MAINTENANCE AND TECHNICAL SUPPORT INFORMATION SYSTEM FOR IT EQUIPMENT FOR ELECTRONIC COMPANY

By

Mr. Worawee Singti

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

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

November, 1998

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Project Title	:	Maintenance and Technical Support Information System for It Equipment for Electronic Company
Name	:	Mr.Worawee Singti
Project Advisor	:	Dr.Sudhiporn Patumtaewabal
Academic Year	:	1998

The Graduate School of Assumption University had approved this final report of the three-credits 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

Nowadays, we need the maintenance and technical support information system to support information needs and to provide data processing and information related services to every department and all users in the organization. The growth in using the computing services is so rapid. The new technologies are never easy to learn by users so the maintenance and technical support information system for IT equipment must be provided to the end users facilities with a user-friendly system.

The new proposed system in this system development project will be developed from the existing system that has been processed manually to a computerized information system to perform the following activities:

- To control the service to be accomplished in desirable time.
- To keep and retrieve records of requests from users.
- To record hardware usage for inventory control.

The new information system is able to fulfill the end-user's requests and indirectly gives benefit by reducing unnecessary paperwork and the errors of the process flow. Moreover, it will increase satisfaction to the customers and help the management monitor the process of the jobs and performance of the ongoing system.

ACKNOWLEDEMENTS

This system development project cannot be completed without kind advice and cooperation of many people. The writer would like to convey special thanks to my advisor, Dr.Sudhiporn Patumtaewapibal who spent more time on advising me the right way to develop the existing system, debugging the project and giving many suggestions to accomplish the project. And also many thanks to the Project Committee, Members of the Graduate School for their advice. And I would like to thank to Mr. Narumit Paopradit, Mr. Warawut Supharatnodom, and many staff members of Alphatec Electronics Public Company Co., Ltd. who kindly supported, cooperated and provided much information during my project work. And finally I am grateful to all instructors who taught me in the Computer Information System Courses so that I can apply this knowledge to the system development project.

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TABLE OF CONTENTS

Chapter	Page
ABSTRACT	i
ACKNOWLEDGMENTS	ii
LIST OF FIGURES	v
LIST OF TABLES	vi
I. INTRODUCTION	
1.1 Background of The Project	1
1.2 Objectives of The Project	3
1.3 Scopes of The Project	3
1.4 Deliverables	4
II. EXISTING SYSTEM	
2.1 Background of The Organization	6
2.2 Existing Functions	12
2.3 Current Problems and Areas for Improvement	15
III. PROPOSED SYSTEM	
3.1 User Requirement	17
3.2 Hardware and Software Requirement	18
3.3 Security and Control	21
3.4 System design	21
3.5 Cost and Benefit Analysis	23
3.6 Payback Period	25
IV. PROJECT IMPLEMENTATION	
4.1 Overview of Project Implementation Schedule and Resources Utilization	27
4.2 Test Plan and Results	29
4.3 Users Training	30
V. CONCLUSION AND RECOMMENDATIONS	
5.1 Conclusion	32
5.2 Recommendations	32
BIBLIOGRAPHY	34
APPENDIX A Context Diagram	35
APPENDIX B Data Flow Diagram	37
APPENDIX C Screen and Report Design	45
APPENDIX D Structure Chart	83
APPENDIX E Data Dictionary	90
APPENDIX F Process Specification	93

LIST OF FIGURES

Figure		Page
2.1	Company Organization Chart	10
2.2	MIS Organization Chart	11
2.3	User Request Form (Existing System)	14
3.1	System Configuration	20
4.1	System Cost Comparison	26
4.2	Project Plan Diagram	28
A.1	Context Diagram (Proposed System)	35
A.2	Context Diagram (Existing System)	36
B.1	Data Flow Diagram – Level 0 (Proposed System)	37
B.2	Data Flow Diagram – Level 1 of process 1.0 (Proposed System)	38
B.3	Data Flow Diagram – Level 1 of process 2.0 (Proposed System)	39
B.4	Data Flow Diagram – Level 1 of process 4.0 (Proposed System)	40
B.5	Data Flow Diagram – Level 1 of process 5.0 (Proposed System)	41
B.6	Data Flow Diagram – Level 1 of process 6.0 (Proposed System)	42
B.7	Data Flow Diagram – Level 1 of process 7.0 (Proposed System)	43
B.8	Data Flow Diagram – Level 1 of process 8.0 (Proposed System)	44
C.1	Main Menu Display Screen	45
C.2	Computer Information (Owner) Display Screen	46
C.3	Computer Information (PC Details) Display Screen	47
C.4	Computer Information (Memory) Display Screen	48
C.5	Computer Information (I/O Cards) Display Screen	49
C.6	Computer Information (Networking) Display Screen	50
C.7	Computer Information (Peripherals) Display Screen	51
C.8	Computer Information (PM Record) Display Screen	52
C.9	Computer Information (Modification Record) Display Screen	53
C.10	Computer Information (Warranty & Cost) Display Screen	54
C.11	Printer Information (H/W details) Display Screen	55
C.12	Printer Information (Warranty & Cost) Display Screen	56
C.13	Printer Information (PM Record) Display Screen	57
C.14	Promis Terminal Information (H/W) Display Screen	58
C.15	Promis Terminal Information (S/W) Display Screen	59
C.16	Technical Support Information (H/W) Display Screen	60
C.17	Technical Support Information (S/W) Display Screen	61
C.18	User Request Information (Master 1) Display Screen	62
C.19	User Support Information (Master 2) Display Screen	63
C.20	Preventive Maintenance Information (PM 1) Display Screen	64
C.21	Preventive Maintenance Information (PM 2) Display Screen	65
C.22	View Report Display Screen	66
C.23	Print Report Display Screen	67
C.24	Activity Summary Report (By Company)	68
C.25	Activity Summary Report (By Cost & Company)	69
C.26	Activity Summary Report (By Estimated Cost)	71
C.27	Activity Summary Report (By Status)	72
C.28	Activity Summary Report (By Priority)	73
C.29	Activity Summary Report (By Work Week)	74
C.30	Computer Summary Report (By Company)	75

Figure **Page**

C.31	Computer Summary Report (By Department)	76
C.32	Computer Summary Report (By CPU Model)	77
C.33	Computer Summary Report (By Warranty)	78
C.34	Computer Summary Report (By Utilization)	79
C.35	Printer Summary Report (By Department)	80
C.36	Printer Summary Report (By Model)	81
C.37	Printer Summary Report (By Warranty)	82
D.1	Structure Chart of Process 1.0 (Proposed System)	83
D.2	Structure Chart of Process 2.0 (Proposed System)	84
D.3	Structure Chart of Process 3.0 (Proposed System)	85
D.5	Structure Chart of Process 5.0 (Proposed System)	86
D.6	Structure Chart of Process 6.0 (Proposed System)	87
D.7	Structure Chart of Process 7.0 (Proposed System)	88
D.8	Structure Chart of Process 8.0 (Proposed System)	89

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LIST OF TABLES

Table		Page
4.1	Cost and Benefit	25

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I. INTRODUCTION

The Maintenance and Technical support information system for IT equipment is the valuable resource for MIS 's decision makers and responsible persons. It must contain several characteristics and should be accurate, complete, economical, flexible, reliable, timely, verifiable and simple to understand. This project has been designed to support the above characteristics and produce a variety of reports including user interface screens and classified processes via several types of structured model.

1.1 Background of the Project

In Alphatec Electronics Public Company Ltd., which is a case study of the project, there is a department called MIS Department. The responsibility of this department is to support internal users and customers by providing the services which are related to the information system such as trouble shooting in hardware, application software, network problems, new hardware/software installation and also produce the system performance report for the management. Now there are many IT equipment and service requests to MIS department because the existing systems are not able to support all the above requirements to all those users and track the information of IT equipment such as specification, lifetime, warrantee period, serial number and maintenance scheduling. Besides, those users from each department are involved in using more paperwork, hardly able to control the process flow from the user requests until those requirements are completed. Often, MIS staff do not follow up the pending problems which are not solved in the desirable time and the management is not able to monitor the performances of each section in the MIS department.

Therefore, we need to develop the existing system in order to make it efficient and

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clarify the problem by using the **Maintenance and Technical Support Information System for IT Equipment for Electronic Company** is to control and monitor the equipment in the MIS Department including control the maintenance data and process flow from the starting process until the job is completed.

The working process procedure of the existing system is as follows:

1. A user has to:
   - write a User Request form (UR) to describe the information service needed and identify the priority of the request.
   - Submit the UR form to their manager for approval.
   - Submit the approval UR form to Help Desk of MIS department.
2. The responsible person in MIS 's UR section will:
   - Check the UR form is filled with information need.
   - Assign the UR referential number.
   - Preliminarily analyze the problem.
   - Make copies of the UR form.
   - Distribute the UR form to responsible person to solve.
3. In the mean time, the record will initiate a record on the log book to keep the requests in file.
4. In the case of the information on the UR form is not completed the MIS responsible person will contact the end-user for clarification on their needs. if some request is needed to purchase new equipment, the end-user will be asked to get approval from the department head. MIS will then issue the Purchase Request to Purchasing Department to carry out their process.
5. After the request has been provided to the requester, the MIS responsible person will update that record and close that request.

1.2 Objectives of the Project

The objectives of the system development project on the Maintenance and Technical Support Information System for IT equipment for Electronic Company are described as follows:

- To study the existing system and identify problems occurred in the system
- To develop computer-based system that will solve these problems
- To reduce error during the process from the requestor to MIS department
- To minimize unnecessary paperwork and make use of the Information System
- To improve the quality of work efficiently and increase their productivity
- To help management in decision making, planning and monitoring the performance of MIS department
- To use a new system to keep track on the status of the request(eg. pending, waiting etc.)
- To control the job to be accomplished within a desirable time.
- To control the hardware usage
- To minimize the timing of the process flow and the cost of paper work
- To minimize the missing communication between end-users and MIS department
- To minimize the unnecessary service requesting procedure from MIS department

1.3 Scope of the Project

The project covers the major part of Maintenance and Technical Support Information System for IT equipment for Electronics Company which are described as follows:

1.3.1 Analyze The Existing System:

This task is required to emphasize gathering information and determining requirement.

1.3.2 Design a New System

The logical designs are:

- Designing the output of computer system(e.g. output screen, report etc.)
- Designing the input of the computer system through the input screen
- Designing processing via using Data Flow Diagram
- Designing a file and database format

The Physical designs are:

- Designing the hardware configuration of the computer
- Designing the reports
- Determining the contents of data dictionary
- Comparing the cost versus benefit of the proposed system

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1.4 Deliverables

The deliverables for the project of Maintenance and Technical Support Information System for IT equipment for Electronics Company are described as follows:

1.4.1 A software package written in Microsoft Access97 for Windows95

1.4.2 User interface screen layouts

1.4.3 Various hard copy lay outs containing:

1.4.3.1 Activities Summary Report(Group by Company)

1.4.3.2 Activities Summary Report(Group by Spending Cost and

Company)

1.4.3.3 Activities Summary Report(Group by Spending Cost)

1.4.3.4 Activities Status Report

1.4.3.5 Activities Priority Request Summary Report

1.4.3.6 Activities Summary Report(By Work Week)

1.4.3.7 Computer Inventory Report(By Computer No)

1.4.3.8 Computer Inventory Report(By Department)

1.4.3.9 Computer Inventory Report(By CPU Model)

1.4.3.10 Warranty List of the Computer Report

1.4.3.11 Printer Inventory Report(By Department)

1.4.3.12 Printer Inventory Report(By Model)

1.4.3.13 Warranty List of the Printer Inventory Report

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II. EXISTING SYSTEM

2.1 Background of the Organization

Alphatec Electronics Public Co., Ltd., founded in 1988, and a public company listed in the stock exchange of Thailand, is one of the world's foremost integrated circuit sub-contract manufacturers. The company is one of Thailand's top ten exporters and the first Thai Electronics Company which received the ISO 9002 standard certification. It is also certified by the Semiconductor Assembly Council Certification for the SAC QS 9000.

Alphatec Electronics is located in Chachengsao province, about 45 kilometers east of Don Muang International airport. It provides fully Integrated manufacturing services for abroad range of Plastic and Hermetic IC packages.

The major business of Alphatec is assembling integrated circuit (IC) and testing Services. The major product type are: Hermetic Cerdip and multi-layer, Plastic MQFP, TQFP, SOIC,SOJ, PDIP and PLCC MQUAD packages. The current employees are over two thousand, the total floor-space is over two hundred thousand square feet and the capacity is five million hermetic packaged ICs a month and twenty million plastic packaged ICs a month. The major customers are, for examples Advanced Micro Devices(AMD), Cypress Semiconductors, Microchip Technology, Inc., Phillips Semiconductors and Texas Instruments, Inc.

