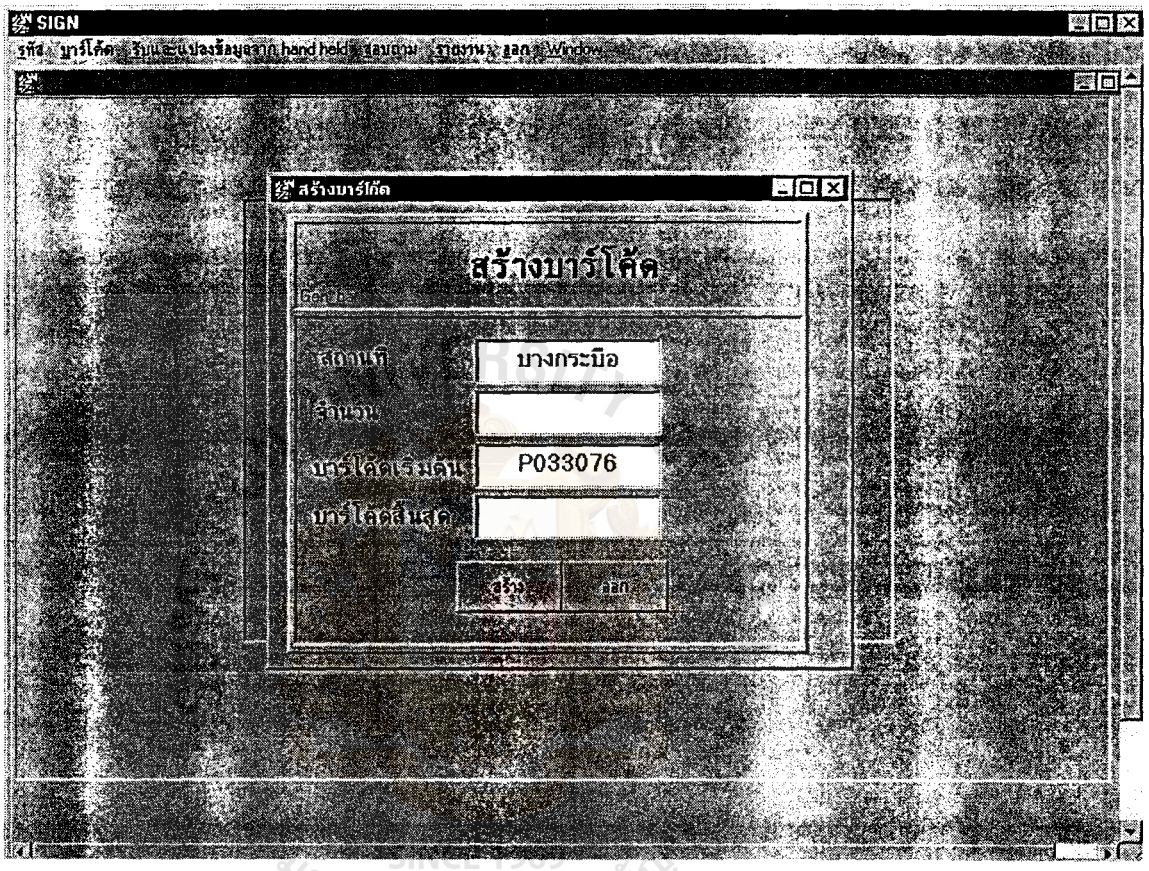

Figure E.12. Generate Bar Code

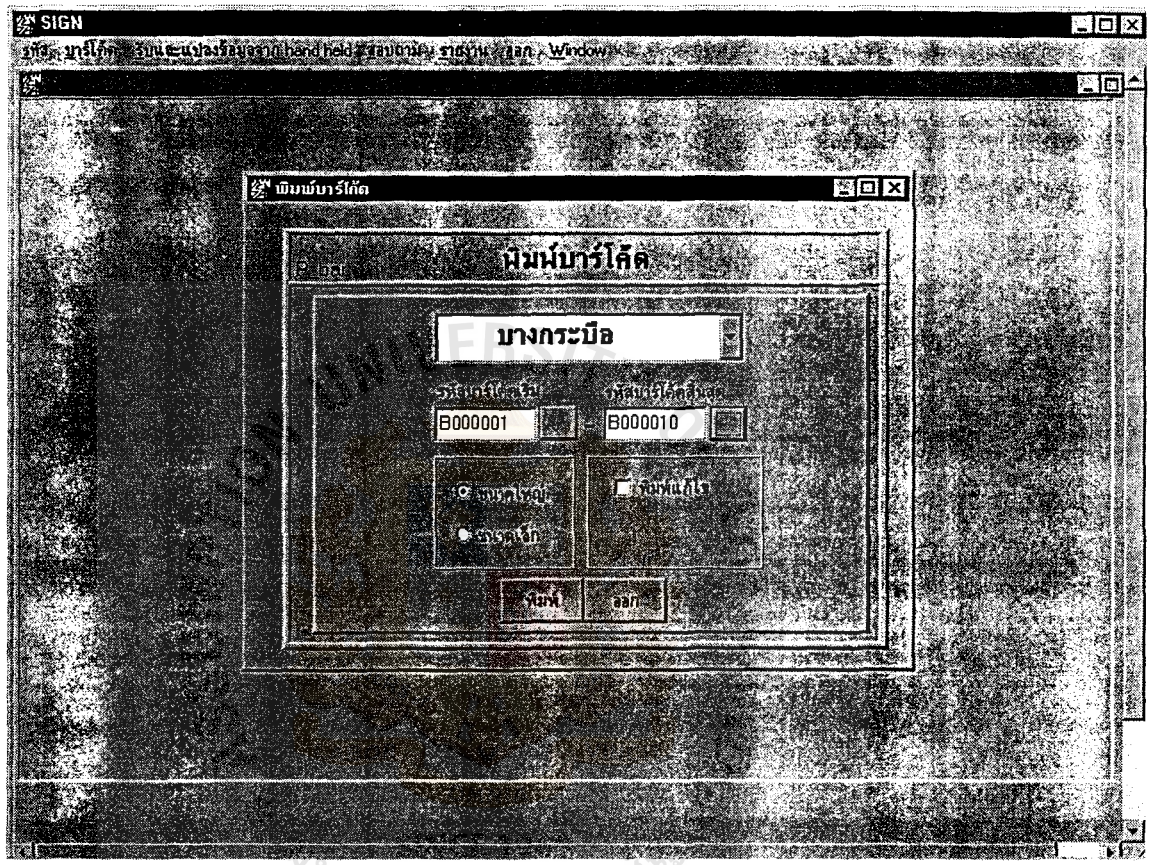

Figure E.13. Print Bar Code

Figure E.14. Print Customer's Bar Code

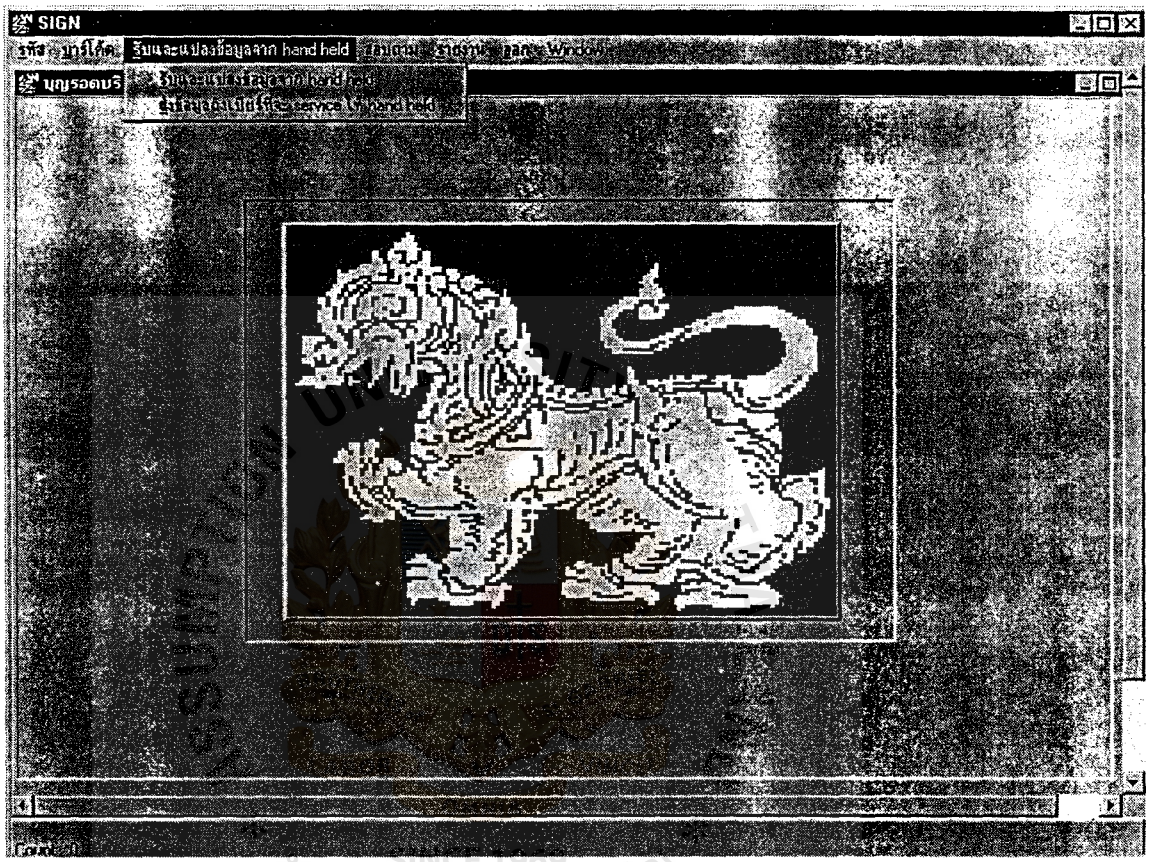

Figure E.15. Received and Converted Data From Hand Held

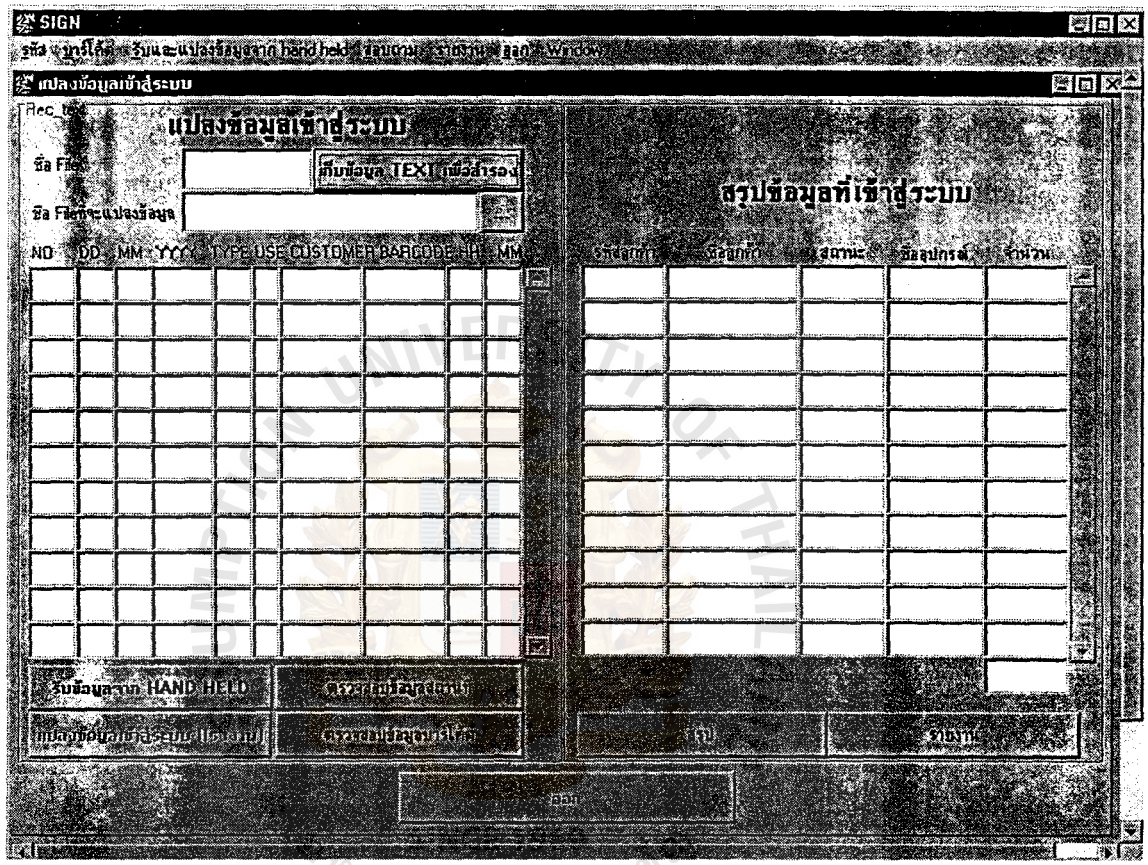

Figure E.16. Convert Data to System

Figure E.17. Load Data to Hand Held

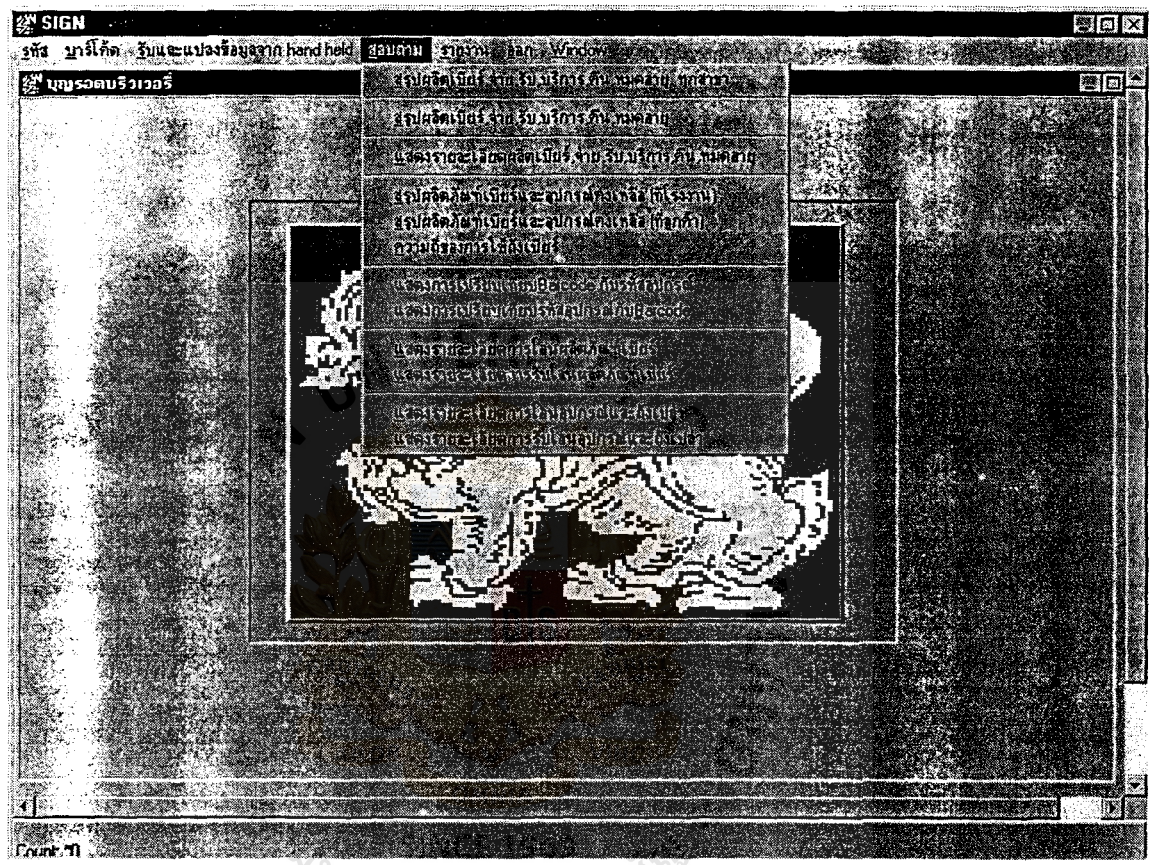

Figure E.18. Inquiry Menu

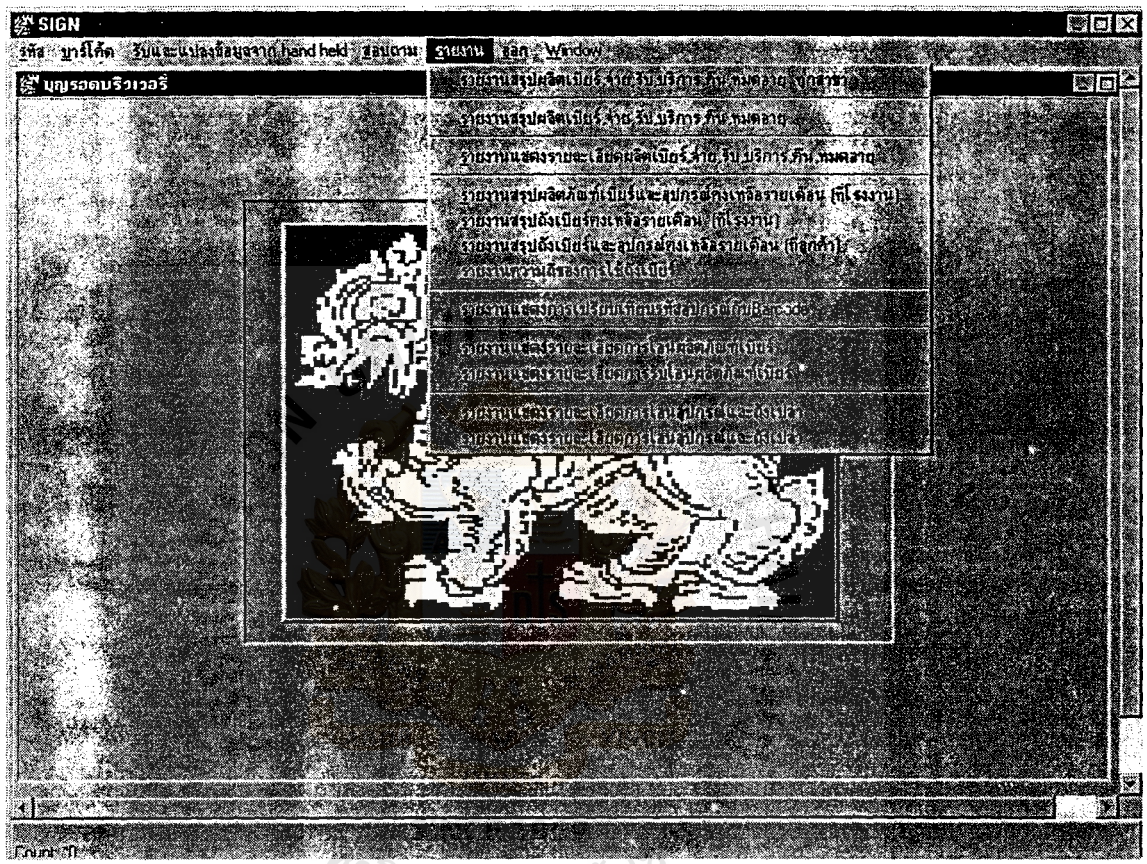

Figure E.19. Report Menu

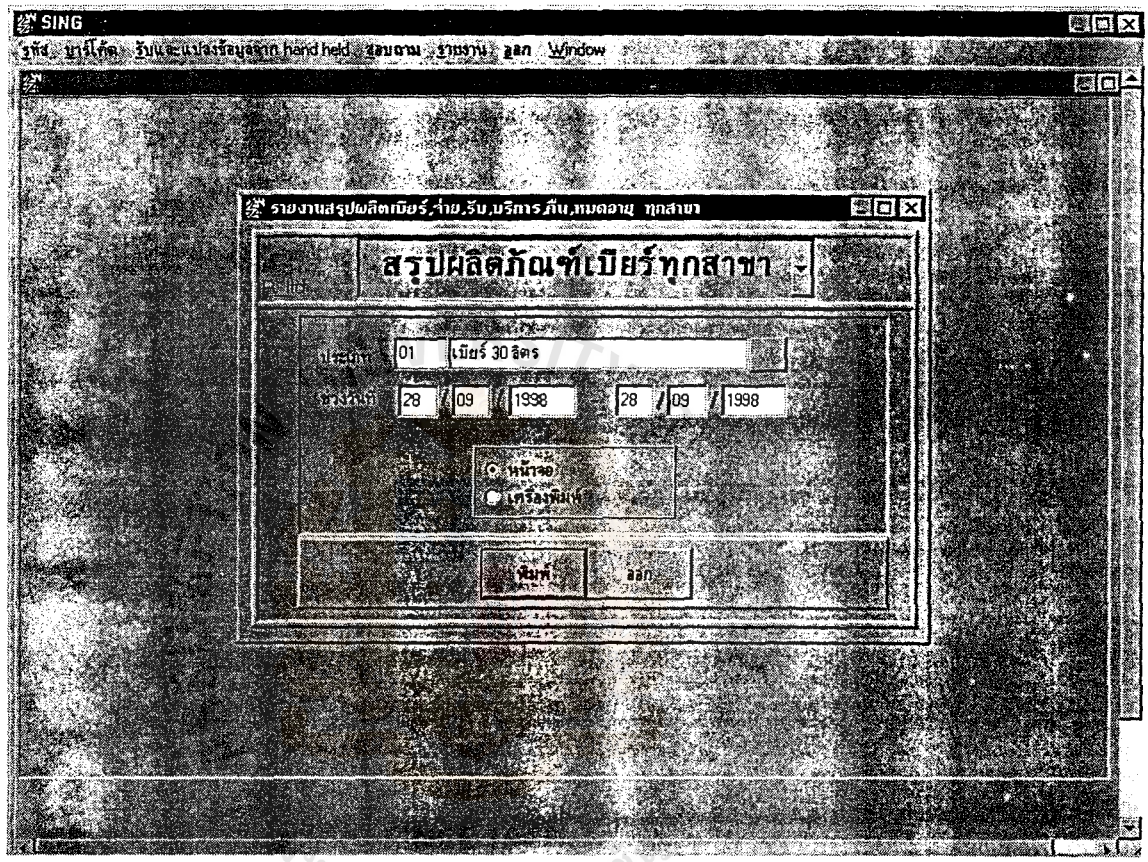

Figure E.20. Summary Product

Figure E.21. Summary Production

Figure E.22. Detail of Production

Figure E.23. Summary of Equipment

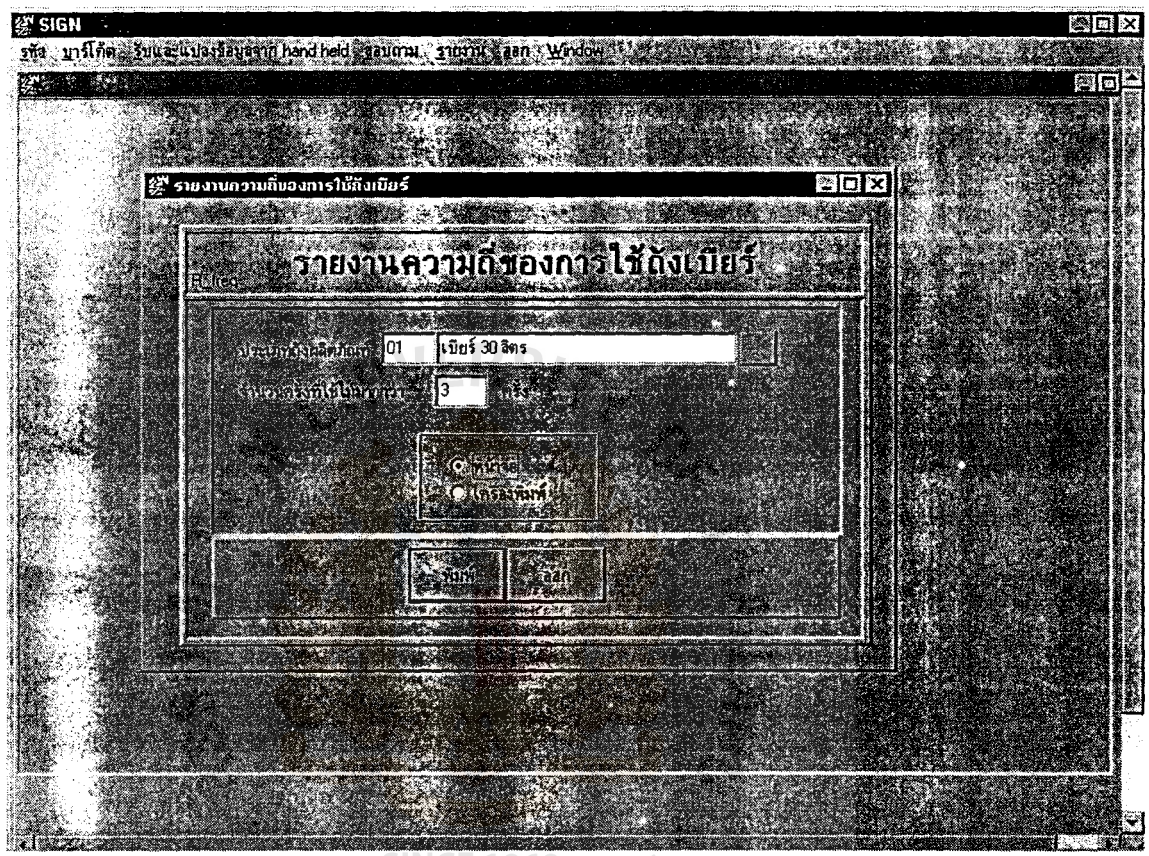

Figure E.24. Frequency of Tank Usage