The group of Alphatec Company such as Alphatec Electronics Corporation located in USA. and Alphatec Electronics Corporation of Shanghai and Alphatec Electronics Public Company Limited is located in Bangkok, Thailand.

Alphatec has chosen the new technology in computerized system to survive the need of internal users within the organization. Thus, the company has established the

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Management Information System (MIS) department as an information services provider of the organization. The computing systems consist of a various types of computers networking such as UNIX, LAN environment of both their systems and customer systems and many kinds of application that run on those systems to serve their end-users and customers. MIS department also provides the services in problem solving in hardwares, softwares, networking as requested by users.

They had classified their applications into two parts as follows:

1) PC base Client-Server Applications

This type of applications is run on PC/LAN platform and the environments are:

Operating System Platforms:

- MS-DOS
- Microsoft Windows for Work-group (version 3.11 and Windows95)
- Novel Netware version 3.12

Software Packages:

- Office group-ware (Microsoft Office)
- Foxpro for DOS and Windows
- Lotus ccMail for DOS and Windows

Application Supports:

- Purchasing System
- Receiving System
- Store System
- Capital System
- Volume System
- Budget Capital System
- Chemical System

- Accounting System
- Retirement Sub System
- Bonded System
- NCRB System
- R&R System
- CAR System
- BOM System
- ECN On-Line System
- PPM System
- Invoicing System
- Costing System
- Project management System
- Fixed Asset Classification Tool
- Document On-line system
- Warehousing System
- Financing system(except Payroll)
- Time-sheet On-Line system

2) UNIX Base Client-Server Applications

Promis Shop floor Application

- Work In process System tracking
- Raw Material Usage Tracking
- Inventory Control System
- SPC System

Mapics Financial Application

MAPICS Financial Application

- Account Payable
- General Ledger
- Account Receivable

INGRESS Shop Floor Application includes:

- Assembly System Tracking and Control
- Testing System
- Finish Good Packing and Shipping System

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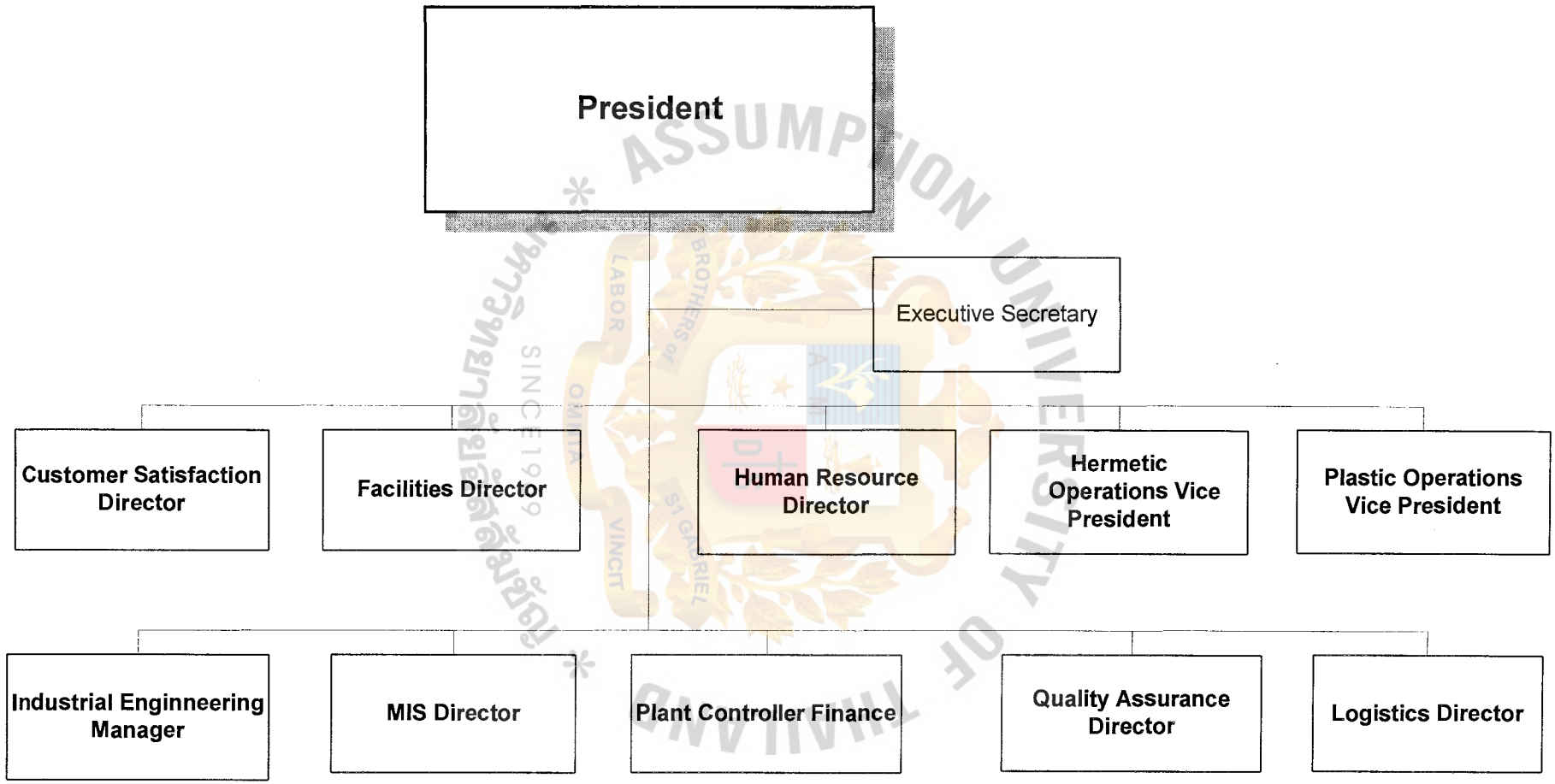

Figure 2.1. Alphatec Electronics Public Company Limited Organization Chart

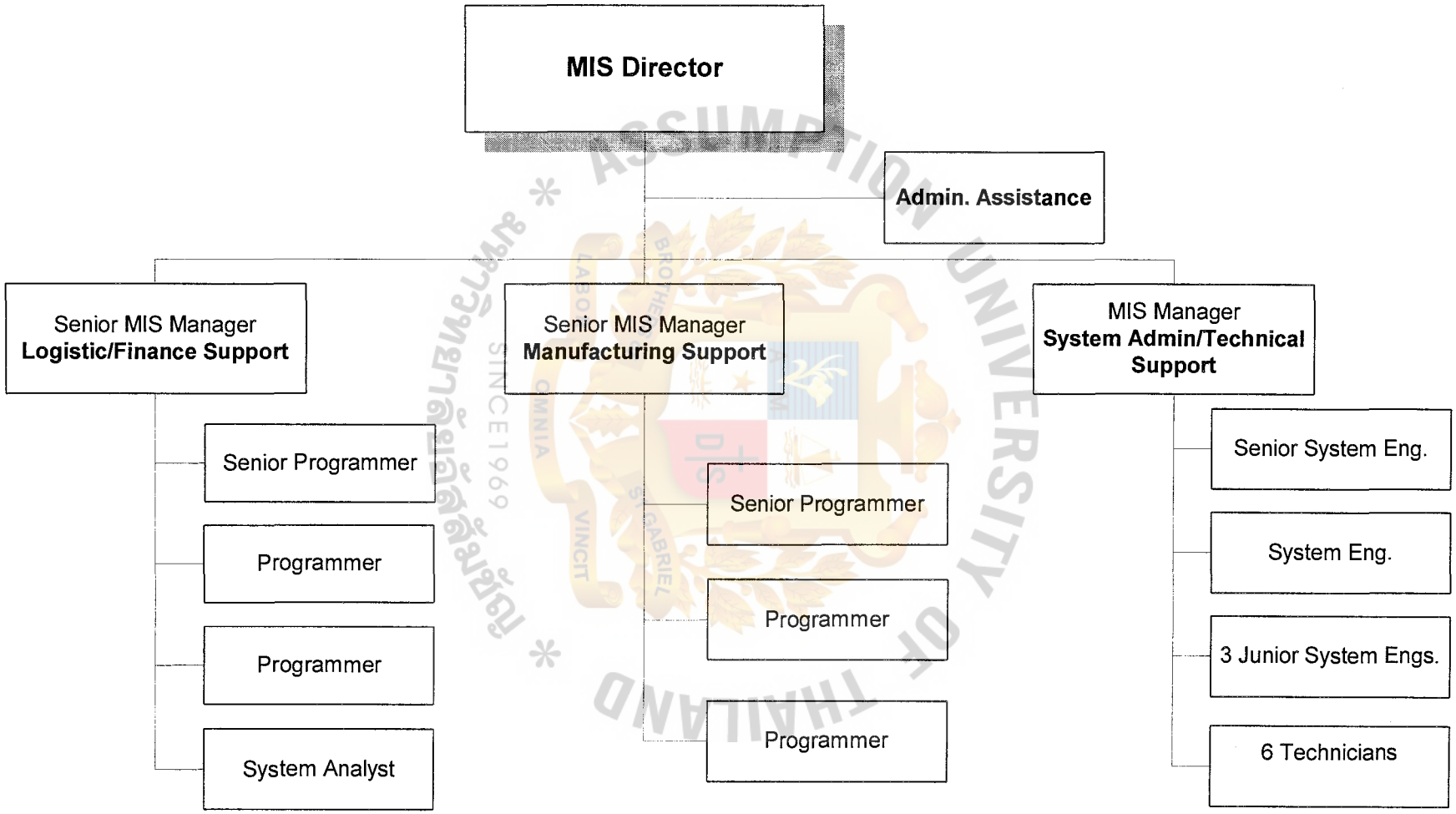

Figure 2.2. MIS Organization Chart

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2.2 Existing Functions

In order to provide services to meet users and MIS people requirements and complete job within a service level agreement, MIS department has established the work procedure as follows:

1) User requirement(Hot line request) form is written by a user and identifies the request as:

o Computer	o Install
o Printer	o Upgrade
o Software	o Emulation
o ccMail	o Move
	o Others

2) A user sends a Hot line request form to his manager for approval and then sends it to MIS/Hot line request section
3) MIS/Hot Line Request Section will send this request to related section such as PC support and Applications Support.
4) The responsible section will collect more information related to the request and assign to responsible person such as request for new installation or setup the IT Equipment. The technician will carry out that job or such as some jobs may need the spare parts so the technician will the supervisor to get that part if the part is not in-stock but in the case that that part is out of stock or not available, the supervisor will inform the MIS operation manager to make a decision whether to buy or not .
5) The responsible section will follow up the problem and attend to that request

6) After the responsible sections solve the problem, they will record the data in their own log book

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Alphatec Bangkok	Title MIS Software / Hardware Request Refer Spec : GN-0-011	Form # ADM-0G-011 Rev : A Refer : GN-0-082

Date :

Requester : Employee No : Ext :

Dept / Sect :

Item Request :

o Computer o Printer o Software o CCMail o others ::

o Install o Upgrade o Emulation o Move

Additional Description :

Requester Manager

**** After completion of this form, send to #HOTLINE account on CCMail .. OR ****

**** Hand carry to MIS Department Secretary at x2816 ****

MIS Response :: (For MIS staff use only)

Actions to Request :: Date :

o Accept request o Reject request o Pending to when :

Additional information ::

Finish date :

MIS Representative Manager Approval

Figure 2.3. User Request Form (Existing System)

2.3 Current Problems and Area for Improvement

2.3.1 More paperwork and cost are increased for maintaining documents because it is performed manually.

2.3.2 Sophisticated process flow and error can happen easily.

2.3.3 Hard to track the pending status of request. If we want to check the status of the request, we will seek from the starting until the end of the book to find out the pending status.

2.3.4 Inefficiency in hardware inventory control because the existing system does not have a record of the hardware usage.

2.3.5 Difficulty in producing a summary report to management. Nowadays, we can generate the report by gathering data from the logbook and typing in spreadsheet software and print out to management.

2.3.6 Difficulty for MIS management to monitor the workload of each section in MIS department and also hard to predict the future trend of information system in the company.

2.3.7 More time is needed to organize the documents.

2.3.8 The existing system needs more people to control all documents.

2.3.9 Easy to lose of control of the process flow from the user sending the request form until the request is completed.

2.3.10 The MIS staff may forget to follow up a pending request/problem because they do not have a system to track the pending request/problem.

2.3.11 The MIS management staff do not have such information of the IT Equipment to work on their plan either long term or short term plan, Some of them may need to be replaced with the new one or need some spare parts.

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2.3.12 The MIS staff may not perceive the warranty period of the IT equipment because they do not have the system to collect the information.

2.3.13 The responsible person may not know which IT equipment that they do need to solve the problem and in some cases they also need specific details of such equipment for helping with problem solving.

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III. PROPOSED SYSTEM

3.1 User Requirements

3.1.1 Output Requirement

1) To produce a report from the request or by tracking as follows:

- Summary of all statuses of request report
- Pending report
- Summary request logging report
- Computer inventory control report
- Printer inventory control report

2) Information inquiry

- Status of request in progress
- Showing a request by tracking from a priority
- Showing an assigned responsible person
- Showing a hardware usage
- Showing a record of the maintenance service(preventive or by request)
- Showing details of such IT equipment(e.g. warranty, buying date etc.)

3.1.2 Input Requirement

- User Request Form
- Computer Inventory Form
- Printer Inventory Form
- Preventive Maintenance Form
- Promis (Shopfloor) Terminal Inventory Form
- Technical Support Problems Form
- Report Viewing Form
- Report Printing Form

3.2 Hardware And Software Requirements

The proposed system will be connected to the Local Area Network (LAN) of the existing system and cooperated with Lotus ccMail. Because it provides facility to users who can access a new proposed database server from their workstations. And the users can use Lotus ccMail when they need to forward their request to whoever may be concerned. And we need one workstation for system administrative of the proposed system.

3.2.1 Hardware Requirment

1. File Server 1 EA

Digital PC

CPU Intel Pentium 266 MHz with MNX technology

Cache Memory 256 KB

Memory 32 MB SDRAM

FDD 1.44 MB

Hard Disk 2.5 GB IDE

CD-ROM 32x

Keyboard Enhance 104 keys keyboard

Monitor 14" SVGA color monitor

Expansion Slots 1 ISA and 4 PCI

2. Workstation 1 EA

Digital PC

CPU Intel Pentium 266 MHz with MNX technology

Cache Memory 256 KB

Memory 32 MB SDRAM

FDD 1.44 MB

Hard Disk 2.5 GB IDE

CD-ROM 32x

Keyboard Enhance 104 keys keyboard

Monitor 14" SVGA color monitor

Expansion Slots 1 ISA and 4 PCI

3. Printer 1 EA

HP LaserJet 5L

4. Network Interface Card 2 EA

Com Etherlink III PCI adapter mode UTP RJ-45 only

Remark:

Warranty term: 3 years for CPU 1 year parts and labor free.

3.2.2 Software Requirement

1. Operating System: Windows95
2. Network Operating System: Novell Netware V. 3.12
3. Microsoft Office97 Professional version

For the application, We used in-house developed which written in MS Access 97 for Windows95.

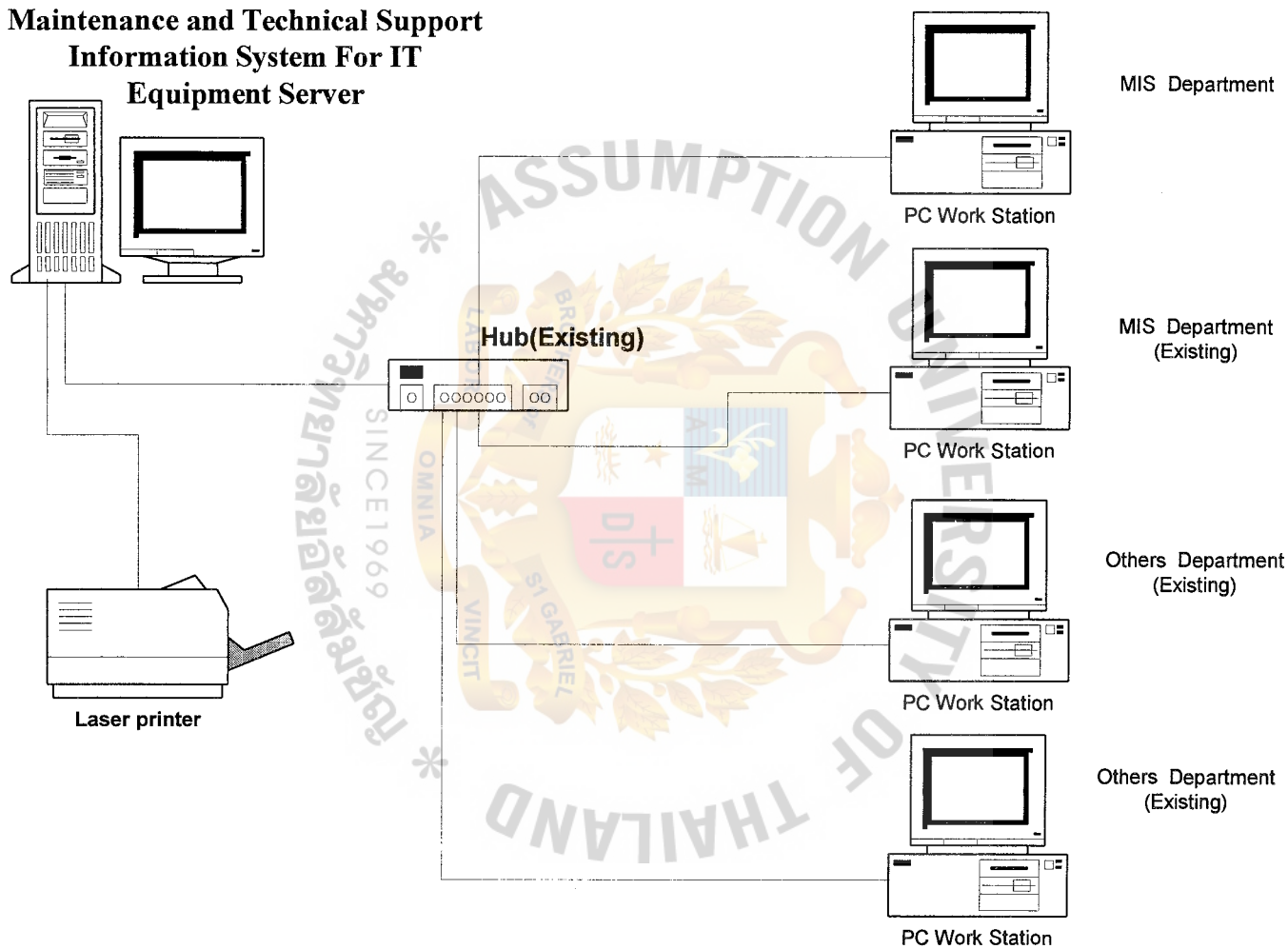

Figure 3.1. Hardware Configuration of the Proposed System

3.3 Security and Control

MIS department establishes tight system controls to maintain data security and protection against advertising fraud. These controls ensure all aspects of the Management Information System (MIS) as described below:

Input Control

The objectives of input control are to maintain input integrity and security including eliminating data entry errors by using tight password and identification of user "rights"

Processing Control

It deals with all aspects of control processing and storage. MIS department will set-up the procedures that ensure processing is being conducted in as error-free a way as possible.

Output Control

To ensure that output is handled correctly by checking system administration of MIS department

Database Controls

To prevent unauthorized access to database, we control the database by limiting user access view of information and including the use of identification numbers, passwords and also backup critical data daily.

Personnel and Environment Control

We use a key lock to prevent unauthorized people entering the computer room this key is distributed to MIS staff only.

3.4 System Design

The approach of system design is to break or partition a large, difficult system

into smaller subsystems and it has the same components and interrelationships among the components as the existing system has, but each module is simple enough to manage and clarify independently. These modules are reusable in new and different programs. And it is easier to modify and update over time.

The data flow diagrams are shown in Appendix B and the data dictionary is described in Appendix E.

3.4.1 Database Design

The database models consist of three common models:

- Hierarchical or Tree Model
- Network Model
- Relational Model

In this system development project, the designed is based on relational model because it is conceptually simple and easy to understand by the system analysts and end-users. All data elements are placed in two-dimensional tables and stored in one database file. The tables used in this proposed system are described as follows:

- Computer Details Table
- Printer Details Table
- Promis Terminal Details Table
- The User Request details Table
- The help Desk online Table
- The Preventive Maintenance Details Table
- The Technical Support Table

3.4.2 Input Design

The major objectives of the input design provide the user with easy data input and reduce the unnecessary paperwork via the graphic user interface screen input as shown in Appendix C.

3.4.3 Output Design

The output of this project is shown in two types as

- screen output
- hard copy(report) output

and it illustrated in Appendix C.

3.5 Cost and Benefit Analysis

<u>Proposed system start-up cost</u>

Equipment purchase:

- Database File Server	45,000	Baht
- PC Workstation	35,000	Baht
- Printer	12,000	Baht
- Ethernet Card	3,000	Baht
- Microsoft Office 97 Professional Edition(2 license)	42,000	Baht
Total	137,000	Baht

<u>Remark:</u> All prices are based on specification in hardware/software requirement topic.

<u>Proposed System Operation Cost</u>

- Salary for one person(15,000 Baht/month)

for one year	180,000	Baht
- Bonus(1.5 months)	22,500	Baht
Total	202,500	Baht
Grand Total Investment costs	**339,500**	Baht

System Benefit

A. Intangible Benefits

- Better end-user satisfaction
- Better monitoring and evaluating of the system
- Centralized Information System(Easy to Control)
- Reduce Working Time
- Increase productivity for a long term
- Reduce IT equipment downtime
- Historical record tracking on each equipment
- Information Support for the future requirement
- Make use of the Information system

B. Tangible benefits

1.) Reduce the number of employee to control paperwork of the existing system.

- Salary for 1 person (15,000 Baht/month) For one year	180,000	Baht
- Bonus for 1 person(1.5 month)	22,500	Baht
Total saving employment costs	**202,500**	Baht

2.) Reduce the number of paperwork

We calculate the cost by:

For 1 request = 2 Pages

20 requests / day = 40 Pages

600 request / month = 600 * 2 = 1200 Pages

72,000 request /year = 12,000 * 12 = 14,400 Pages

IF 1 ream(500 pages) = 95 Baht

14,400 pages = 29 reams = 29 *95 = 2,755 Baht/year

Total saving paperwork cost = **2,755** Baht/year

Grand Total Saving Cost = **205,255** Baht/year

3.6 Payback Period

We compute how long it takes to get the benefit from the proposed system by using a basic formula after-tax payback of :

$$P = \frac{I}{(1-T) * R}$$

Where P = Payback

I = Investment or capital expenditure

T = Corporate tax rate(use 30 %)

R = Annual saving realized by invest

$$\text{Payback} = \frac{379{,}500}{(1-0.3) * 205{,}255}$$

= 2.98 year

= 35.8 months

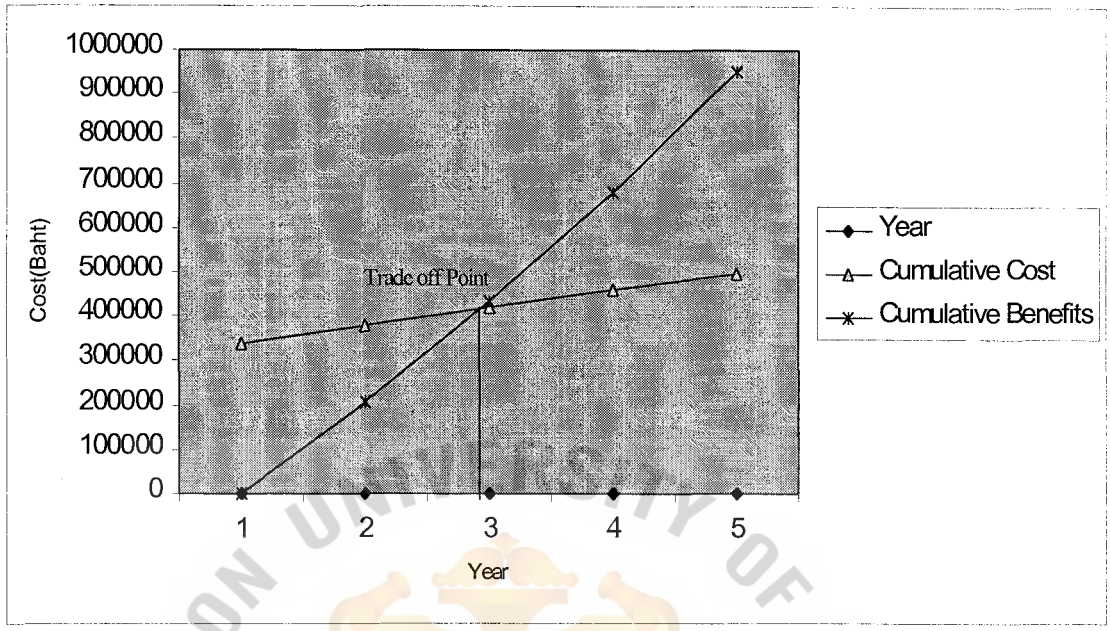

Figure 4.1. System Cost Comparison

Table 4.1. Cost and Benefit

Year	Cost	Cumulative Cost	Benefits	Cumulative Benefits
-	339,500	339,500	-	-
1	39,500	379,000	205,255	205,255
2	39,500	418,500	225,781	431,036
3	39,500	458,000	248,359	679,394
4	39,500	497,500	273,194	952,588

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation Schedule and Resources Utilization

4.1.1 Program Implementation

The application programmers are developed from the structure chart which describes the processing modules relationship and program modules within the system and is shown in Appendix D. Each module uses Microsoft Access 97 for Windows 95.