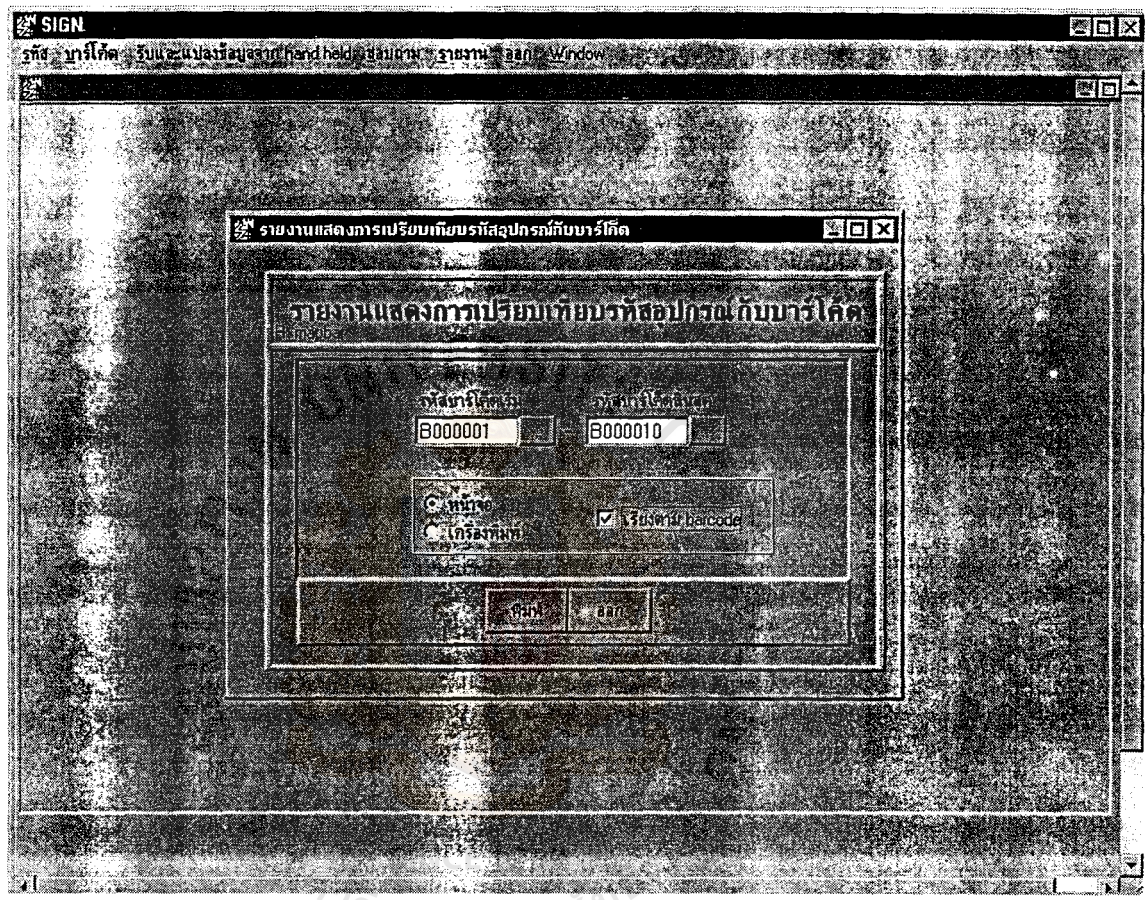

Figure E.25. Comparison between Equipment and Bar Code

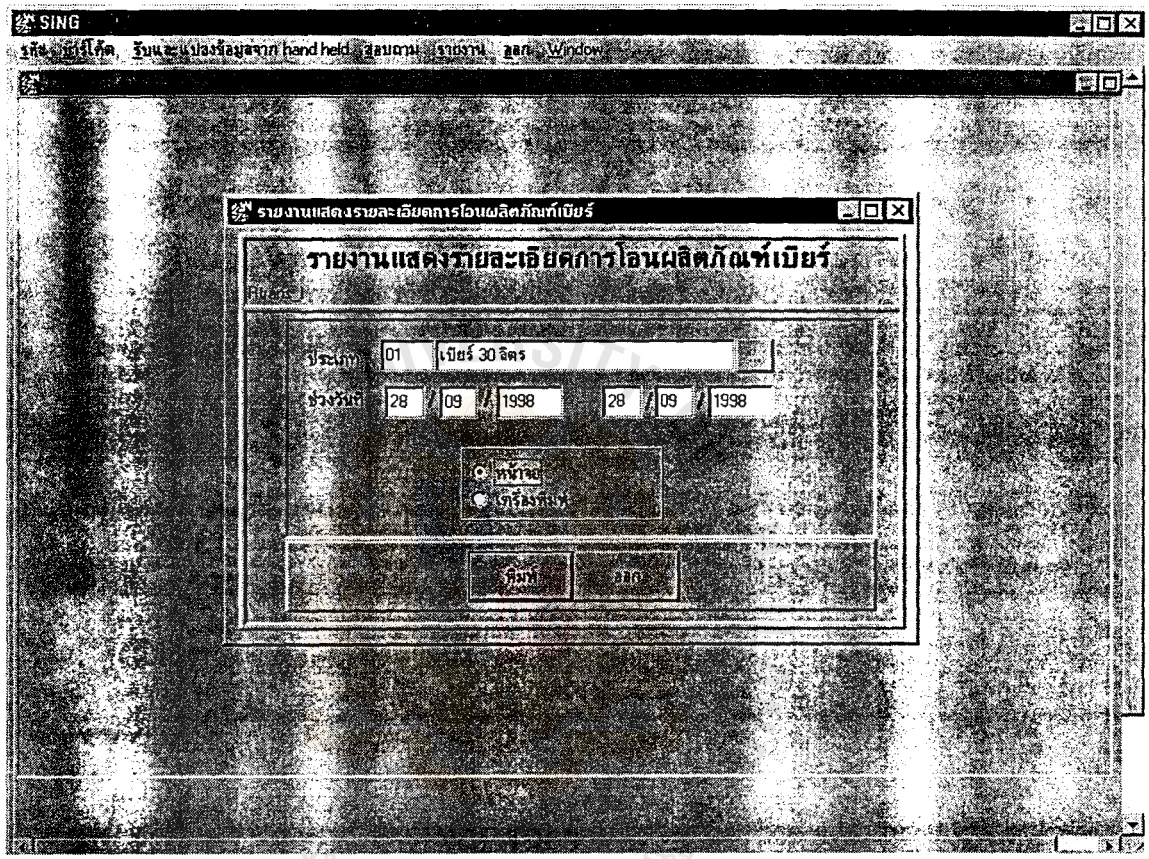

Figure E.26. Detail of Transfer Product

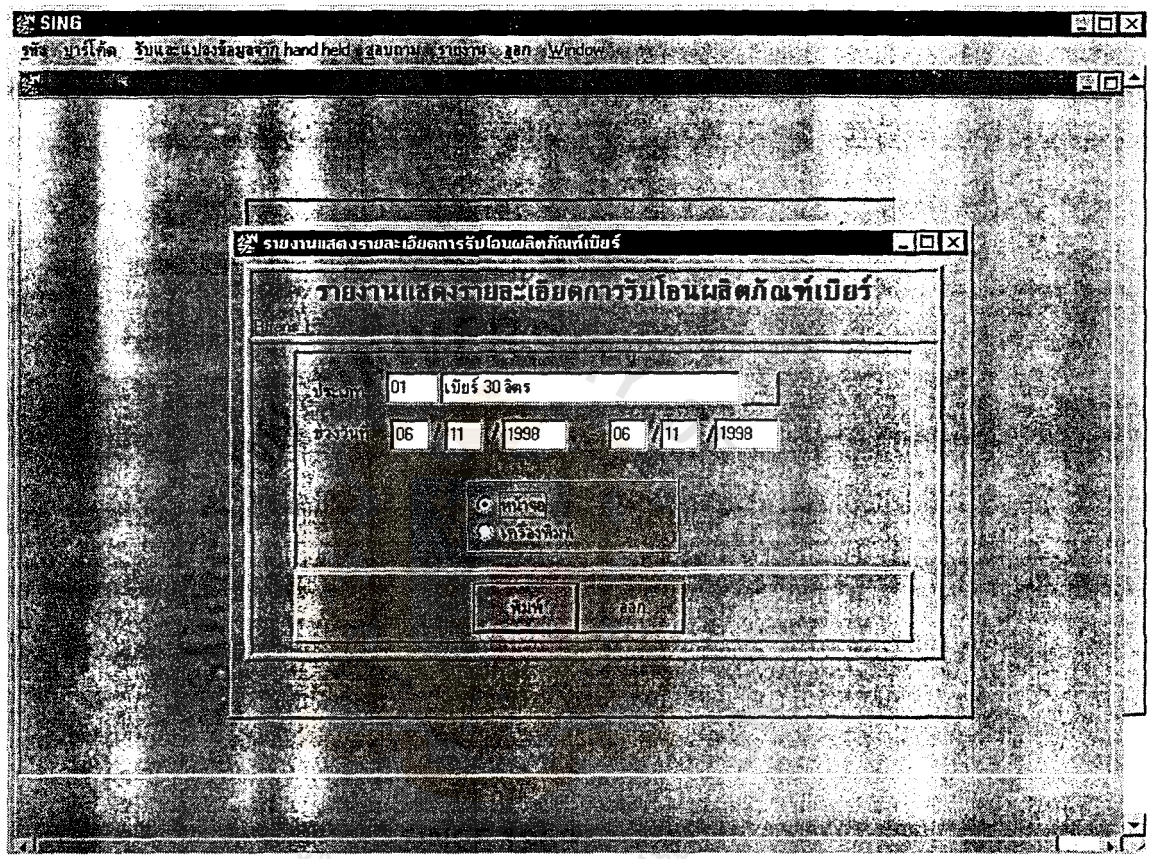

Figure E.27. Detail of Receive Product

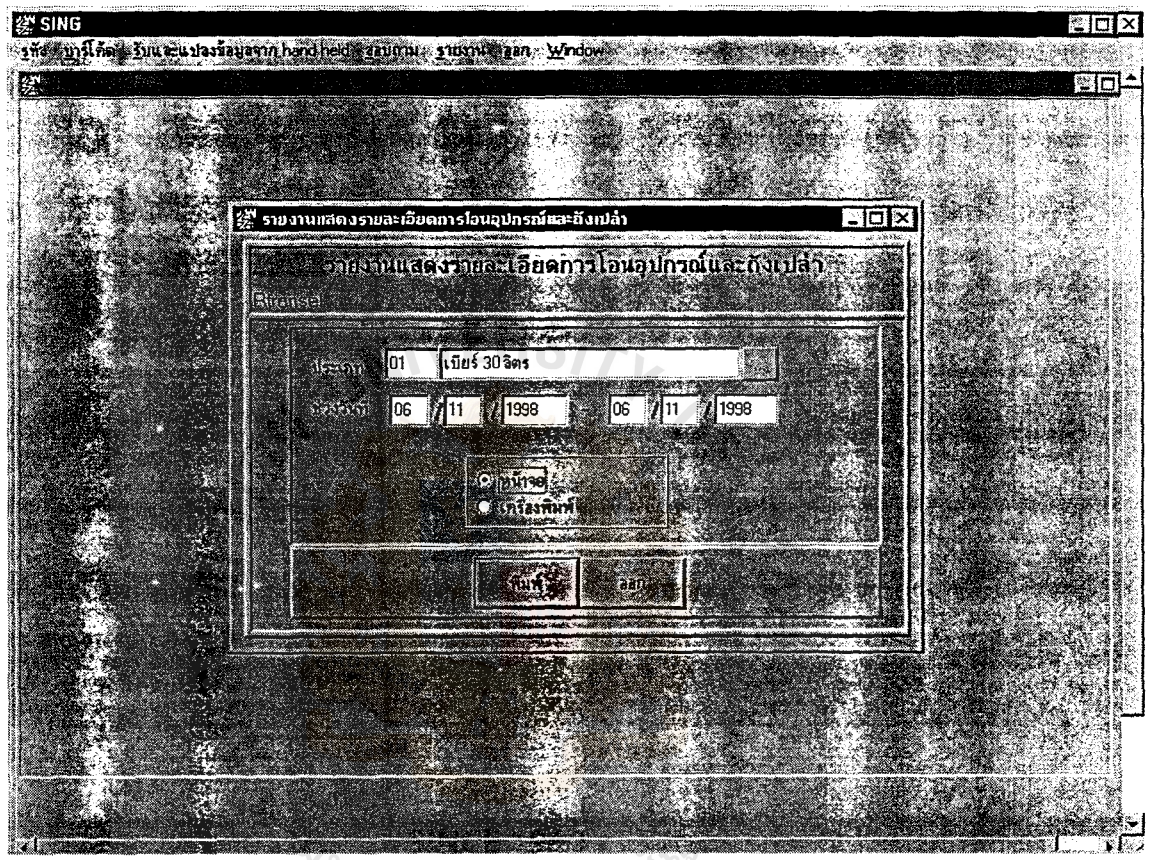

Figure E.28. Detail of Transfer Equipment

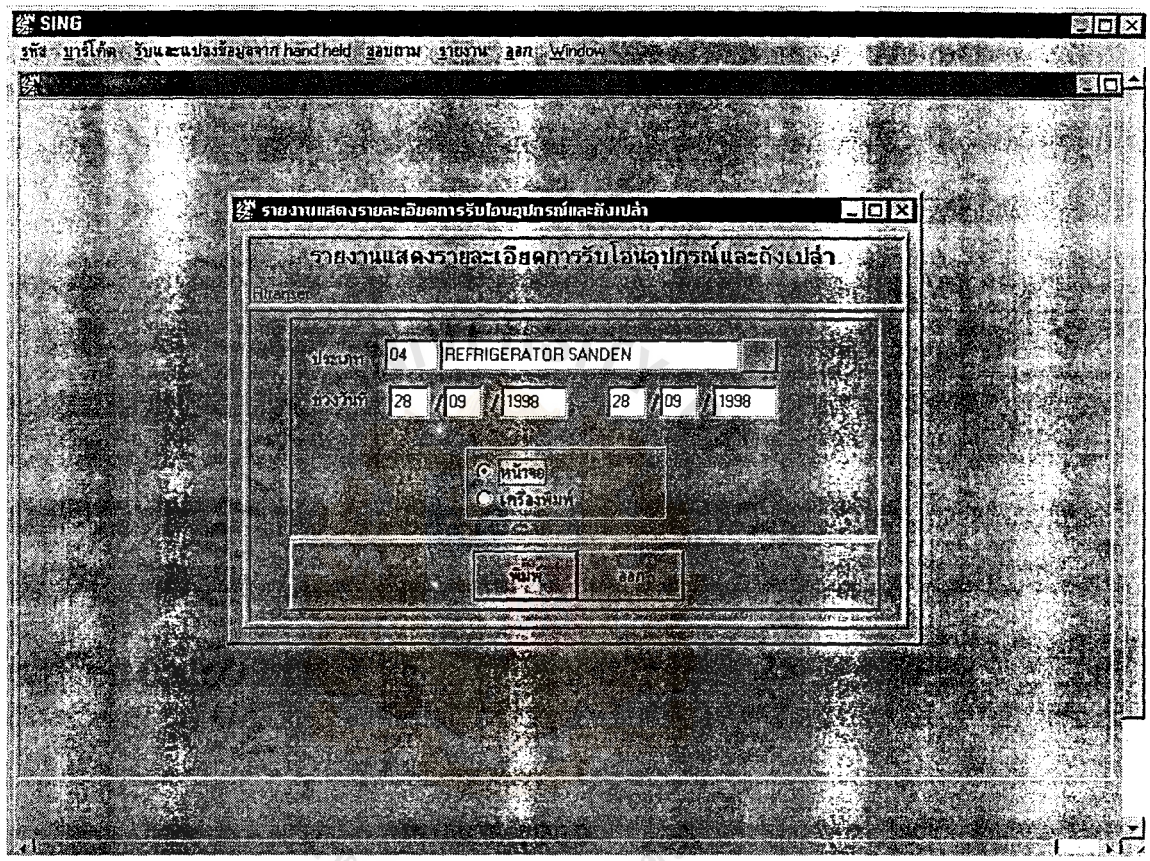

Figure E.29. Detail of Receive Equipment

APPENDIX F

Report Form Design

รายงานสรุปผลิตภัณฑ์เบียร์ทุกสาขา

ประเภท เบียร์ 30 ลิตร

วันที่ 01-AUG-98 ถึง 10-AUG-98

โรงงาน	สถานที่	วันที่	จำนวน
บุญรอด ปทุม		01-AUG-1998	525
		02-AUG-1998	428
		03-AUG-1998	400
		04-AUG-1998	32
		05-AUG-1998	40
ขอนแก่นบริวเวอรี่		01-Aug-1998	1540
		02-Aug-1998	150
		03-Aug-1998	1450
		04-Aug-1998	100
		05-Aug-1998	200
วังน้อย		01-Aug-1998	500
		02-Aug-1998	480