4.1.2 Hardware Purchasing and Installation

We select the vendor who provides and installs a hardware by considering quality of equipment, post services and delivery period which we do need a lead time to set-up the working team.

4.1.3 Program Installation and Testing

After completing the hardware installation by the vendor, we install and set-up in-house application by MIS staff for security and installation cost reduction. Moreover, it is easy to debug programs by the MIS staff who developed this application.

The project plan is shown in Figure 4.2.

Maintenance and Technical Support Information System for IT Equipment

ID	Task Name	Duration	Start	Finish
1	**Activities**	**0d**	**Thu 8/20/98**	**Thu 8/20/98**
2	**System Analysis-existing system**	**17d**	**Thu 8/20/98**	**Fri 9/11/98**
3	- Indentify Existing System	7d	Thu 8/20/98	Fri 8/28/98
4	- Gather requirements	6d	Mon 8/24/98	Mon 8/31/98
5	- Context diagram	10d	Mon 8/24/98	Fri 9/4/98
6	- Data flow Diagram level 0	8d	Wed 9/2/98	Fri 9/11/98
7	**Detail Analysis & Design- New System**	**26d**	**Mon 9/14/98**	**Mon 10/19/98**
8	- Develop the DFDs	13d	Mon 9/14/98	Wed 9/30/98
9	- Refine data dictionary	9d	Mon 9/28/98	Thu 10/8/98
10	- Structure Chart	9d	Mon 9/28/98	Thu 10/8/98
11	- Screen layout	10d	Mon 10/5/98	Fri 10/16/98
12	- Report Layout	11d	Mon 10/5/98	Mon 10/19/98
13	**Implementation**	**29d**	**Wed 10/21/98**	**Mon 11/30/98**
14	- Psedocode/System Specification	12d	Wed 10/21/98	Thu 11/5/98
15	- Programming	15d	Mon 10/26/98	Fri 11/13/98
16	- Testing	9d	Mon 11/16/98	Thu 11/26/98
17	- Documentation	7d	Fri 11/20/98	Mon 11/30/98

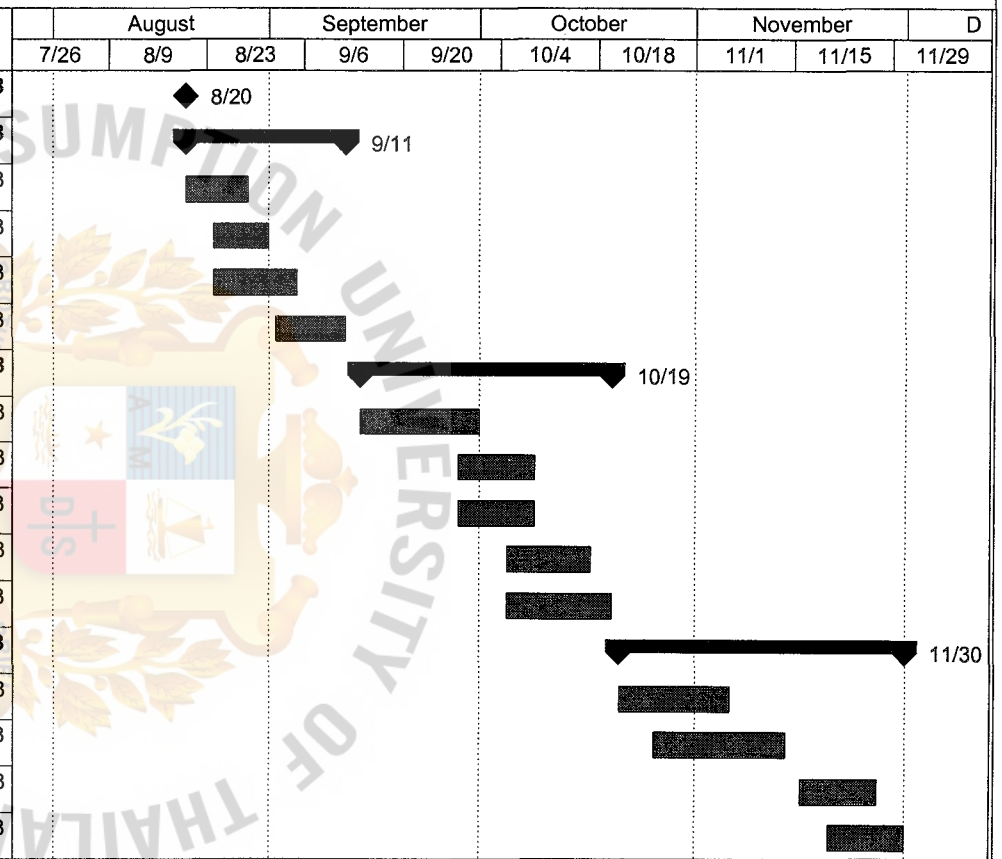

Figure 4.2. Project Plan Diagram

4.2 Test Plan and Results

We need a testing of system to ensure and minimize error in a program, and that the system output meets the target of Maintenance and Technical Support Information System for IT Equipment for Electronic Company Project. We classify the test programs into three levels as follows:

4.2.1 Program Test

We perform testing of each module independently in order to detect and debug an error in coding or functioning.

For example, Maintenance and Technical Support Information System for IT equipment consist of modules to handle user request data, computer information, printer information, technical support, Promis terminal information, preventive maintenance information, user request form, view report form, print report form and so on. For each, it provides the ability for data entering, changing, deleting and viewing or printing the report of the printer. We test that the results are correct.

4.2.2 System Test

After completing the testing on each module, we begin to test the whole system modules to find discrepancies between the system and the output and to investigate whether these meet original objectives and they are compatible with each module to ensure that the system is consistent.

4.2.3 Special System Test

Peak Load Testing is: to ensure that the system is able to handle many users one at a time without incident, hang up or access denies from the system.

Recovery Testing: By assuring that in the case of system failure, we are able to reload and recover a data file from the backup and it continues to run without any problem on the system.

4.3 Users Training

4.3.1 Purpose

- To help MIS staffs to be able to operate and control the proposed system.
- To improve MIS staff in basic knowledge of the proposed system, which they can apply to their working.
- To prepare a staff for supporting a new requirement of the company when this system needs to be changed or modified.

4.3.2 Procedure

- A training center set-up a course and training schedule and cooperation with MIS staff.
- A training coordinator will distribute the training information to all departments.
- The interested persons will get approval from their department heads and take name list, badges and contact numbers back to the training department.
- The training coordinator will confirm the list of attendance back to the interested persons for confirmation.
- Training of users by the in-house application developer

  For the system operator, they must know the basic as to work on the system, what to do when an error occur, basic troubleshooting and how to enter the data into the proposed system.

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For the other users, they must known how to inquire about the information on the new proposed system, what type of report it will produce.

- MIS staff will follow up and make users training evaluation forms which will help with course improvement.

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V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The information system is important for corporation because it can improve profitability and provide the all-important competitive advantage. Therefore, we need to develop the existing system by replacing the manual procedure with the computer system. In this project, we mention the Maintenance and Technical Support Information System for IT Equipment for Electronic Company which are designed to support the MIS and other users in the organization for a service request and inquiry of information about the IT equipment.

The proposed system provides a real-time (on-line) information and is easy to access at any time. And also it helps to reduce paperwork, cost, inquiry time and allows users to interact with the system on their computer screens. This project describes each of the activity associated with developing a computer-based maintenance and technical support information system of IT equipment. Start from the examination, analyses of the existing system and designing a new system by using various methods based on the System Development Life Cycle, until the production of output as reports and screen displays.

5.2 Recommendations

An important criterion in Maintenance and Technical Support Information for IT Equipment for Electronic Company is people who control and operate the computing system which supports all service requests and information of the IT equipment. They must have good knowledge in computer environment because they will provide an information system which users request for advising on any facet of the computing system. They should be skillful in analyzing or classifying the

problem before forwarding it onto responsible section to solve the problem. And also they should be service-minded in order to make the system more efficient. This criteria can be done by providing a good training system. After completing the installation of Maintenance and Technical Support Information System for IT equipment for Electronic Company, we plan to improve the system not only to support the service requested and information of the IT equipment. We will also link it with other systems such as:

- IT inventory control system(Spare Part Control System)
- purchasing system
- Financing system(Fix Asset system)
- HR system

To make it more useful in future.

To ensure that the new system is fully utilized, we have to evaluate the performance of the new system after running it for a period of time by taking into account the satisfaction from the MIS decision maker, MIS technician and users and compare the reduced error between the old system and the new system. The results of performing this method will make the Maintenance and Technical support Information System meet the needs and target of the organization.

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APPENDIX A

Context Diagram

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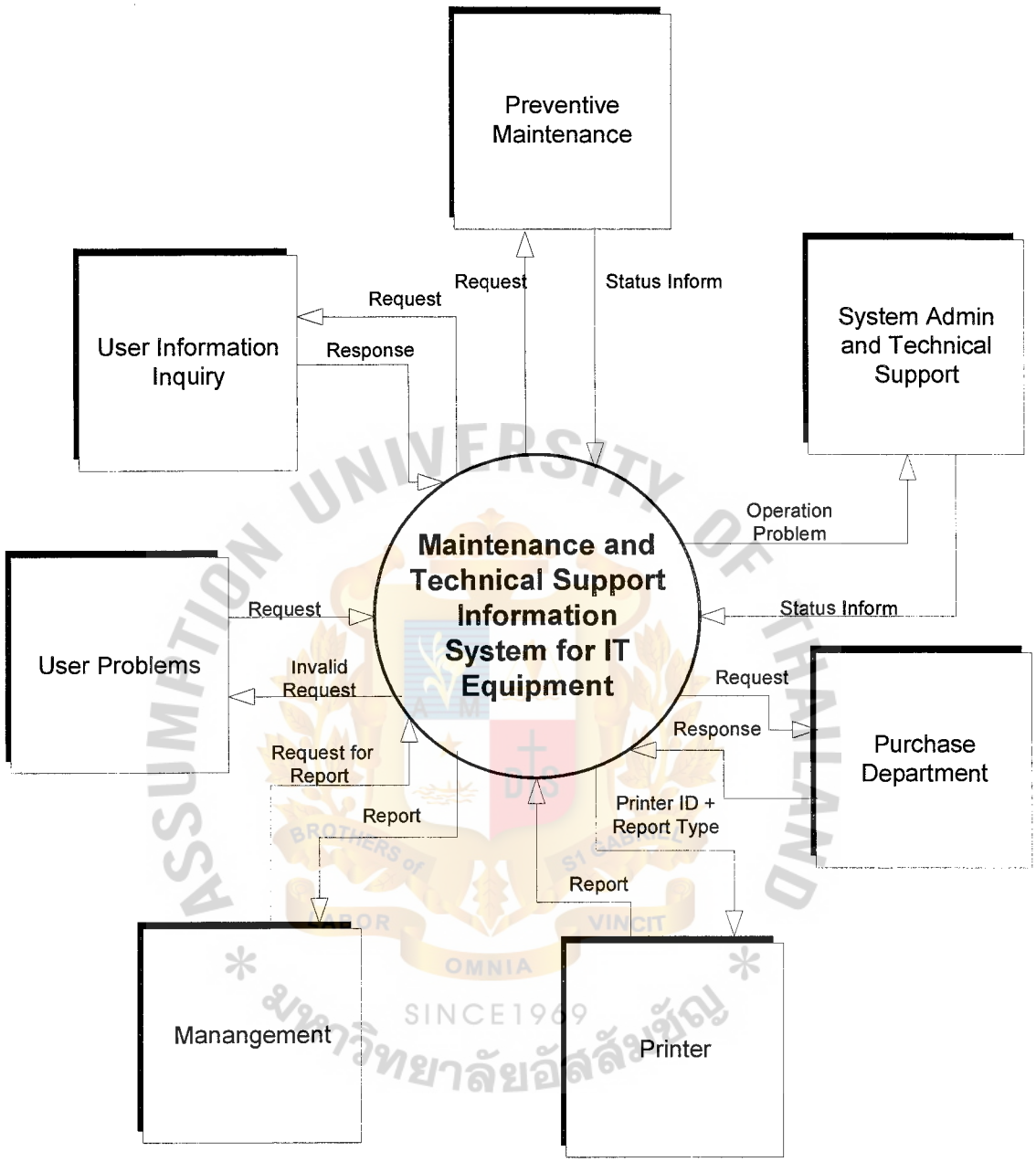

Figure A.1. Context Diagram(Proposed System)

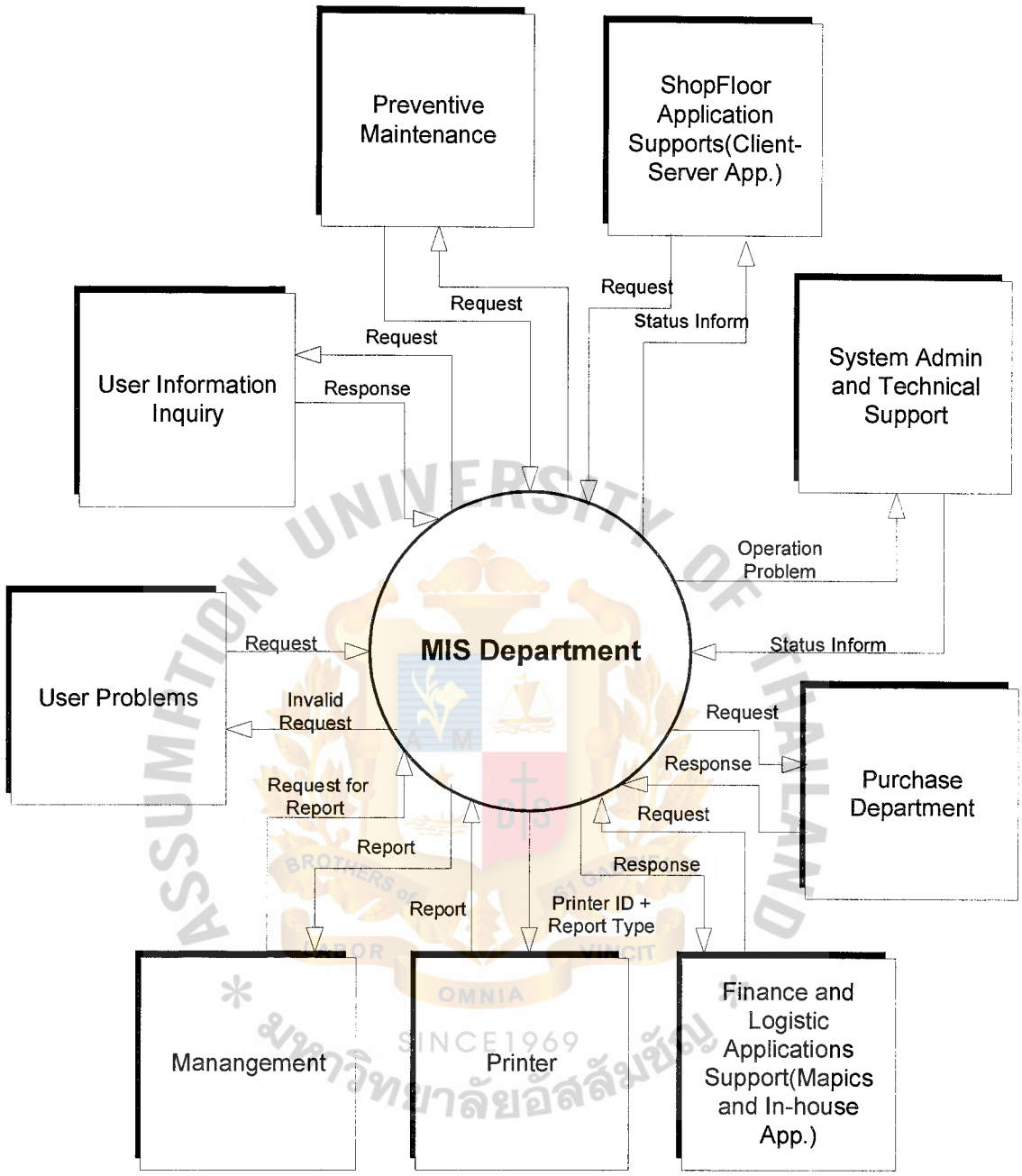

Figure A.2. Context Diagram of The Existing System(Manual System)

APPENDIX B

Data Flow Diagram

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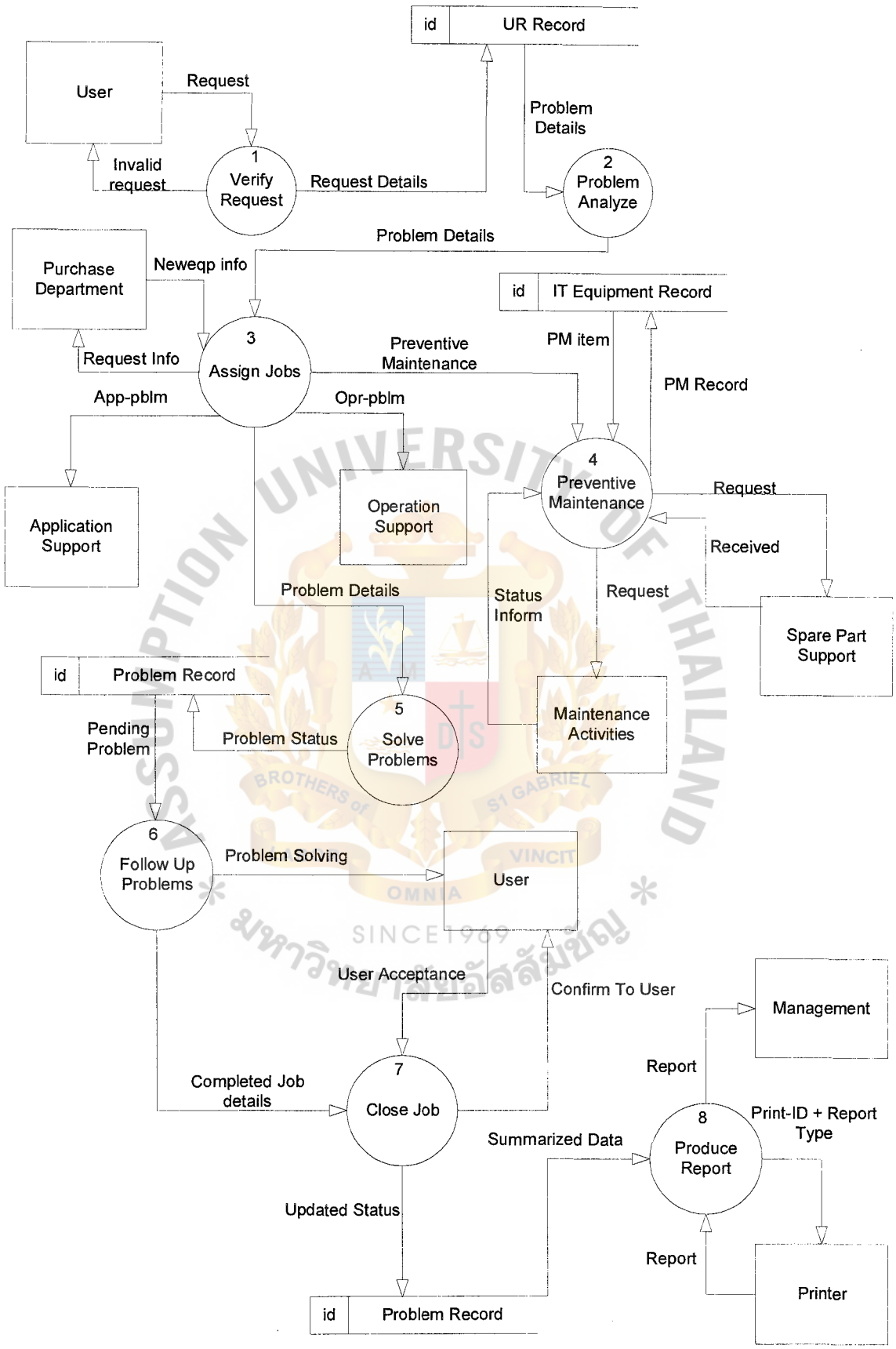