		03-Aug-1998	500
		04-Aug-1998	20
สุราษฎร์ธานี		01-Aug-1998	258
		02-Aug-1998	348
		03-Aug-1998	24
		04-Aug-1998	258
		05-Aug-1998	256
		06-Aug-1998	87
เชียงใหม่		01-Aug-1998	90
		02-Aug-1998	40

Figure F.1. Summary Production of All Branches

รายงานสรุปการจ่ายทุกสาขา

ประเภท เบียร์ 30 ลิตร

วันที่ 01-AUG-98 ถึง 10-AUG-98

โรงงาน	สถานที่	วันที่	จำนวน
บุญรอด ปทุม		01-AUG-1998	525
		02-AUG-1998	428
		03-AUG-1998	400
		04-AUG-1998	32
		05-AUG-1998	40
ขอนแก่นบริวเวอรี่		01-Aug-1998	1,540
		02-Aug-1998	150
		03-Aug-1998	1,450
		04-Aug-1998	100
		05-Aug-1998	200
วังน้อย		01-Aug-1998	500
		02-Aug-1998	480
		03-Aug-1998	500
		04-Aug-1998	20
สุราษฎร์ธานี		01-Aug-1998	258
		02-Aug-1998	348
		03-Aug-1998	24
		04-Aug-1998	258
		05-Aug-1998	256
เชียงใหม่		01-Aug-1998	90
		02-Aug-1998	40
		03-Aug-1998	500