Figure B.1. Data Flow Diagram - Level 0

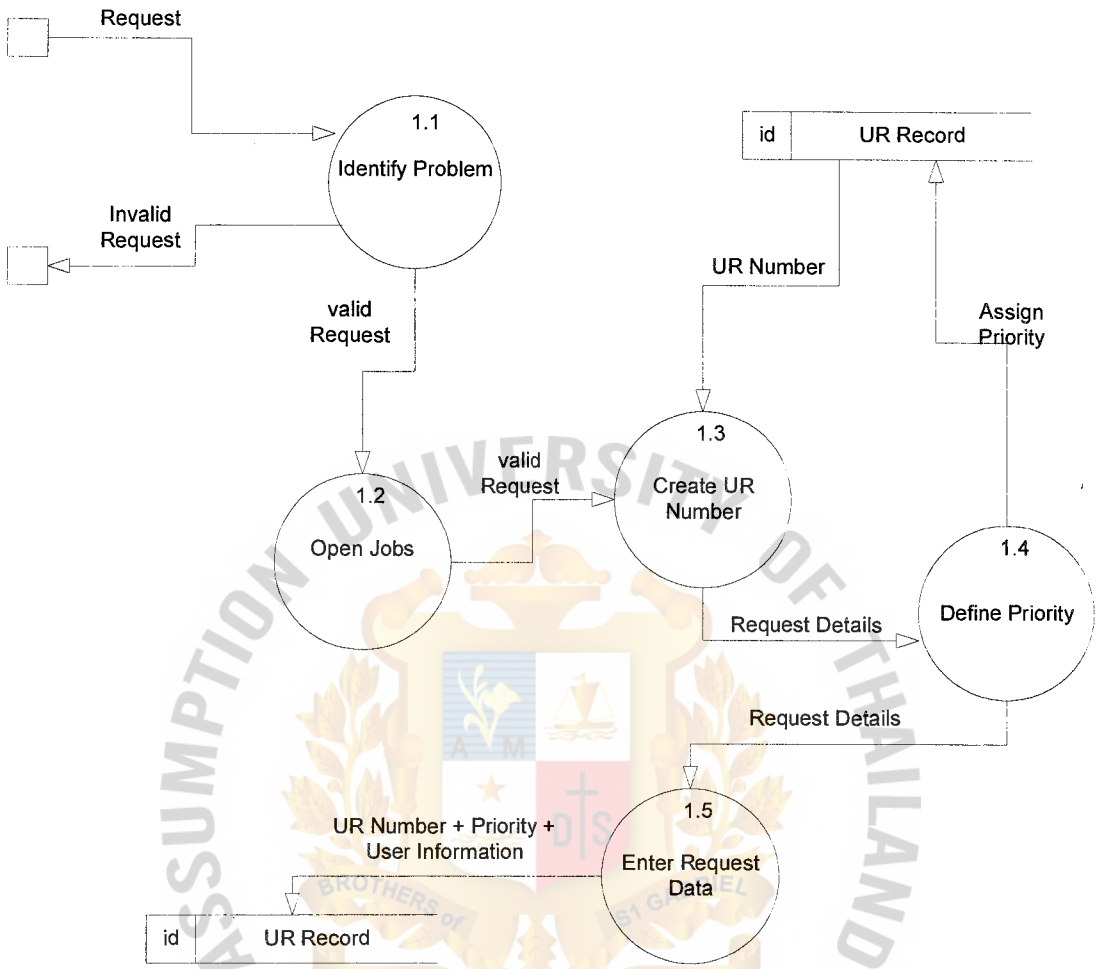

Figure B.2. Data Flow - Level 1 of Process 1.0

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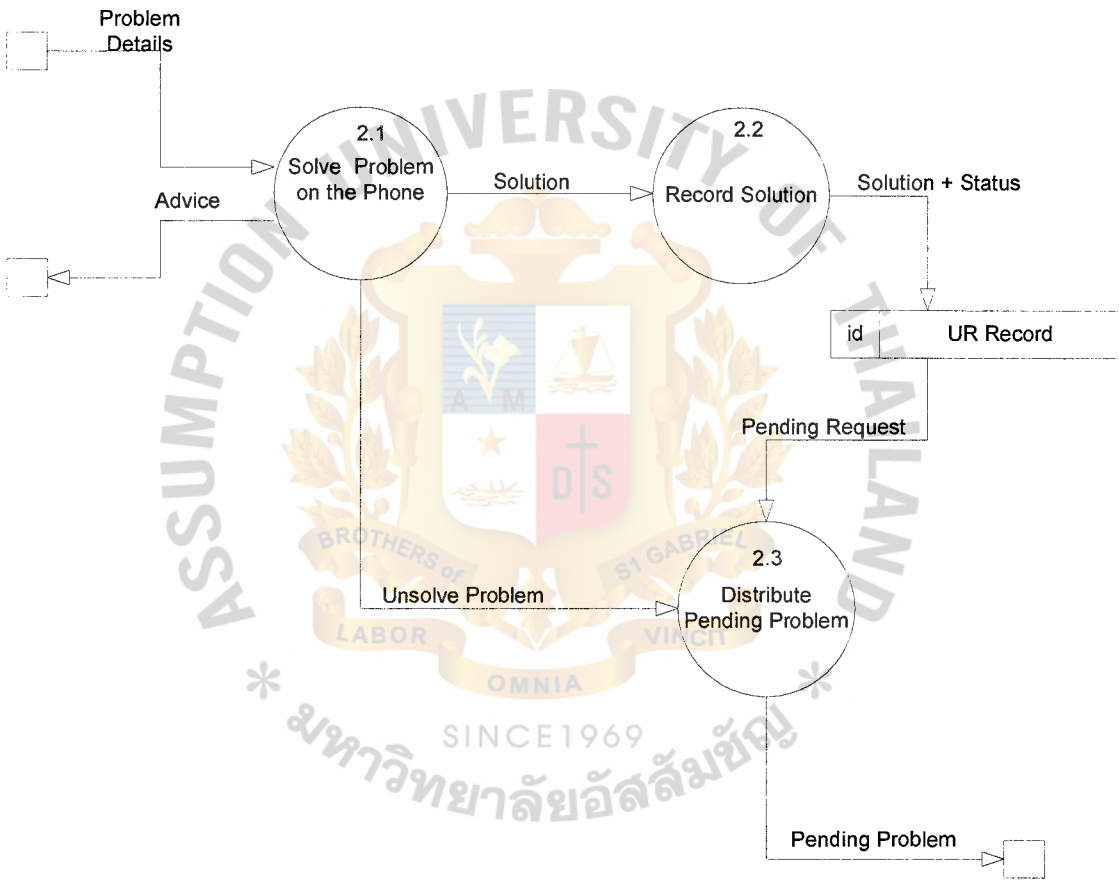

Figure B.3. Data Flow - Level 1 of Process 2.0

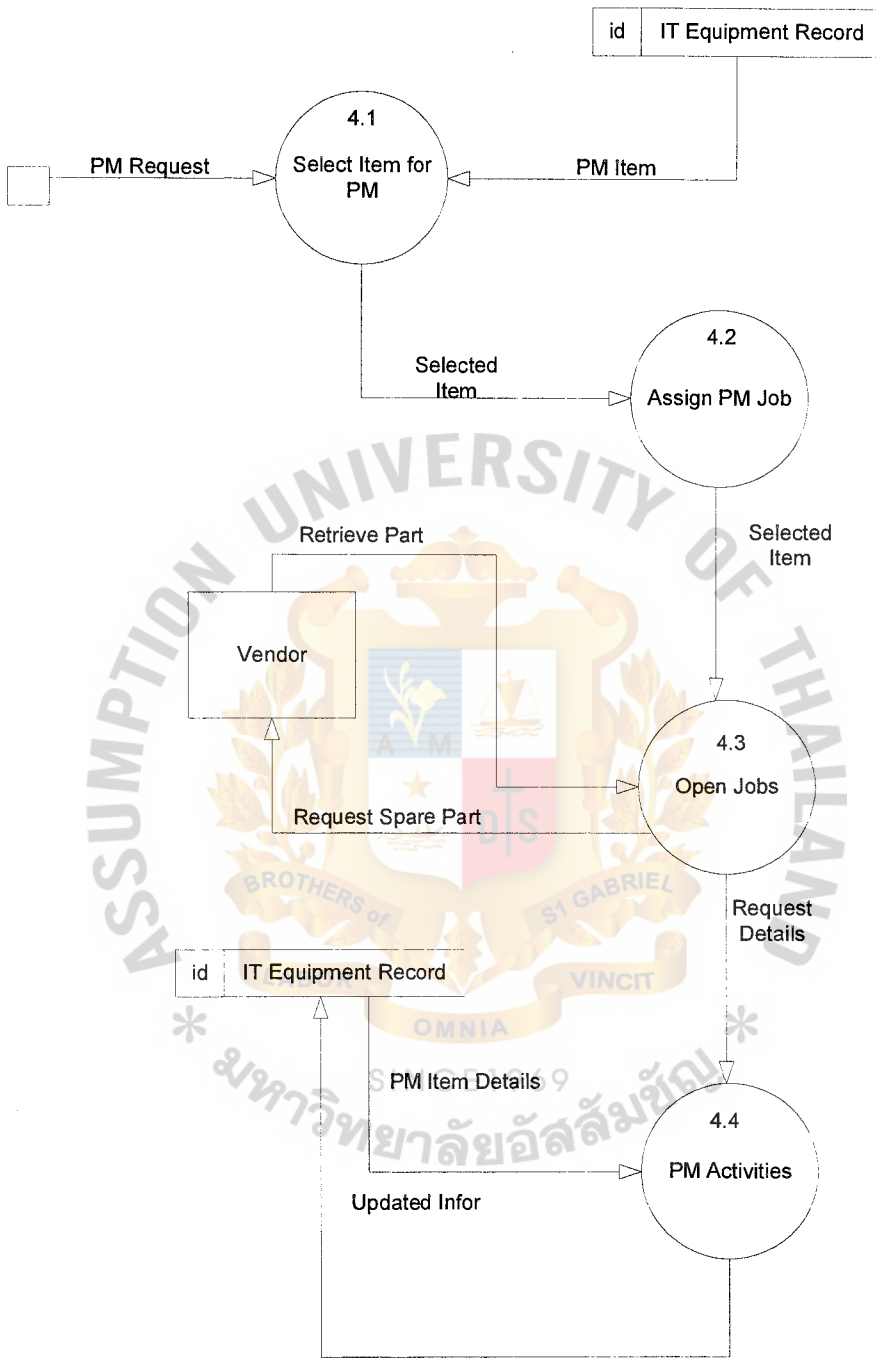

Figure B.4. Data Flow - Level 1 of Process 4.0

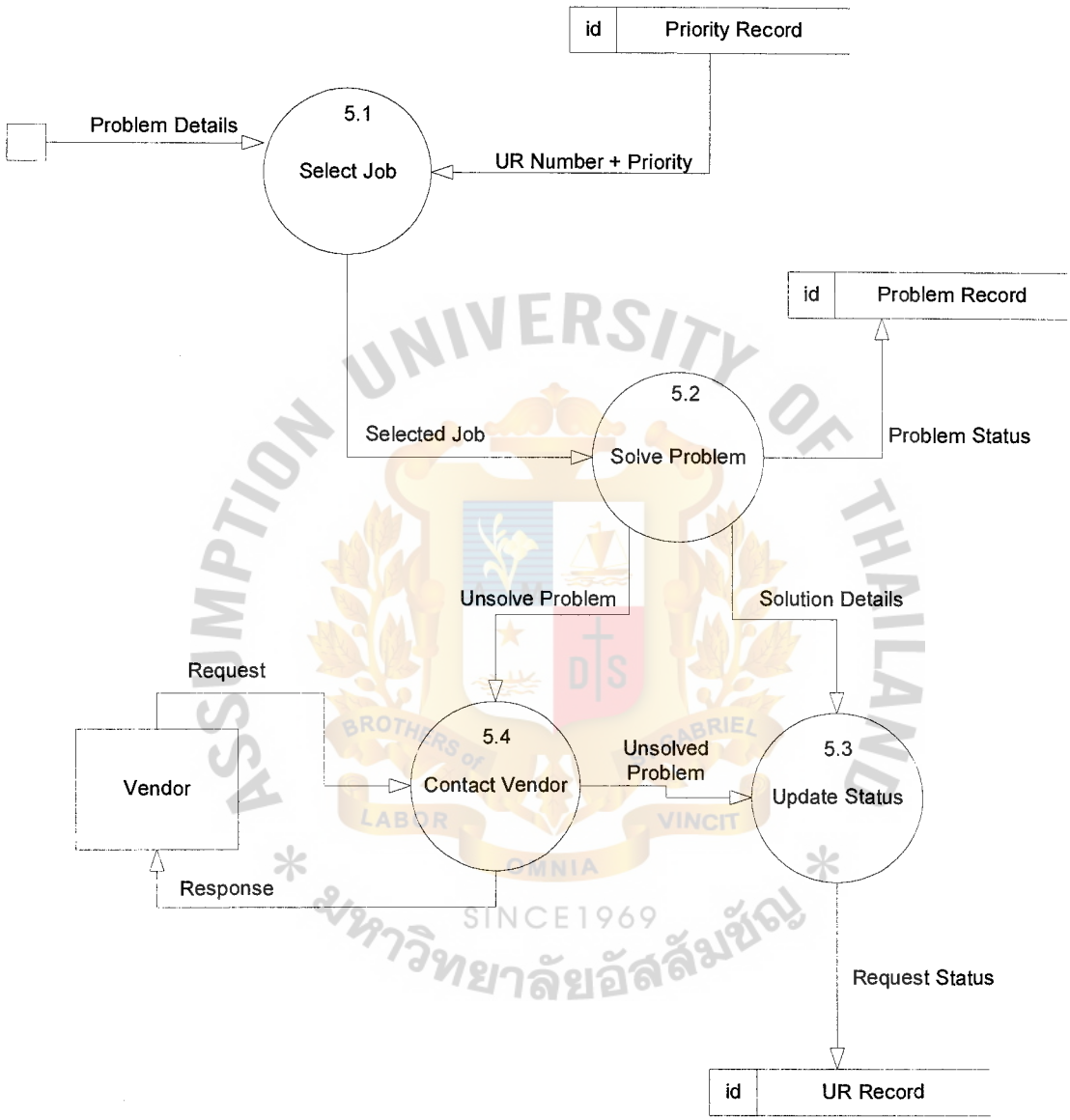

Figure B.5. Data Flow - Level 1 of Process 5.0

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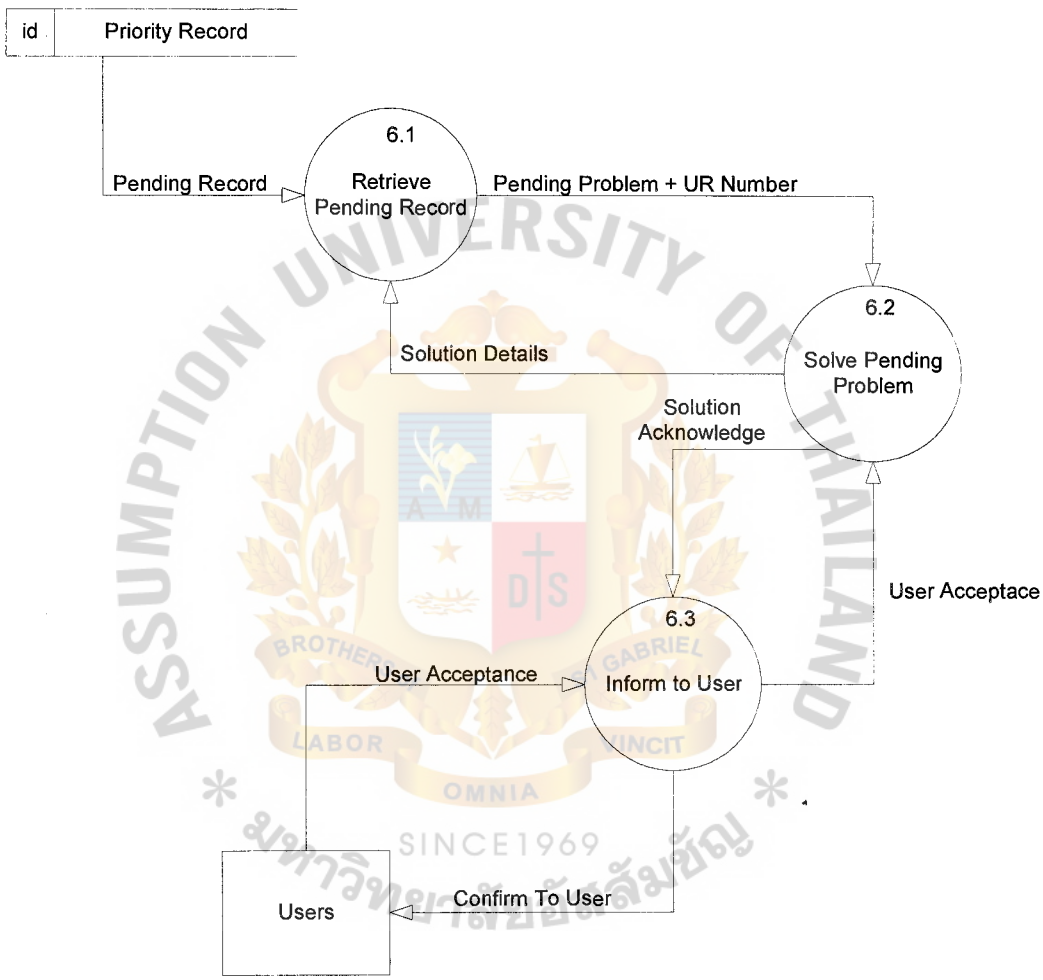