Figure F.2. Summary Issue of All Branches

รายงานสรุปการรับทุกสาขา

ประเภท เบียร์ 30 ลิตร

วันที่ 01-AUG-98 **ถึง** 10-AUG-98

โรงงาน	สถานที่	วันที่	จำนวน
บุญรอด ปทุม		01-AUG-1998	525
		02-AUG-1998	428
		03-AUG-1998	400
		04-AUG-1998	32
		05-AUG-1998	40
ขอนแก่นบริวเวอรี่		01-Aug-1998	1540
		02-Aug-1998	150
		03-Aug-1998	1450
		04-Aug-1998	100
		05-Aug-1998	200
วังน้อย		01-Aug-1998	500
		02-Aug-1998	480
		03-Aug-1998	500
		04-Aug-1998	20
สุราษฎร์ธานี		01-Aug-1998	258
		02-Aug-1998	348
		03-Aug-1998	24
		04-Aug-1998	258
		05-Aug-1998	256
เชียงใหม่		01-Aug-1998	90
		02-Aug-1998	40
		03-Aug-1998	500

Figure F.3. Summary Goods Receipt Of All Branches

รายงานสรุปการบริการทุกสาขา

ประเภท เบียร์ 30 ลิตร

วันที่ 01-AUG-98 **ถึง** 10-AUG-98

โรงงาน	สถานที่	วันที่	จำนวน
บุญรอด ปทุม		01-AUG-1998	525
		02-AUG-1998	428
		03-AUG-1998	400
		04-AUG-1998	32
		05-AUG-1998	40
ขอนแก่นบริวเวอรี่		01-Aug-1998	1540
		02-Aug-1998	150
		03-Aug-1998	1450
		04-Aug-1998	100
		05-Aug-1998	200
วังน้อย		01-Aug-1998	500
		02-Aug-1998	480
		03-Aug-1998	500
		04-Aug-1998	20
สุราษฎร์ธานี		01-Aug-1998	258
		02-Aug-1998	348
		03-Aug-1998	24
		04-Aug-1998	258
		05-Aug-1998	256
เชียงใหม่		01-Aug-1998	90
		02-Aug-1998	40
		03-Aug-1998	500

Figure F.4. Summary Service of All Branches

รายงานสรุปการคืนทุกสาขา

ประเภท เบียร์ 30 ลิตร

วันที่ 01-AUG-98 ถึง 10-AUG-98

โรงงาน	สถานที่	วันที่	จำนวน
บุญรอด ปทุม		01-AUG-1998	525
		02-AUG-1998	428
		03-AUG-1998	400
		04-AUG-1998	32
		05-AUG-1998	40
ขอนแก่นบริวเวอรี่		01-Aug-1998	1540
		02-Aug-1998	150
		03-Aug-1998	1450
		04-Aug-1998	100
		05-Aug-1998	200
วังน้อย		01-Aug-1998	500
		02-Aug-1998	480
		03-Aug-1998	500
		04-Aug-1998	20
สุราษฎร์ธานี		01-Aug-1998	258
		02-Aug-1998	348
		03-Aug-1998	24
		04-Aug-1998	258
		05-Aug-1998	256
เชียงใหม่		01-Aug-1998	90
		02-Aug-1998	40
		03-Aug-1998	500

Figure F.5. Summary Goods Return of All Branches

รายงานสรุปการหมดอายุทุกสาขา

ประเภท เบียร์ 30 ลิตร

วันที่ 01-AUG-98 ถึง 10-AUG-98

โรงงาน	สถานที่	วันที่	จำนวน
บุญรอด ปทุม		01-AUG-1998	525
		02-AUG-1998	428
		03-AUG-1998	400
		04-AUG-1998	32
		05-AUG-1998	40
ขอนแก่นบริวเวอรี่		01-Aug-1998	1540
		02-Aug-1998	150
		03-Aug-1998	1450
		04-Aug-1998	100
		05-Aug-1998	200
วังน้อย		01-Aug-1998	500
		02-Aug-1998	480
		03-Aug-1998	500
		04-Aug-1998	20
สุราษฎร์ธานี		01-Aug-1998	258
		02-Aug-1998	348
		03-Aug-1998	24
		04-Aug-1998	258
		05-Aug-1998	256
เชียงใหม่		01-Aug-1998	90
		02-Aug-1998	40
		03-Aug-1998	500

Figure F.6. Summary Expire of All Branches

รายงานสรุปผลิตภัณฑ์เบียร์

สาขา บางกระบือ

ประเภท เบียร์ 30 ลิตร

วันที่ 01-JAN-98 ถึง 10-JAN-98

สถานที่	วันที่	จำนวน
บางกระบือ	01-Jan-1998	45
	02-Jan-1998	70
	03-Jan-1998	450
	04-Jan-1998	859
	05-Jan-1998	628
	06-Jan-1998	157
	07-Jan-1998	50
	08-Jan-1998	58
	09-Jan-1998	758
	10-Jan-1998	588
	รวม	3,663

Figure F.7. Summary Production Report

รายงานสรุปการจ่าย

สาขา บางกระบือ

ประเภท เบียร์ 30 ลิตร

วันที่ 01-JAN-98 ถึง 10-JAN-98

สถานที่	วันที่	จำนวน
บางกระบือ	01-Jan-1998	45
	02-Jan-1998	70
	03-Jan-1998	450
	04-Jan-1998	859
	05-Jan-1998	628
	06-Jan-1998	157
	07-Jan-1998	50
	08-Jan-1998	58
	09-Jan-1998	758
	10-Jan-1998	588
	รวม	3,663

Figure F.8. Summary Issue Report

รายงานสรุปการรับ

สาขา บางกระบือ

ประเภท เบียร์ 30 ลิตร

วันที่ 01-JAN-98 ถึง 10-JAN-98

สถานที่	วันที่	จำนวน
บางกระบือ	01-Jan-1998	45
	02-Jan-1998	70
	03-Jan-1998	450
	04-Jan-1998	859
	05-Jan-1998	628
	06-Jan-1998	157
	07-Jan-1998	50
	08-Jan-1998	58
	09-Jan-1998	758
	10-Jan-1998	588
	รวม	3,663

Figure F.9. Summary Receipt Report

รายงานสรุปการบริการ

สาขา บางกระบือ

ประเภท เบียร์ 30 ลิตร

วันที่ 01-JAN-98 ถึง 10-JAN-98

สถานที่	วันที่	จำนวน
บางกระบือ	01-Jan-1998	45
	02-Jan-1998	70
	03-Jan-1998	450
	04-Jan-1998	859
	05-Jan-1998	628
	06-Jan-1998	157
	07-Jan-1998	50
	08-Jan-1998	58
	09-Jan-1998	758
	10-Jan-1998	588
	รวม	3,663

Figure F.10. Summary Service Report

รายงานสรุปการคืน

สาขา บางกระบือ

ประเภท เบียร์ 30 ลิตร

วันที่ 01-JAN-98 ถึง 10-JAN-98

สถานที่	วันที่	จำนวน
บางกระบือ	01-Jan-1998	45
	02-Jan-1998	70
	03-Jan-1998	450
	04-Jan-1998	859
	05-Jan-1998	628
	06-Jan-1998	157
	07-Jan-1998	50
	08-Jan-1998	58
	09-Jan-1998	758
	10-Jan-1998	588
	รวม	3,663

Figure F.11. Summary Return Report

รายงานสรุปการหมดอายุ

สาขา บางกระบือ

ประเภท เบียร์ 30 ลิตร

วันที่ 01-JAN-98 ถึง 10-JAN-98

สถานที่	วันที่	จำนวน
บางกระบือ	01-Jan-1998	45
	02-Jan-1998	70
	03-Jan-1998	450
	04-Jan-1998	859
	05-Jan-1998	628
	06-Jan-1998	157
	07-Jan-1998	50
	08-Jan-1998	58
	09-Jan-1998	758
	10-Jan-1998	588
	รวม	3,663

Figure F.12. Summary Expire Report

รายงานแสดงรายละเอียดการบรรจุผลิตภัณฑ์

ประเภท เบียร์ 30 ลิตร

วันที่ 01-FEB-1998 ถึง 10-FEB-1998

วันที่	บาร์โค้ด	BATCH_NO	HH	MM
01-Feb-1998	B000015	1000001	08	35
	B000103	1000002	08	40
	B000139	1000003	08	45
02-Feb-1998	B000243	1000004	13	40
	B000318	1000005	13	45
	B000379	1000006	14	47
03-Feb-1998	B000385	1000007	09	23
	B000422	1000008	09	28
	B000520	1000009	09	32
	B000527	1000010	10	10
	B000537	1000011	10	15
04-Feb-1998	B000148	1000012	11	20
	B000586	1000013	11	25
	B000603	1000014	11	30
	B000738	1000015	11	45
05-Feb-1998	B000195	1000016	13	08
	B001042	1000017	13	17
	B001235	1000018	13	19
06-Feb-1998	B000155	1000019	11	25
	B001367	1000020	11	30
	B001368	1000021	11	35
07-Feb-1998	B001369	1000022	14	10
รวม	24			

Figure F.13. Details of Filled Quantity

รายงานแสดงรายละเอียดการจ่าย

ประเภท เบียร์ 30 ลิตร

วันที่ 01-FEB-1998 ถึง 10-FEB-1998

สถานที่	วันที่	จำนวน
แอมบาสซาเดอร์	01-Feb-1998	1
	02-Feb-1998	2
	03-Feb-1998	5
	04-Feb-1998	10
	05-Feb-1998	5
มาบุญครองศิริชัย บจก.	04-Feb-1998	1
	05-Feb-1998	5
รอยัส ปริ๊นเซส บจก.	02-Feb-1998	8
	03-Feb-1998	7
	04-Feb-1998	5
คุณ ปัทมา ประทุมทอง	02-Feb-1998	6
	03-Feb-1998	7
	04-Feb-1998	8
ไนซ์พาเลซ บจก.	04-Feb-1998	2
โอเอไอ คอนซัลแต้นท์	04-Feb-1998	5
	05-Feb-1998	4
	06-Feb-1998	6
	07-Feb-1998	5
	08-Feb-1998	4
	รวม	88

Figure F.14. Details of Issue

รายงานแสดงรายละเอียดการรับ

ประเภท เบียร์ 30 ลิตร

วันที่ 01-FEB-1998 ถึง 10-FEB-1998

สถานที่	วันที่	จำนวน
แอมบาสซาเดอร์	01-Feb-1998	1
	02-Feb-1998	2
	03-Feb-1998	5
	04-Feb-1998	10
	05-Feb-1998	5
มาบุญครองศิริชัย บจก.	04-Feb-1998	1
	05-Feb-1998	5
รอยัส ปริ๊นเซส บจก.	02-Feb-1998	8
	03-Feb-1998	7
	04-Feb-1998	5
คุณ ปัทมา ประทุมทอง	02-Feb-1998	6
	03-Feb-1998	7
	04-Feb-1998	8
ไนซ์พาเลซ บจก.	04-Feb-1998	2
โอเอไอ คอนซัลแต้นท์	04-Feb-1998	5
	05-Feb-1998	4
	06-Feb-1998	6
	07-Feb-1998	5
	08-Feb-1998	4
	รวม	96

Figure F.15. Details of Receipt

รายงานแสดงรายละเอียดการบริการรับ

ประเภท เบียร์ 30 ลิตร

วันที่ 01-FEB-1998 ถึง 10-FEB-1998

วันที่	บาร์โค้ด
01-Feb-1998	B000015
	B000103
	B000139
	B000243
02-Feb-1998	B000318
	B000379
03-Feb-1998	B000385
	B000422
	B000520
	B000527
04-Feb-1998	B000537
	B000148
	B000586
05-Feb-1998	B000603
	B000738
	B000195
	B001042
06-Feb-1998	B001235
	B000155
	B001367
07-Feb-1998	B001368
	B001369
	B001370

Figure F.16. Details of Service

รายงานแสดงรายละเอียดการคืน

ประเภท เบียร์ 30 ลิตร

วันที่ 01-FEB-1998 ถึง 10-FEB-1998

ชื่อผู้คืน	วันที่	บาร์โค้ด	หมายเหตุ
แอมบาสซาเดอร์	01-Feb-1998	B000015	
		B000103	
		B000139	
		B000243	
		B000318	
มาบุญครองศิริชัย บจก.	02-Feb-1998	B000379	
		B000385	
รอยัส ปริ๊นเซส บจก.	03-Feb-1998	B000422	
		B000520	
		B000527	
คุณ ปัทมา ประทุมทอง	04-Feb-1998	B000537	
		B000148	
		B000586	
ไนซ์พาเลซ บจก.	05-Feb-1998	B000603	
		B000738	
		B000195	
		B001042	
โอเอไอ คอนซัลแต้นท์	06-Feb-1998	B001235	
		B000155	
		B001367	
ครัวลีลา	07-Feb-1998	B001368	
		B001369	
	รวม	26	

Figure F.17. Details of Return

รายงานแสดงรายละเอียดการหมดอายุ

ประเภท เบียร์ 30 ลิตร

วันที่ 01-FEB-1998 ถึง 10-FEB-1998

ชื่อผู้คืน	วันที่	บาร์โค้ด	หมายเหตุ
แอมบาสซาเดอร์	01-Feb-1998	B000015	
		B000103	
		B000139	
		B000243	
		B000318	
มาบุญครองศิริชัย บจก.	02-Feb-1998	B000379	
		B000385	
รอยัส ปริ๊นเซส บจก.	03-Feb-1998	B000422	
		B000520	
		B000527	
คุณ ปัทมา ประทุมทอง	04-Feb-1998	B000537	
		B000148	
		B000586	
ไนซ์พาเลซ บจก.	05-Feb-1998	B000603	
		B000738	
		B000195	
		B001042	
โอเอไอ คอนซัลแต้นท์	06-Feb-1998	B001235	
		B000155	
		B001367	
ครัวลีลา	07-Feb-1998	B001368	
		B001369	
	รวม	25	

Figure F.18. Details of Expire

รายงานผลิตภัณฑ์เบียร์รายเดือน(โรงงาน)

ประเภท เบียร์ 30 ลิตร

ประจำเดือน 05/1999

วันที่	ยอดยกมา	ยอดบรรจุ,โอน,คืน	ยอดจ่าย	ยอดคงเหลือ
01-May-1999	1227	1	414	864
02-May-1999	864	4	117	751
03-May-1999	751	0	128	623
04-May-1999	623	3	475	151
05-May-1999	151	200	272	79
06-May-1999	79	202	252	29
07-May-1999	29	400	301	128
08-May-1999	128	450	404	174
09-May-1999	174	6	131	49
10-May-1999	49	200	174	75
11-May-1999	75	402	355	122
12-May-1999	122	300	365	57
13-May-1999	1252	51	111	1192
14-May-1999	1352	808	288	1872
15-May-1999	1333	44	24	1353
16-May-1999	1458	25	122	1361
17-May-1999	1258	48	222	1084
18-May-1999	1358	25	458	925
19-May-1999	1458	69	255	1272
20-May-1999	1659	58	356	1361

Figure F.19. Monthly Production (At Factory)

รายงานความถี่ของการใช้ถังเบียร์

ประเภท เบียร์ 30 ลิตร

จำนวนครั้งที่ใช้ไม่มากกว่า 3 ครั้ง

รหัส Bar Code	จำนวนครั้งที่ใช้
B000015	1
B000103	1
B000139	1
B000243	1
B000318	1
B000379	1
B000385	2
B000422	3
B000520	1
B000527	1
B000537	1
B000148	2
B000586	2
B000603	1
B000738	3
B000195	3
B001042	3
B001235	3
B000155	2
B001367	2
B001368	1
B001369	2