Figure B.6. Data Flow - Level 1 of Process 6.0

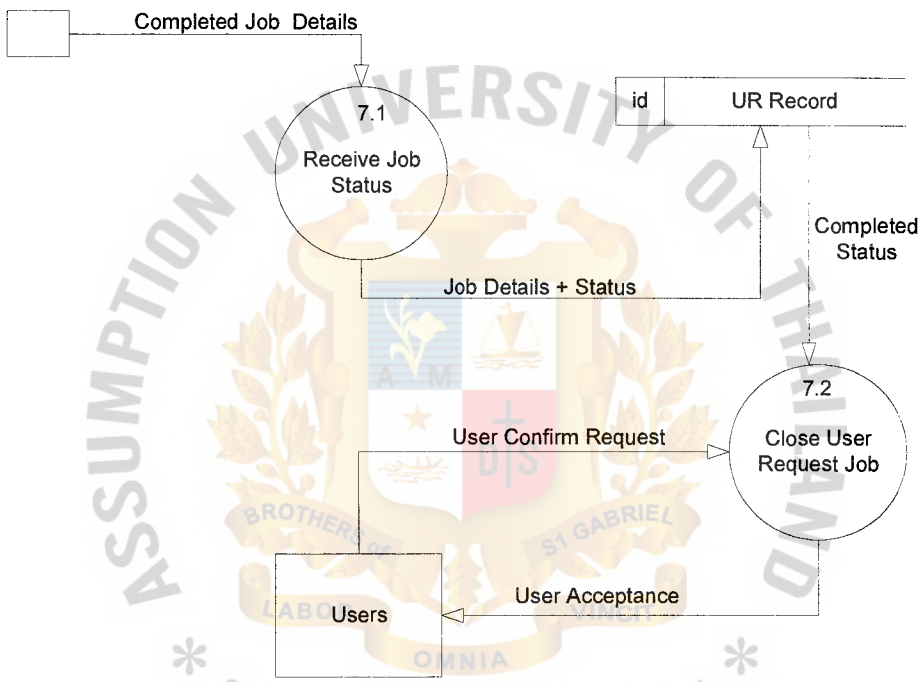

Figure B.7. Data Flow - Level 1 of Process 7.0

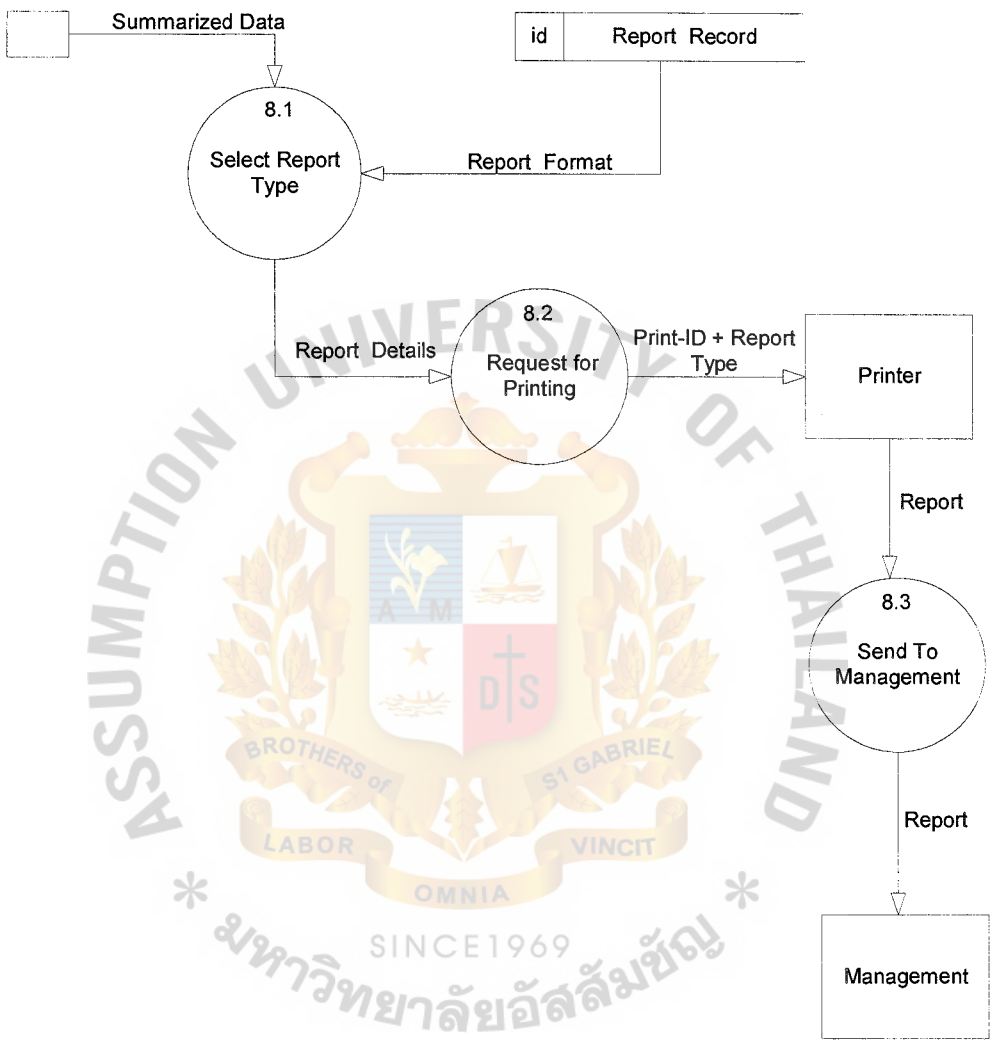

Figure B.8. Data Flow - Level 1 of Process 8.0

APPENDIX C

Screen and Report Design

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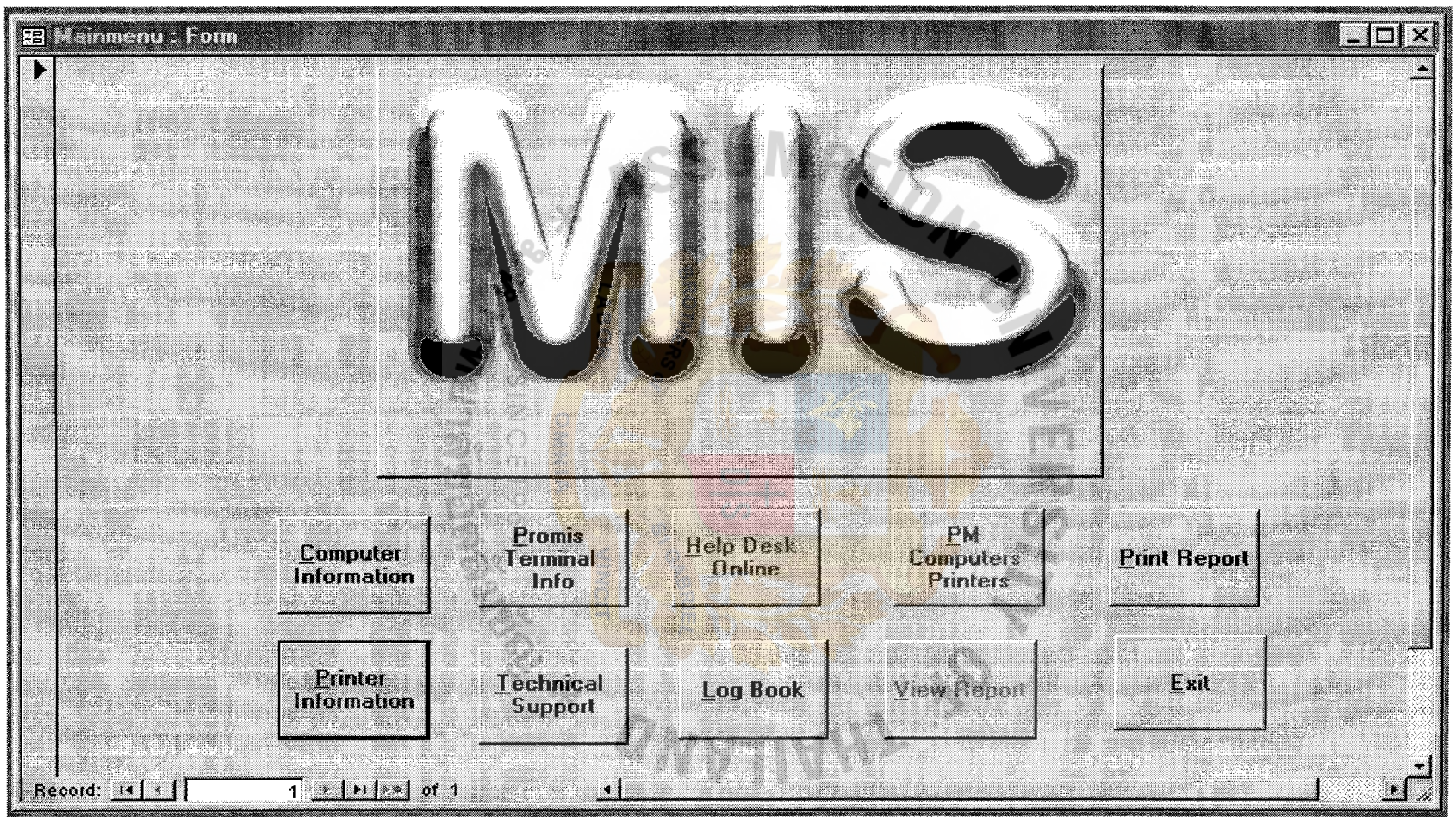