Figure F.20. Frequency Report of Tanks Usage

APPENDIX G

Table Design

Table G.1. Amphur

System Name : Draft Beer Prpduct and Equipment Control System

Table Name : Amphur

Table Description : Amphur

Field Description :

Field Name	Type	Description
amphur_code	CHAR(2)	amphur code
province_code	CHAR(2)	province code
amphur_desc_th	VARCHAR2(100)	amphur name in thai
amphur_desc_en	VARCHAR2(100)	amphur name in english

Primary Key : amphur_code, province_code

Foreign Key : province_code

Table G.2. Province

System Name : Draft Beer Product and Equipment Control System

Table Name : Province

Table Description : Province

Field Description :

Field Name	Type	Description
province_code	CHAR(2)	province code
province_desc_th	VARCHAR2(100)	province name in thai
province_desc_en	VARCHAR2(100)	province name in english

Primary Key : province_code

Foreign Key :

Table G.3. Equipment Status

System Name : Draft Beer Prpdict and Equipment Control System

Table Name : Equipment Status

Table Description : Equipment Status

Field Description :

Field Name	Type	Description
status_no	CHAR(2)	status code
status_desc	VARCHAR2(100)	status description

Primary Key : status_no

Foreign Key : -

Table G.4. Bar Code

System Name : Draft Beer Product and Equipment Control System

Table Name : Bar Code

Table Description : Bar Code

Field Description :

Field Name	Type	Description
bar_code	CHAR(7)	bar code no.
equipment_code	VARCHAR2(20)	serial no.
type_code	VARCHAR2(2)	equipment type

Primary Key : bar_code

Foreign Key : bar_code, equipment_code, type_code

Table G.5. Equipment

System Name : Draft Beer Product and Equipment Control System

Table Name : Equipment

Table Description : Equipment

Field Description :

Field Name	Type	Description
equipment_code	CHAR(20)	serial no
type_code	CHAR(2)	equipment type
entry_date	DATE	start date
entry_dd	CHAR(2)	start day
entry_mm	CHAR(2)	start monty
entry_yy	CHAR(4)	start year

Primary Key : equipment_code, type_code

Foreign Key : type_code

Table G.6. Type

System Name : Draft Beer Product and Equipment Control System

Table Name : Type

Table Description : Equipment Type

Field Description :

Field Name	Type	Description
type_code	CHAR(2)	equipment type
type_desc	VARCHAR2(100)	full name of equipment type
type_abbrv	VARCHAR2(100)	abbreviate name

Primary Key : type_code

Foreign Key : -

Table G.7. Equipment Stock

System Name : Draft Beer Product and Equipment Control System

Table Name : Equipment Stock

Table Description : Stock of Equipment

Field Description :

Field Name	Type	Description
count_use	CHAR(2)	frequency used
status_use	CHAR(1)	used status
status_location	CHAR(7)	owner equipment

Primary Key : bar_code

Foreign Key : status_no, Location_code

Table G.8. Location

System Name : Draft Beer Product and Equipment Control System

Table Name : Location

Table Description : Customer

Field Description :

Field Name	Type	Description
location_code	CHAR(7)	customer code
location_code_old	VARCHAR2(5)	old customer code
amphur_code	CHAR(2)	amphur code
province_code	CHAR(2)	province code
location_desc	VARCHAR2(300)	customer name
district	VARCHAR2(100)	district
street	VARCHAR2(100)	street
soi	VARCHAR2(100)	soi
tel	VARCHAR2(100)	telephone number
fax	VARCHAR2(100)	fax number
status_location	CHAR(1)	owner
address	VARCHAR2(300)	customer description
master_location	VARCHAR2(300)	

Primary Key : location_code

Foreign Key : amphur_code, province_code

Table G.9. Expire

System Name : Draft Beer Product and Equipment Control System

Table Name : Expire

Table Description : Expire of Producdt and Equipment

Field Description :

Field Name	Type	Description
111	DATE	expire date
bar_code	CHAR(7)	bar code no.
location_code	CHAR(7)	customer code
hh	CHAR(2)	hour
mm	CHAR(2)	minute
expire_dd	CHAR(2)	expire day
expire_mm	CHAR(2)	expire month
expire_yy	CHAR(4)	expire year
expire_desc	VARCHAR2(100)	expire description
ss	CHAR(7)	operator
type_code	CHAR(2)	equipment type

Primary Key : expire_date, bar_code, location_code, hh, mm

Foreign Key : bar_code, location_code

Table G.10. Return

System Name : Draft Beer Product and Equipment Control System

Table Name : Return

Table Description : Return

Field Description :

Field Name	Type	Description
return_date	DATE	return date
bar_code	CHAR(7)	bar code no.
location_code	CHAR(7)	customer code
hh	CHAR(2)	hour
mm	CHAR(2)	minute
status_return_code	CHAR(2)	return code
return_dd	CHAR(2)	return day
return_mm	CHAR(2)	return month
return_yy	CHAR(4)	return year
ss	CHAR(7)	operator
type_code	CHAR(2)	equipment type

Primary Key : return_date, bar_code, location_code, hh, ,mm

Foreign Key : bar_code, location_code, status_return_code

Table G.11. Receive

System Name : Draft Beer Product and Equipment Control System

Table Name : Receive

Table Description : Receive

Field Description :

Field Name	Type	Description
receive_date	DATE	recript date
bar_code	CHAR(7)	bar code no.
location_code	CHAR(7)	customer code
hh	CHAR(2)	hour
mm	CHAR(2)	minute
receive_dd	CHAR(2)	received day
receive_mm	CHAR(2)	received month
receive_yy	CHAR(4)	received year
receive_desc	VARCHAR2(200)	received description
ss	CHAR(7)	operator
type_code	CHAR(2)	equipment type

Primary Key : receive_date, bar_code, location_code, hh, mm

Foreign Key : bar_code, location_code

Table G.12. Status Return

System Name : Draft Beer Product and Equipment Control system

Table Name : Status Return

Table Description : Return Status

Field Description :

Field Name	Type	Description
status_return_code	CHAR(2)	return status code
status_return_desc	VARCHAR2(100)	return status description

Primary Key : status_return_code

Foreign Key : -

Table G.13. Total Last

System Name : Draft Beer Product and Equipment Control System

Table Name : Total Last

Table Description : Balance Forward of Product and Equipment

Field Description :

Field Name	Type	Description
type_code	CHAR(2)	equipment type
mm	CHAR(2)	month
yy	CHAR(4)	year
total_last	NUMBER(8)	balance forward

Primary Key : type_code, mm, yy

Foreign Key : -

Table G.14. Total Empty

System Name : Draft Beer Product and Equipment Control System

Table Name : Total Empty

Table Description : Balance Forward of Empty Tank

Field Description :

Field Name	Type	Description
type_code	CHAR(2)	equipment type
mm	CHAR(2)	hour
yy	CHAR(4)	minute
total_empty	NUMBER(8)	balance forward

Primary Key : type_code, mm, yy

Foreign Key : -

Table G.15. Monthly Table

System Name : Draft Beer Product and Equipment Control System

Table Name : Monthly Table

Table Description :

Field Description :

Field Name	Type	Description
type_code	CHAR(2)	equipment type
net_code	DATE	
net_dd	CHAR(2)	
net_mm	CHAR(2)	
net_yy	CHAR(4)	
net1	NUMBER(8)	
net2	NUMBER(8)	
net3	NUMBER(8)	
net4	NUMBER(8)	

Primary Key : -

Foreign Key : -

Table G.16. Total_ Ltd _Table

System Name : Draft Beer Product and Equipment Control System

Table Name : Total_Ltd_Table

Table Description : Summary

Field Description :

Field Name	Type	Description
factory_code	CHAR(5)	factory code
location_code	CHAR(2)	customer code
ltd_type	CHAR(2)	status type
ltd_date	DATE	date
ltd_type_code	CHAR(2)	equipment type code
status_return	CHAR(2)	return status
ltd_dd	CHAR(2)	day
ltd_mm	CHAR(2)	month
ltd_yy	CHAR(4)	year
sum_barcade	NUMBER(8)	total of bar code
ss	CHAR(7)	operator

Primary Key : factory_code, location_coe, ltd_type, ltd_date,
ltd_type_code, status_return

Foreign Key : -

Table G.17. Service

System Name : Draft Beer Product and Equipment Control System

Table Name : Service

Table Description : Service

Field Description :

Field Name	Type	Description
service_date	DATE	service date
bar_code	CHAR(7)	bar code no.
location_code	CHAR(7)	customer code
hh	CHAR(2)	hours
mm	CHAR(2)	minute
service_dd	CHAR(2)	service day
service_mm	CHAR(2)	service month
service_yy	CHAR(4)	service year
service_desc	VARCHAR2(100)	service description
ss	CHAR(7)	operator
type_code	CHAR(2)	equipment type

Primary Key : service_date, Bar_code, Location_code, hh, mm

Foreign Key : bar_code, location_code

Table G.18. Loading

System Name : Draft Beer Product and Equipment Control System

Table Name : Loading

Table Description : Issue

Field Description :

Field Name	Type	Description
loading_date	DATE	issue date
bar_code	CHAR(7)	bar code no.
location_code	CHAR(7)	customer code
hh	CHAR(2)	hours
mm	CHAR(2)	minute
loading_dd	CHAR(2)	issue day
loading_mm	CHAR(2)	issue month
loading_yy	CHAR(4)	issue year
loading_desc	VARCHAR(200)	issue description
ss	CHAR(7)	operator
type_code	CHAR(2)	equipment type

Primary Key : loading_date, bar_code, location_code, hh, mm

Foreign Key : bar_code, location_code

Table G.19. Product

System Name : Draft Beer Product and Equipment Control System

Table Name : Product

Table Description : Production

Field Description :

Field Name	Type	Description
pack_date	DATE	production date
bar_code	CHAR(7)	bar code no.
location_code	CHAR(7)	customer code
hh	CHAR(2)	hour
mm	CHAR(2)	minute
pack_dd	CHAR(2)	production day
pack_mm	CHAR(2)	production month
pack_yy	CHAR(4)	production year
batch_no	CHAR(7)	production line code
product_desc	VARCHAR2(200)	production description
ss	CHAR(7)	operator
type_code	CHAR(2)	equipment type

Primary Key : pack_date, bar_code, location_code, hh, mm

Foreign Key : bar_code, location_code

Table G.20. Tran Receive

System Name : Draft Beer Product and Equipment Control System

Table Name : Tran Receive

Table Description : Transfer Receiving

Field Description :

Field Name	Type	Description
trans_date	DATE	transfering date
status_no	CHAR(2)	status code and equipment
bar_code	CHAR(7)	bar code no.
location_code	CHAR(7)	customer code
hh	CHAR(2)	hours
mm	CHAR(2)	minute
trans_dd	CHAR(2)	transfering day
trans_mm	CHAR(2)	transfering month
trans_yy	CHAR(4)	transfering year
trans_desc	VARCHAR2(100)	transfering description
ss	CHAR(7)	operator
type_code	CHAR(2)	equipment type
status_oldnew	CHAR(1)	old status

Primary Key : trans_date, status_no, bar_code, location_code, hh, mm

Foreign Key : bar_code, location_code

Table G.21. Trans Loading

System Name : Draft Beer Product and Equipment Control System

Table Name : Trans Loading

Table Description : Transfers

Field Description :

Field Name	Type	Description
trans_date	DATE	transfering date
status_no	CHAR(2)	status code and equipment
bar_code	CHAR(7)	bar code no.
location_code	CHAR(7)	customer code
hh	CHAR(2)	hour
mm	CHAR(2)	minute
trans_dd	CHAR(2)	transfering day
trans_mm	CHAR(2)	transfering month
trans_yy	CHAR(4)	transfering year
trans_desc	VARCHAR2(100)	transfering description
ss	CHAR(7)	operator
type_code	CHAR(2)	equipment type

Primary Key : trans_date, status_no, bar_code, location_code, hh, mm

Foreign Key : bar_code, Location_code

Table G.22. Temp Trans

System Name : Draft Beer Product and Equipment Control System

Table Name : Temp Trans

Table Description : Tempolary Transfers Table

Field Description :

Field Name	Type	Description
trans_date	DATE	transfering date
status_no	CHAR(2)	status code
bar_code	CHAR(7)	bar code no.
location_code	CHAR(7)	customer code
hh	CHAR(2)	hour
mm	CHAR(2)	minute
trans_dd	CHAR(2)	transfer day
trans_mm	CHAR(2)	transfer month
trans_yy	CHAR(4)	transfer year
trans_desc	VARCHAR2(100)	transfer description
ss	CHAR(7)	operator
type_code	CHAR(2)	equipment type

Primary Key : trans_date, status_no, bar_code, location_code, hh, mm

Foreign Key : bar_code, location_code

Table G.23. Temp Detail Bar code

System Name : Draft Beer Product and Equipment Control System

Table Name : Temp Detail Bar code

Table Description : Tempolary Bar Code Detail Table

Field Description :

Field Name	Type	Description
user_id	VARCHAR2(30)	user id
lastactive_date	DATE	last used date
bar_code	CHAR(7)	bar code no.

Primary Key : -

Foreign Key : -

Table G.24. Location Status

System Name : Draft Beer Product and Equipment Control System

Table Name : Location Status

Table Description : Location Status

Field Description :

Field Name	Type	Description
location_status	CHAR(1)	factory status
location_code	CHAR(7)	factory code

Primary Key : -

Foreign Key : -

Table G.25. Print Bar Code

System Name : Draft Beer Product and Equipment Control System

Table Name : Print Bar Code

Table Description :

Field Description :

Field Name	Type	Description
type_code	VARCHAR2(100)	equipment type

Primary Key : -

Foreign Key : -

Table G.26. Batch No

System Name : Draft Beer Product and Equipment Control System

Table Name : Batch No

Table Description : Production Line

Field Description :

Field Name	Type	Description
batch_no	CHAR(7)	production line code
batch_desc	VARCHAR2(200)	production line description
batch_date	DATE	manufactury date
batch_dd	CHAR(2)	manufactury day
batch_mm	CHAR(2)	manufactury monty
batch_yy	CHAR(4)	manufactury year

Primary Key : batch_no

Foreign Key : -

APPENDIX H

Structure Chart

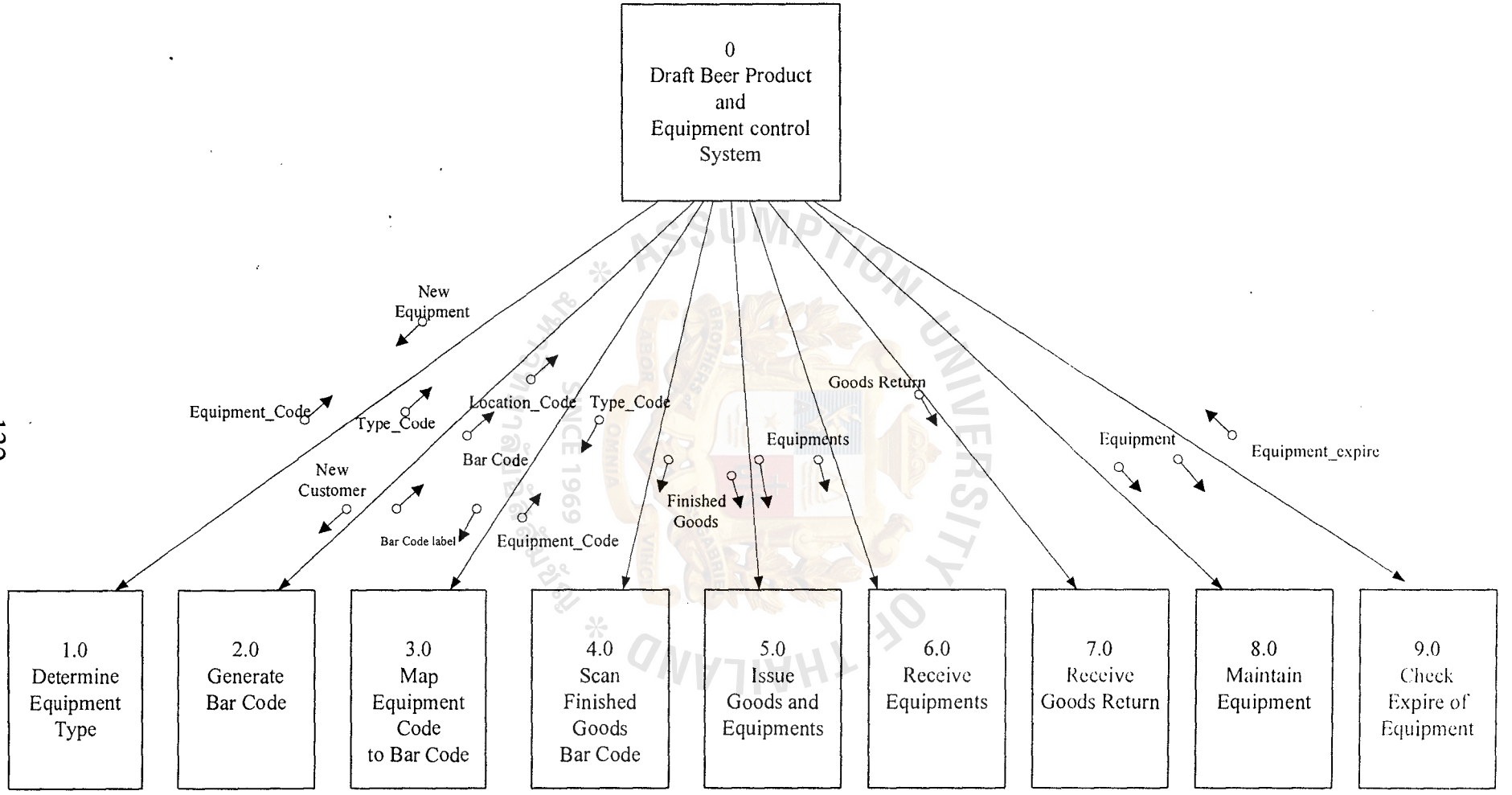

Figure H.1. Structure Chart of Draft Beer Product and Equipment Control System

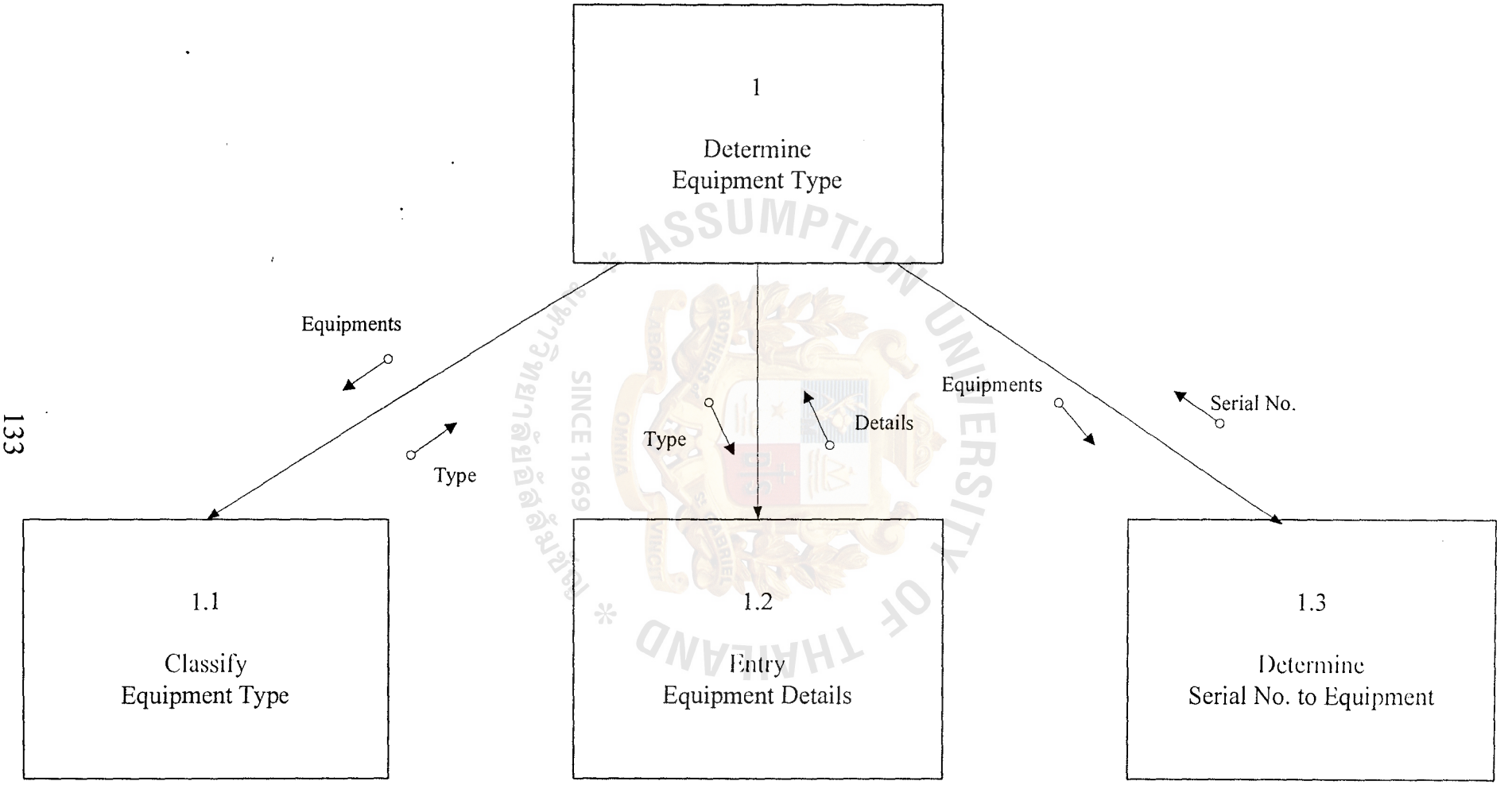

Figure H.2. Structure Chart of Process 1.0

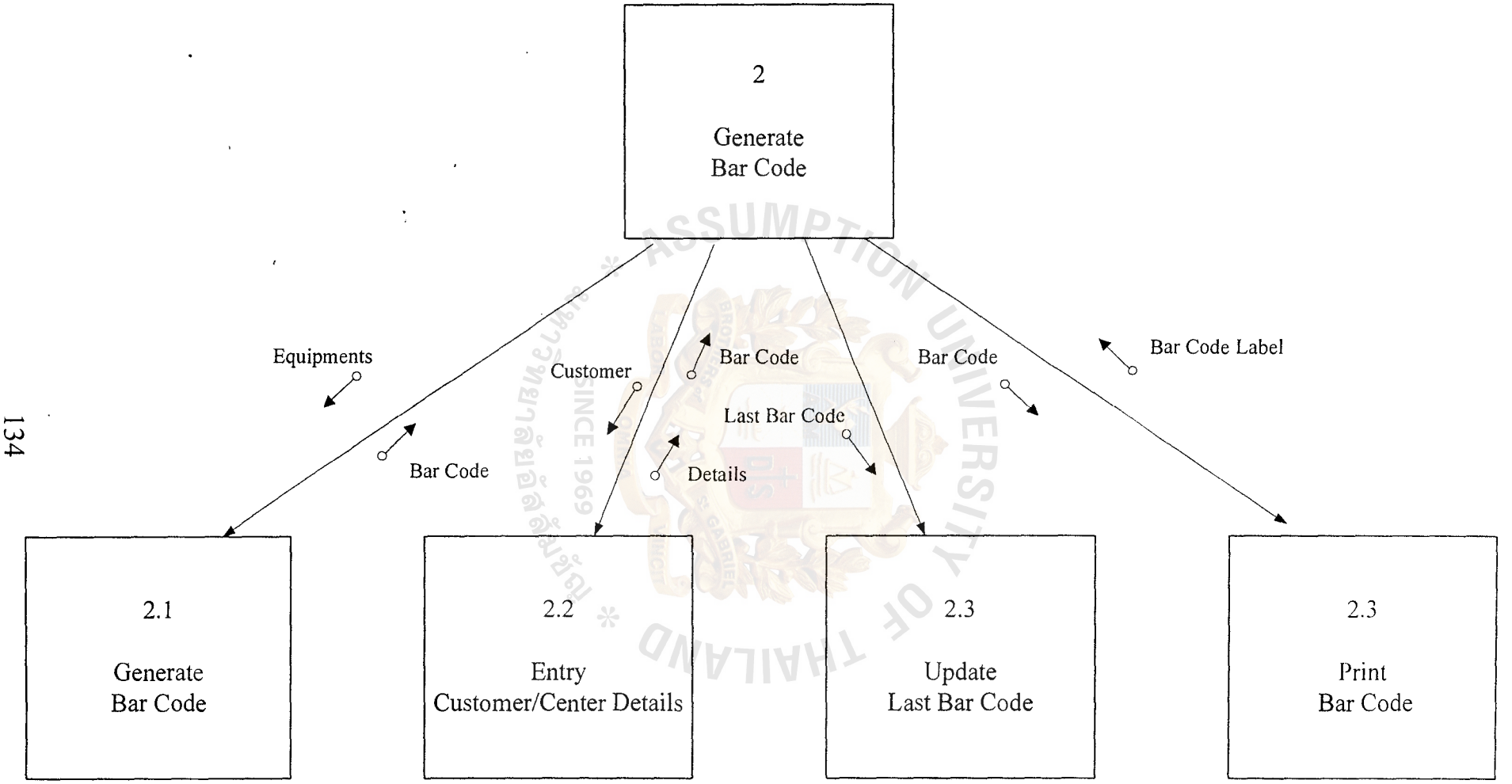

Figure H.3. Structure Chart of Process 2.0

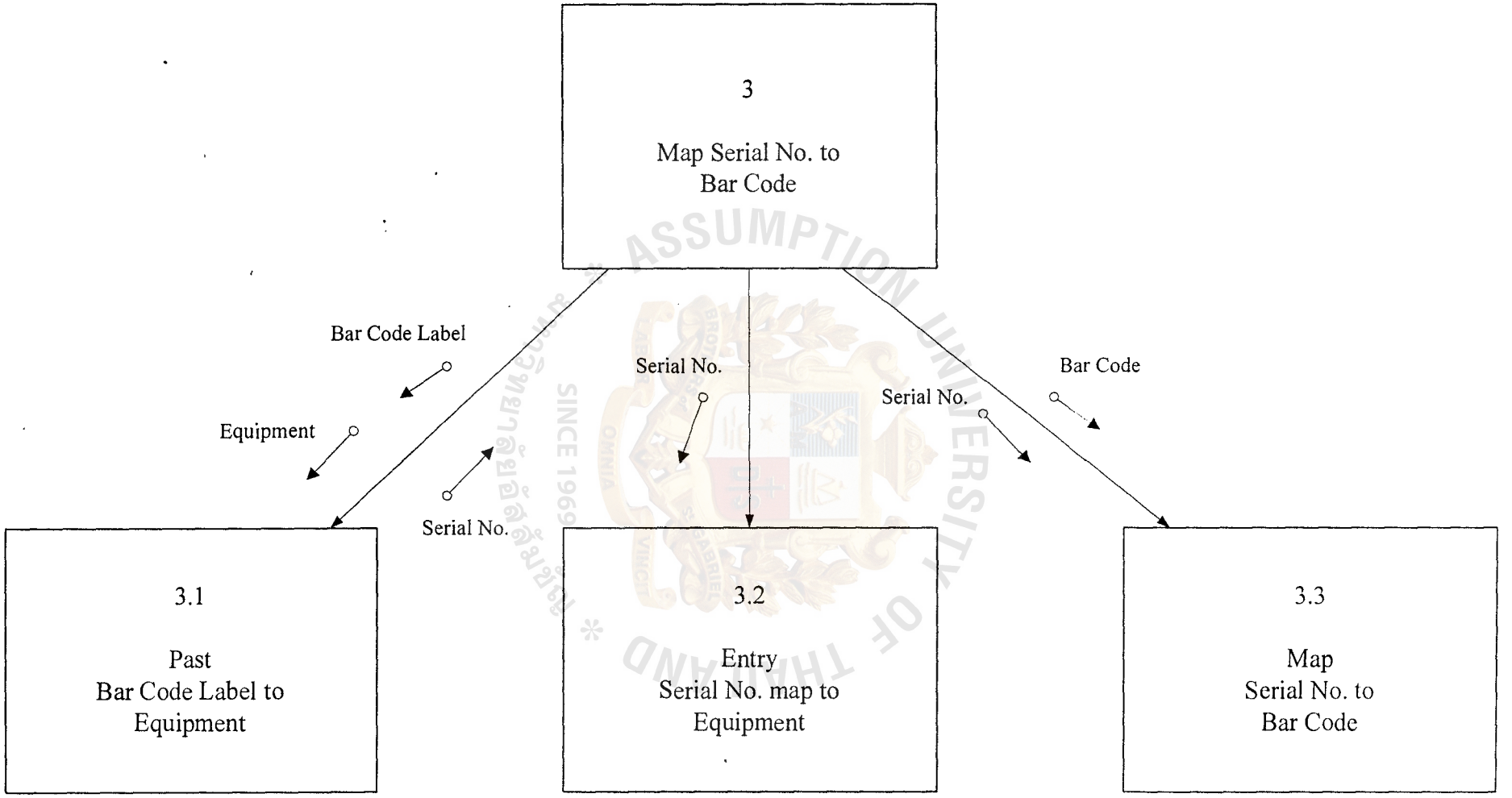

Figure H.4. Structure Chart of Process 3.0

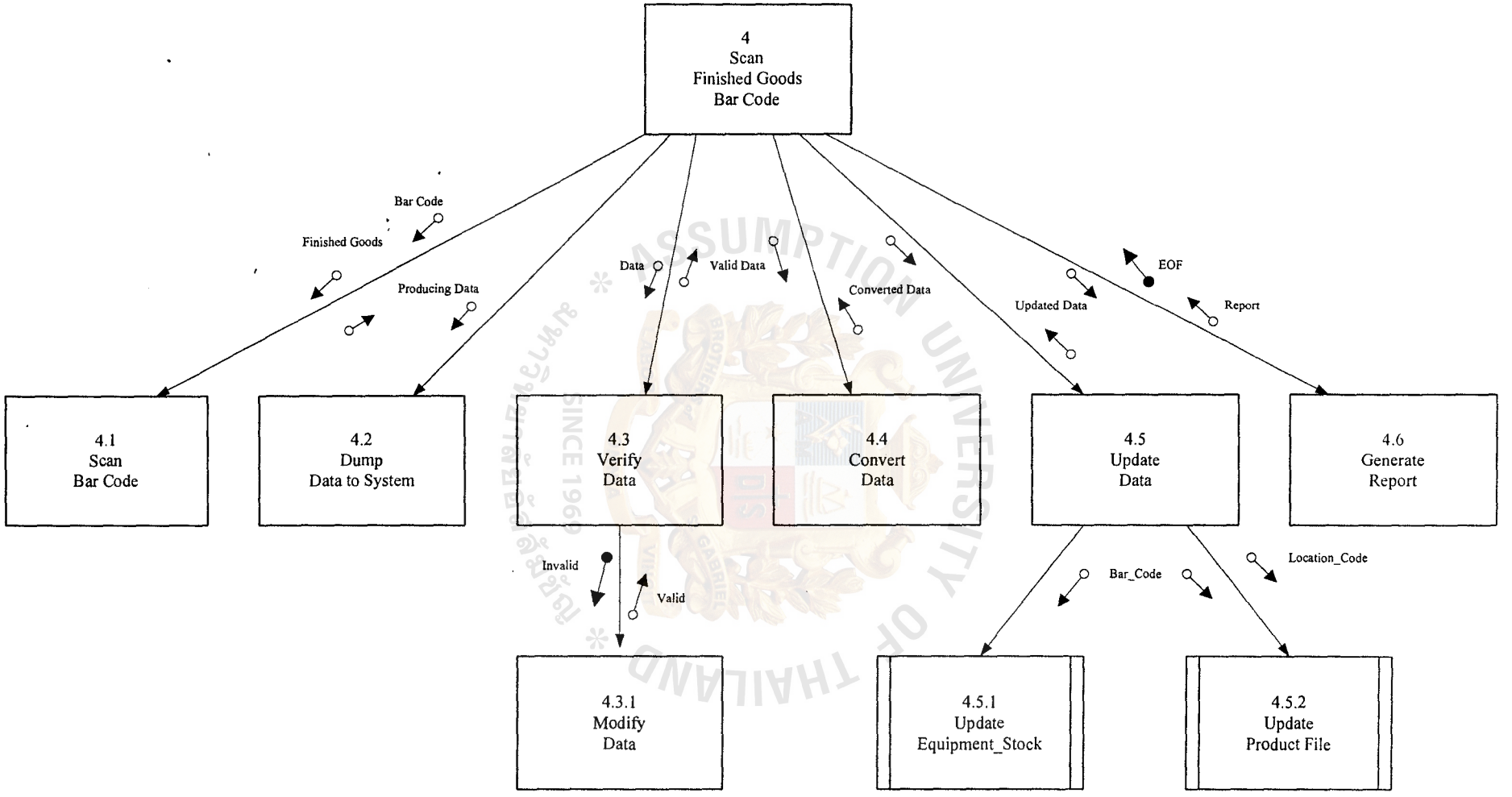

Figure H.5. Structure Chart of Process 4.0

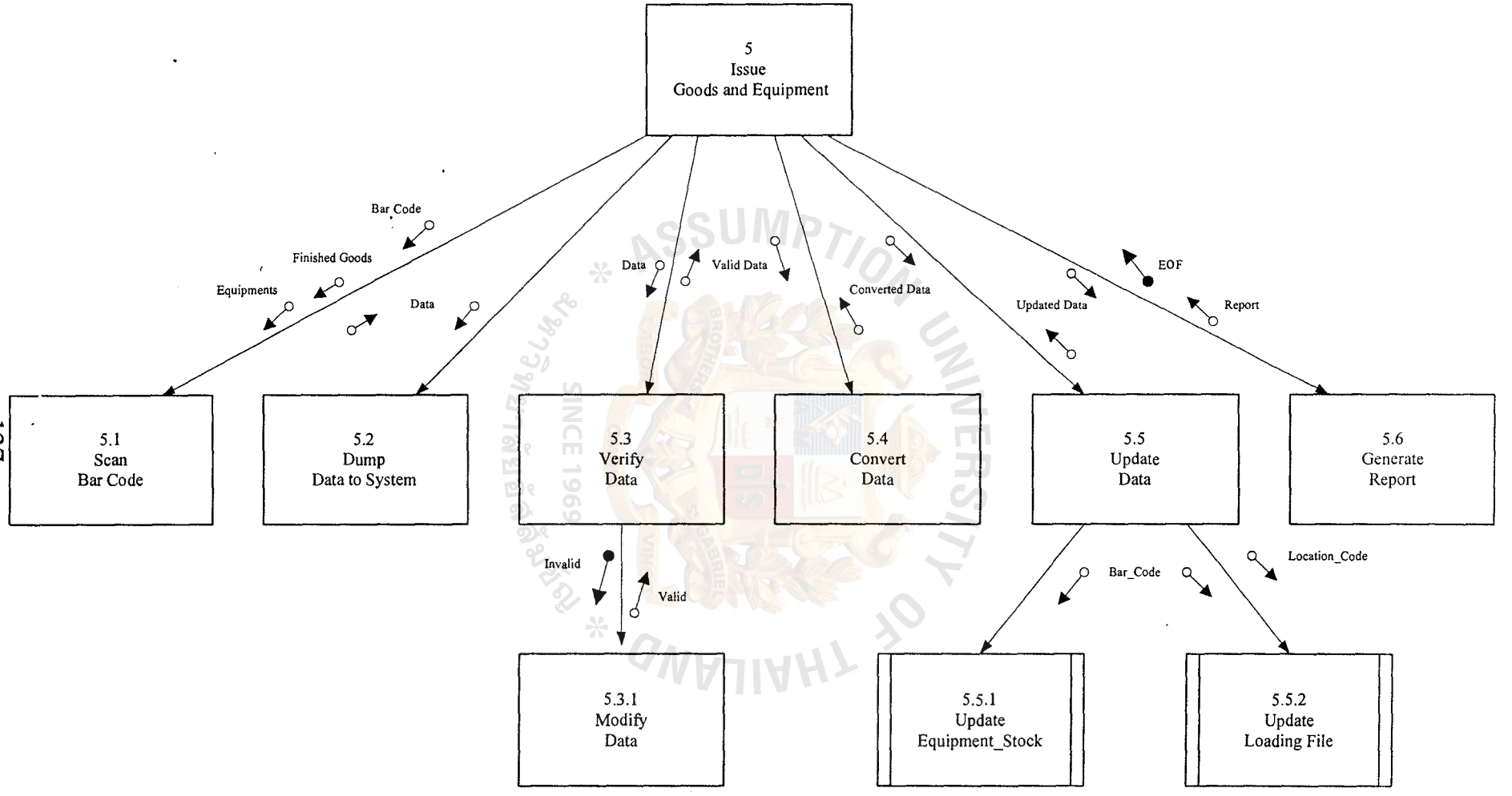

Figure H.6. Structure Chart of Process 5.0

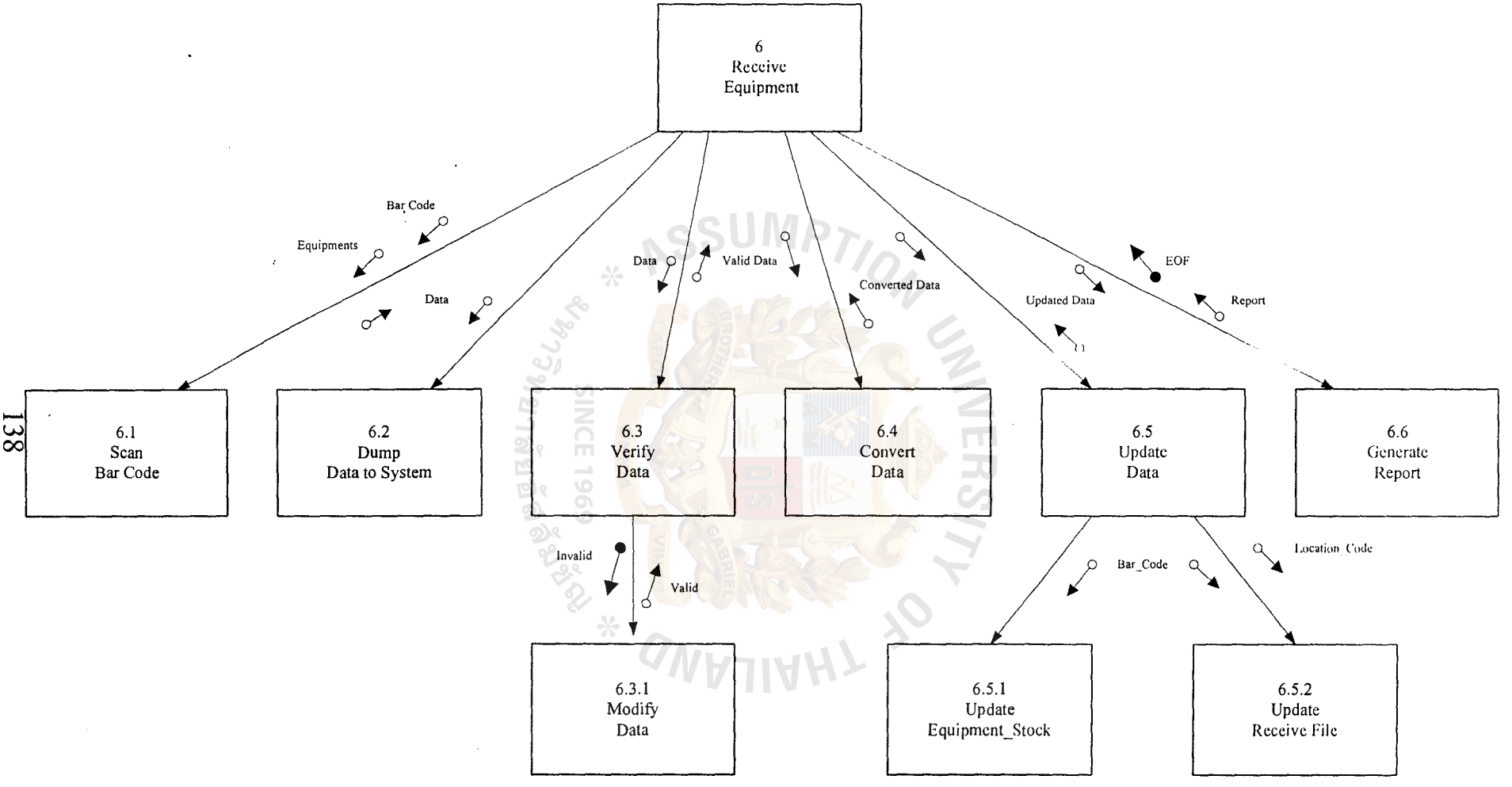

Figure H.7. Structure Chart of Process 6.0

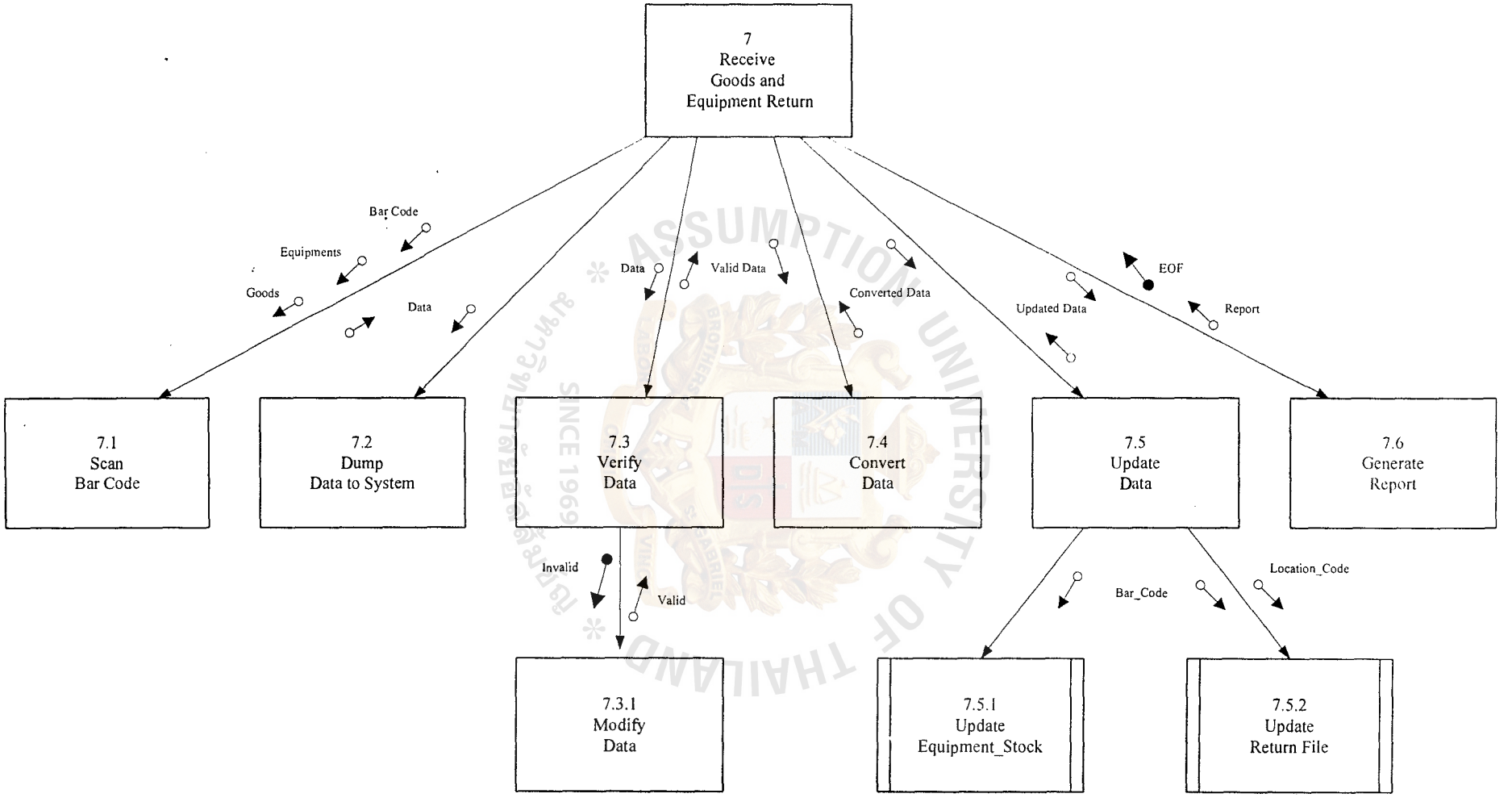

Figure H.8. Structure Chart of Process 7.0

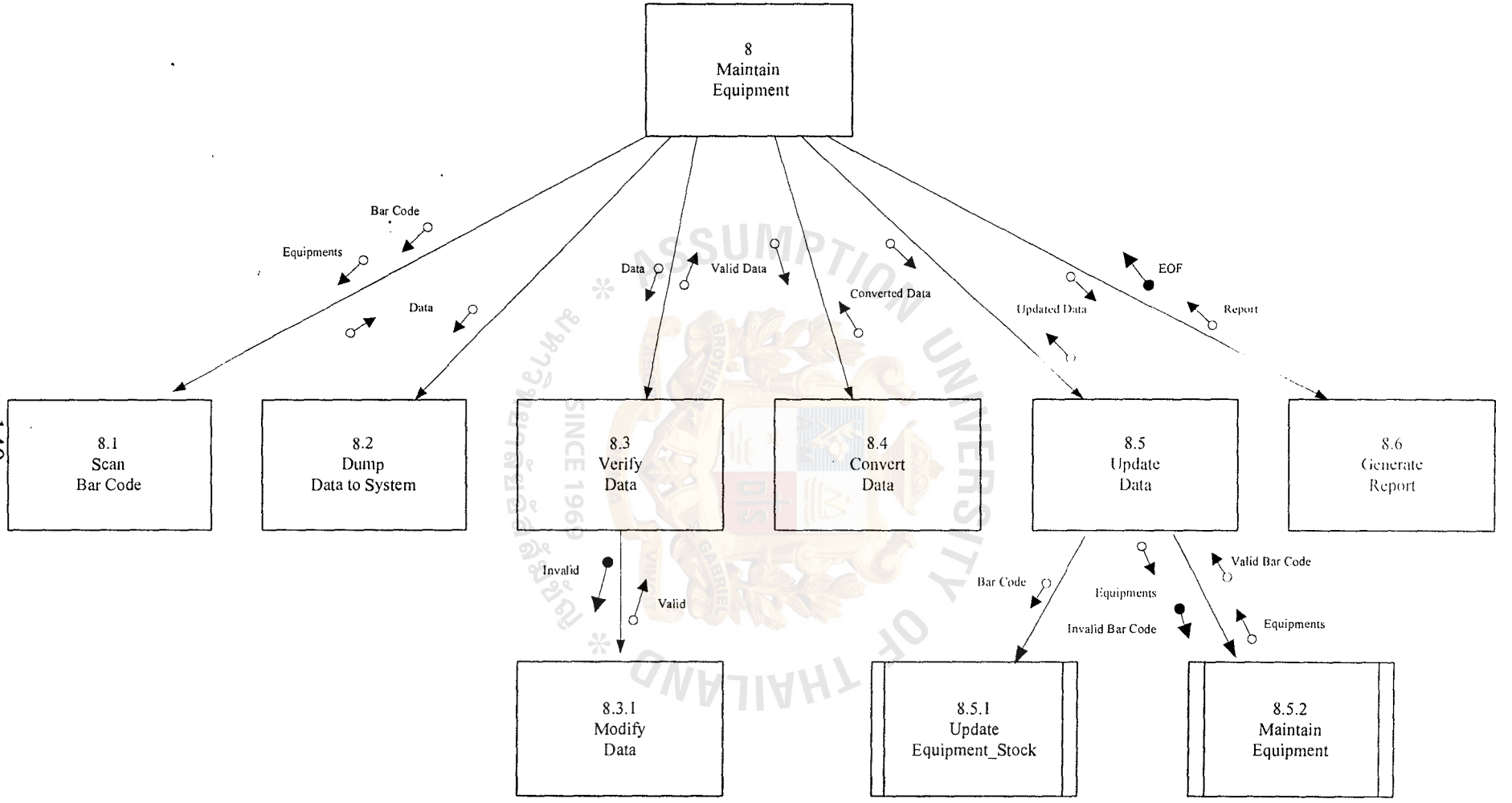

Figure H.9. Structure Chart of Process 8.0

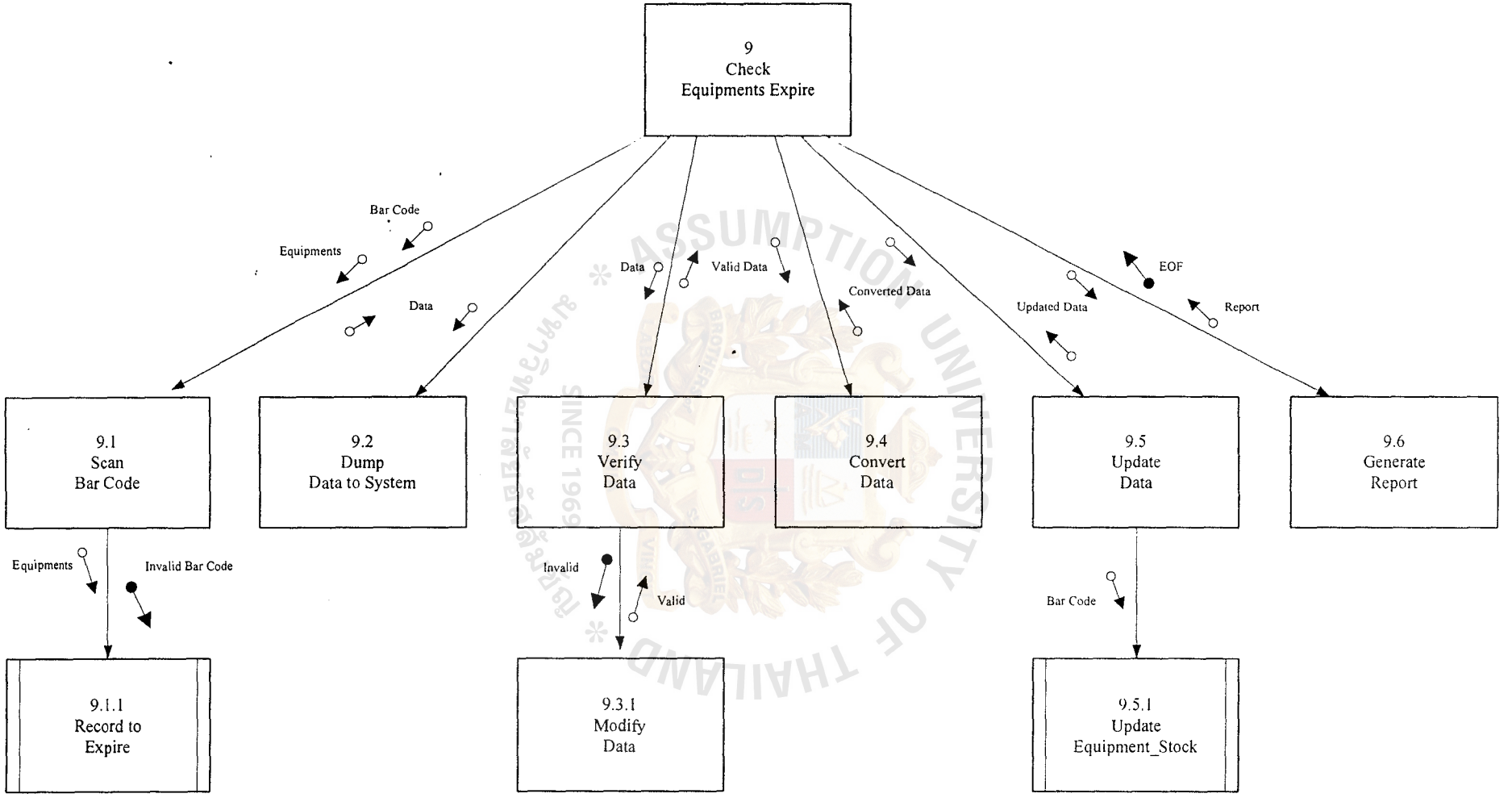

Figure H.10. Structure Chart of Process 9.0

APPENDIX I

Data Dictionary

DATA DICTIONARY FOR INPUT SCREEN

Screen Name : Define Code Menu

Group of system name that allow to select one choice from the following list :

- Type of equipments
- Determine Serial No.
- Map serial number with Barcode
- Modify Map Serial Number with Barcode
- Determine Batch No.
- Determine Transportation Code
- Determine Customer Code
- Summary Data

Table I.1. Data Dictionary for Screen Name Type of Equipment

Field Name	Type	Length
Type_code	CHAR	2
Equiptment_code	CHAR	20
Type_Abbry	VARCHAR2	100

Table I.2. Data Dictionary for Screen Name Determine Serial No.

Field Name	Type	Length
Type_code	CHAR	2
Equiptment_code	CHAR	20
Equiptment_No.	CHAR	20
Entry_dd:	CHAR	2
Entry_mm:	CHAR	2
Entry_yy:	CHAR	4

Table I.3. Data Dictionary for Screen Name Map Serial No. with Bar Code

Field Name	Type	Length
Type_Code	CHAR	2
Product_Desc	VARCHAR2	200
Serial_no	CHAR	20
Bar_Code	CHAR	7
DD	CHAR	2
MM	CHAR	2
YY	CHAR	4

Table I.4. Data Dictionary for Screen Name Modifing Map Serial No. with Bar Code

Field Name	Type	Length
Bar_Code	CHAR	7
Serial No.	CHAR	20
dd	CHAR	2
mm	CHAR	2
yy	CHAR	4
Product_Desc	VARCHAR2	200

Table I.5. Data Dictionary for Screen Name Determining Batch No.

Field Name	Type	Length
Bar_Code	CHAR	7
Batch_No	CHAR	7

Table I.6. Data Dictionary for Screen Name Determining Transportion Code

Field Name	Type	Length
Location_Code	CHAR	7
Trans_Desc	VARCHAR2	100
Trans_Address	VARCHAR2	300
Status	CHAR	2

Table I.7. Data Dictionary for Screen Name Determining Customer Code

Field Name	Type	Length
Location_Code	CHAR	7
Trans_Desc	VARCHAR2	100
Location_Desc	VARCHAR2	300
Status	CHAR	2

Screen Name : Generate and Print Bar Code

Group of system name that allows to select one choice from the following list :

- Gernerate Barcode
- Print Barcode
- Print Customer's Barcode

Table I.8. Data Dictionary for Screen Name Generating Bar Code

Field Name	Type	Length
Location_Desc	VARCHAR	300
Quantity	NUMBER	9
Start_Bar_Code	CHAR	7
End_Bar_Code	CHAR	7

Table I.9. Data Dictionary for Screen Name Print Bar Code

Field Name	Type	Length
Start_Bar_Code	CHAR	7
End_Bar_Code	CHAR	7
Large_Size	NUMBER	1
Small_Size	NUMBER	1
Print	NUMBER	1

Screen Name : Define Code Menu

Group of system name that allows selection of one choice from the following list :

- Convert Data to System
- Load Data to Hand Held

Table I.10. Data Dictionary for Screen Name Converting Data to System

Field Name	Type	Length
Source_File_Name	TEXT	20
Destination_File_Name	TEXT	20
Number	NUMBER	3
DD	CHAR	2
MM	CHAR	2
YYYY	CHAR	4
Type	NUMBER	2
Use	NUMBER	1
Customer_Code	CHAR	7
Bar_Code	CHAR	7
HH	NUMBER	2
MM	NUMBER	2

Screen Name : Inquiry Menu

Group of system name that allows selection of one choice from the following list :

- Summary Product
- Summary Production
- Detail of Production
- Summary of Equipment
- Frequency of Usage Tank
- Comparison between Equipment and Bar Code
- Detail of Transfer Production
- Detail of Receive Product
- Detail of Transfer Equipment
- Detail of Receive Equipment

Screen Name : Report Menu

Group of system name that allows selection of one choice from the following list :

- Summary Product
- Summary Production
- Detail of Production
- Summary of Equipment
- Frequency of Usage Tank
- Comparison between Equipment and bar code
- Detail of Transfer Production
- Detail of Receive Product
- Detail of Transfer Equipment
- Detail of Receive Equipment

DATA DICTIONARY FOR REPORT/OUTPUT FORMS

Table I.11. Data Dictionary for Report Name Summary Production of all Branches

Field Name	Type	Length
Factory	VARCHAR2	20
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.12. Data Dictionary for Report Name Summary Issue of all Branches

Field Name	Type	Length
Factory	VARCHAR2	20
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.13. Data Dictionary for Report Name Summary Goods Receipt of all Branches

Field Name	Type	Length
Factory	VARCHAR2	20
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.14. Data Dictionary for Report Name Summary Service of all Branches

Field Name	Type	Length
Factory	VARCHAR2	20
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.15. Data Dictionary for Report Name Summary Goods Return of all Branches

Field Name	Type	Length
Factory	VARCHAR2	20
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.16. Data Dictionary for Report Name Summary Expire of all Branches

Field Name	Type	Length
Factory	VARCHAR2	20
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.17. Data Dictionary for Report Name Summary Production Report

Field Name	Type	Length
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.18. Data Dictionary for Report Name Summary Issue Report

Field Name	Type	Length
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.19. Data Dictionary for Report Name Summary Receipt Report

Field Name	Type	Length
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.20. Data Dictionary for Report Name Summary Service Report

Field Name	Type	Length
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.21. Data Dictionary for Report Name Summary Return Report

Field Name	Type	Length
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.22. Data Dictionary for Report Name Summary Expire Report

Field Name	Type	Length
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.23. Data Dictionary for Report Name Detail of Containing

Field Name	Type	Length
Date	NUMERIC	6
Bar Code	CHAR	7
Batch no.	CHAR	7
HH	NUMERIC	2
MM	NUMERIC	2

Table I.24. Data Dictionary for Report Name Detail of Issue

Field Name	Type	Length
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.25. Data Dictionary for Report Name Detail of Receipt

Field Name	Type	Length
Location	VARCHAR2	20
Date	NUMERIC	6
Quantity	NUMERIC	9

Table I.26. Data Dictionary for Report Name Detail of Service

Field Name	Type	Length
Date	NUMERIC	6
Bar Code	CHAR	7

Table I.27. Data Dictionary for Report Name Detail of Return

Field Name	Type	Length
Name Return	VARCHAR2	20
Date	NUMERIC	6
Bar Code	CHAR	7
Note	VARCHAR2	30

Table I.28. Data Dictionary for Report Name Detail of Expire

Field Name	Type	Length
Name Return	VARCHAR2	20
Date	NUMERIC	6
Bar Code	CHAR	7
Note	VARCHAR2	30