Figure C.1. Main Menu Display Screen

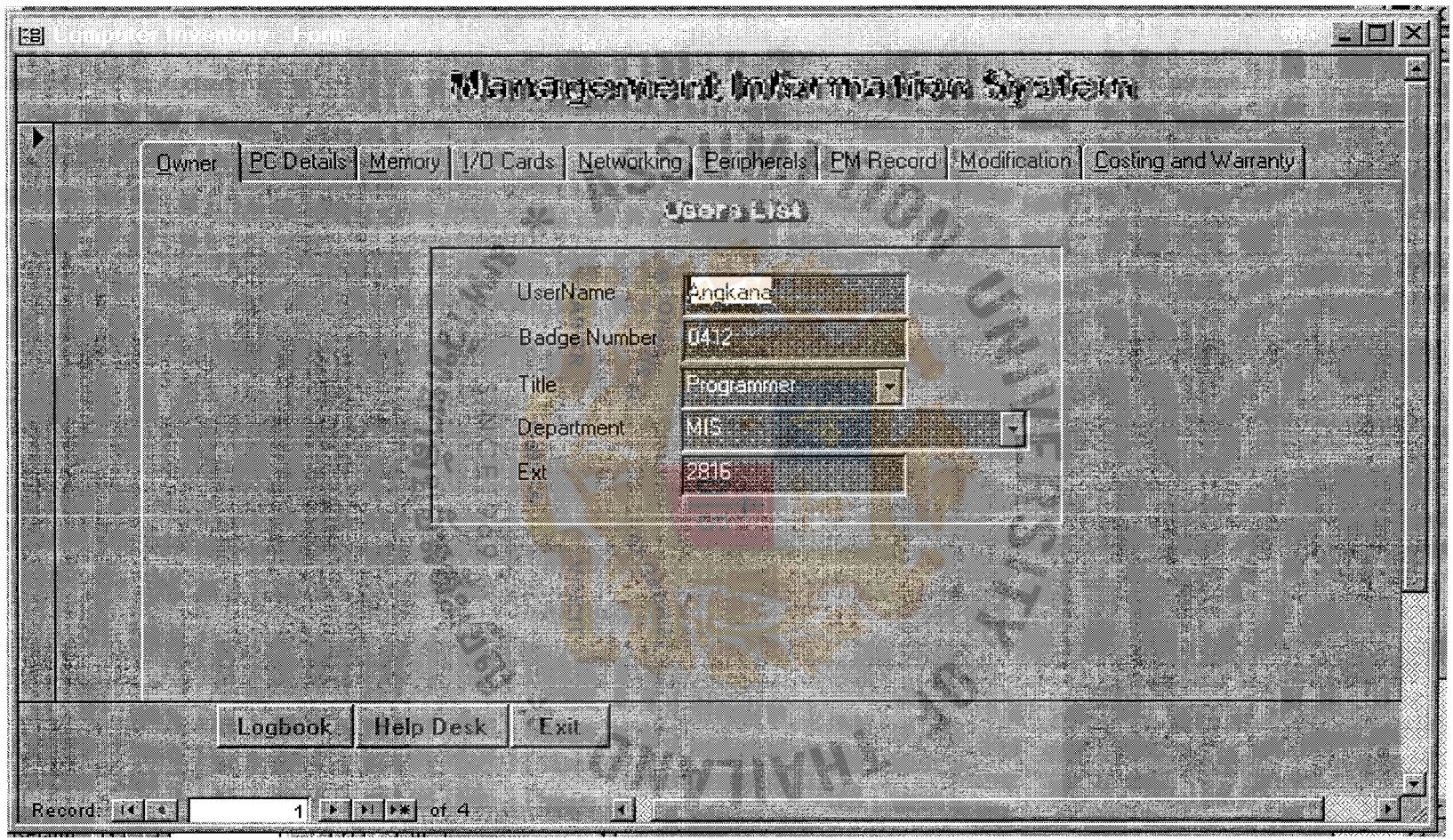

Figure C.2. Computer Information(Owner) Display Screen

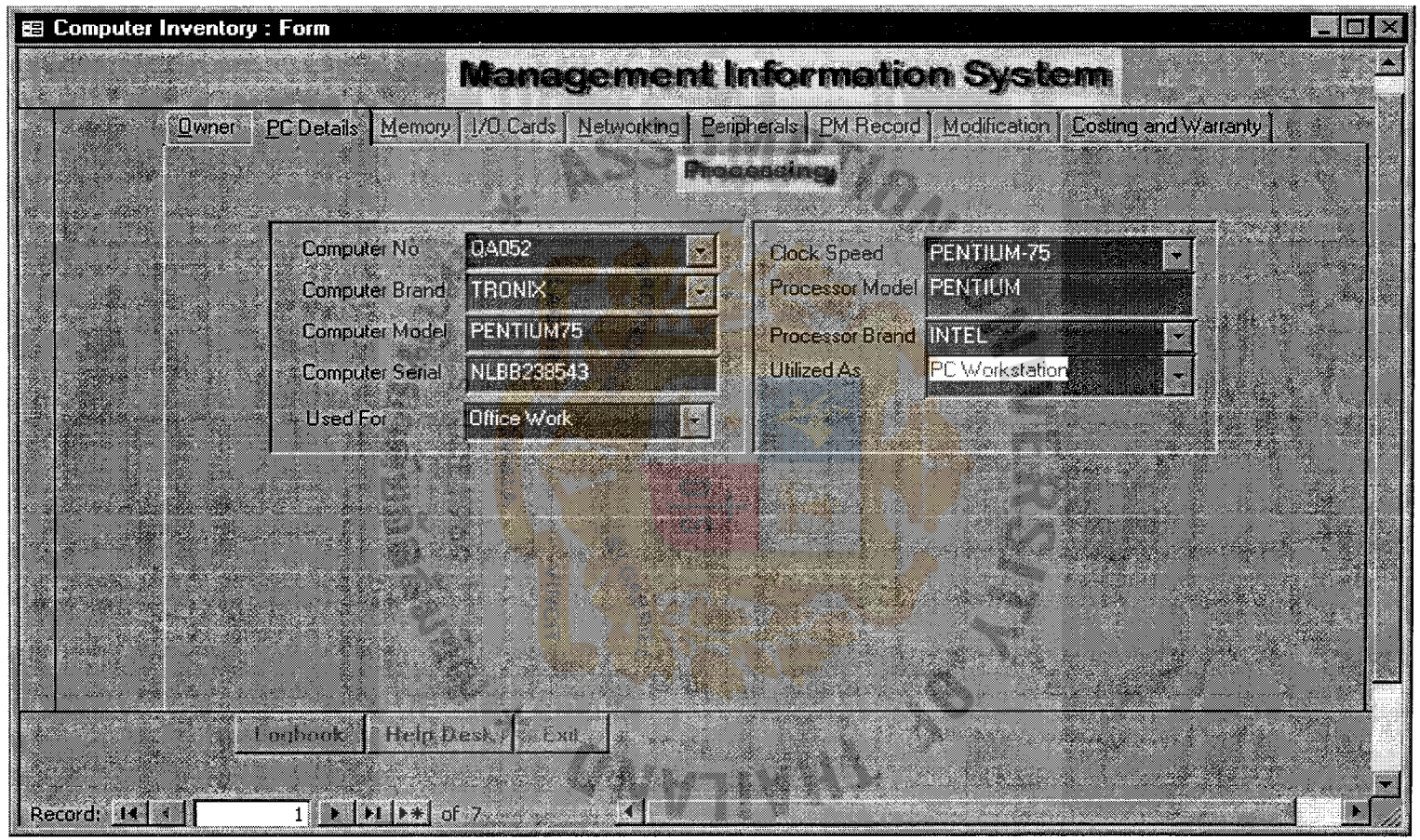

Figure C.3. Computer Information(PC Details) Display Screen

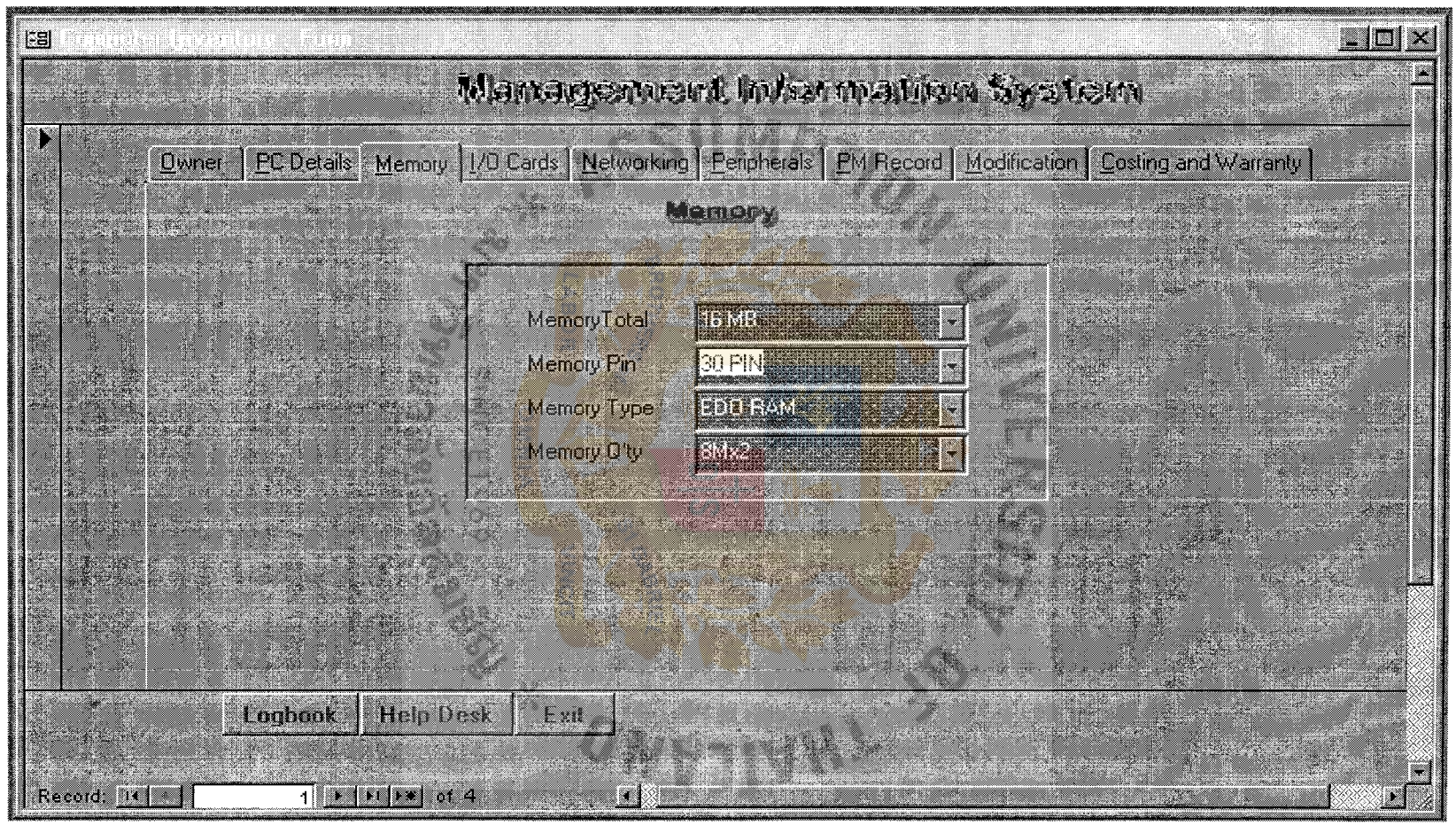

Figure C.4. Computer Information(Memory) Display Screen

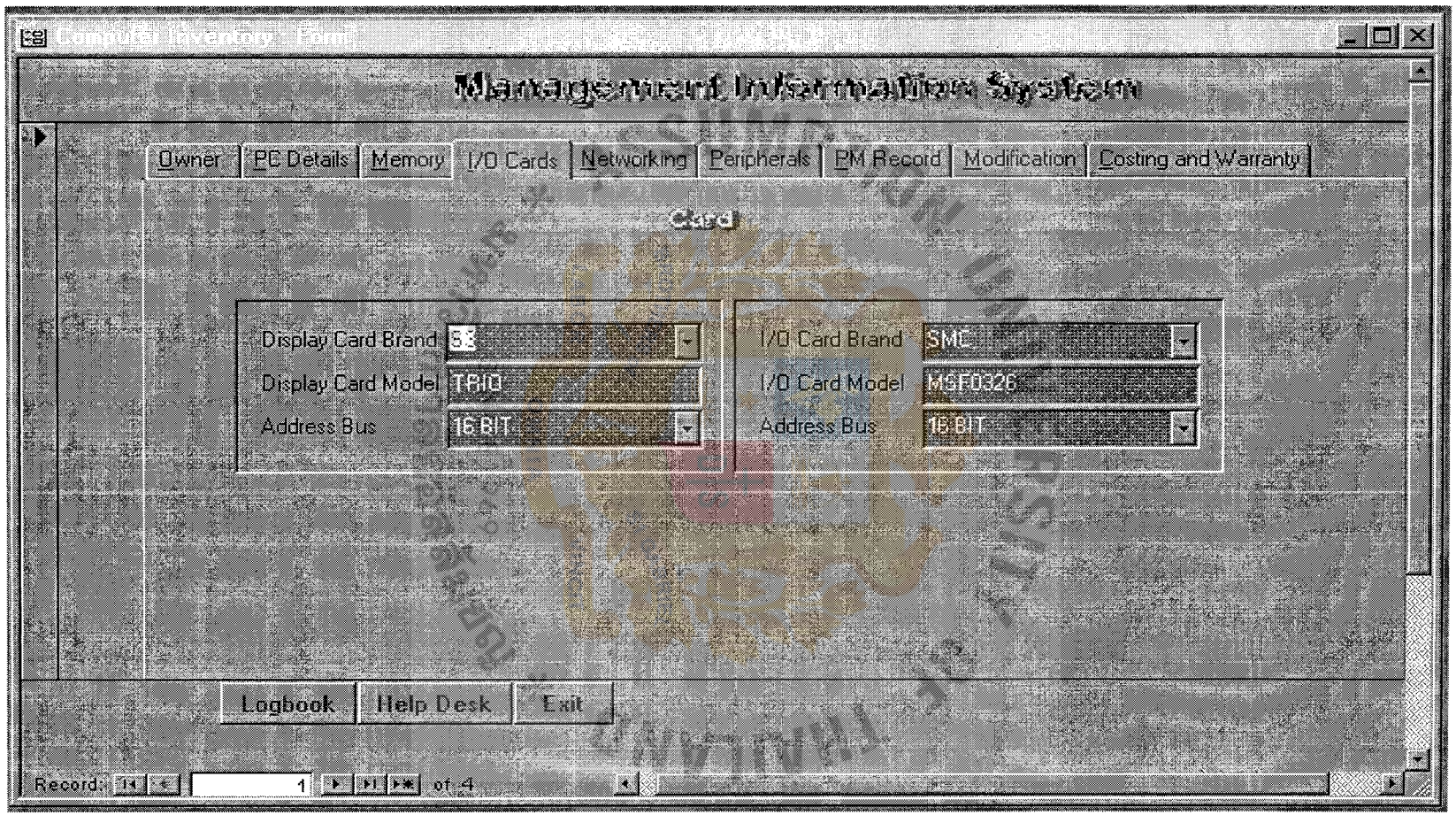

Figure C.5 Computer Information (I/O Cards) Display Screen

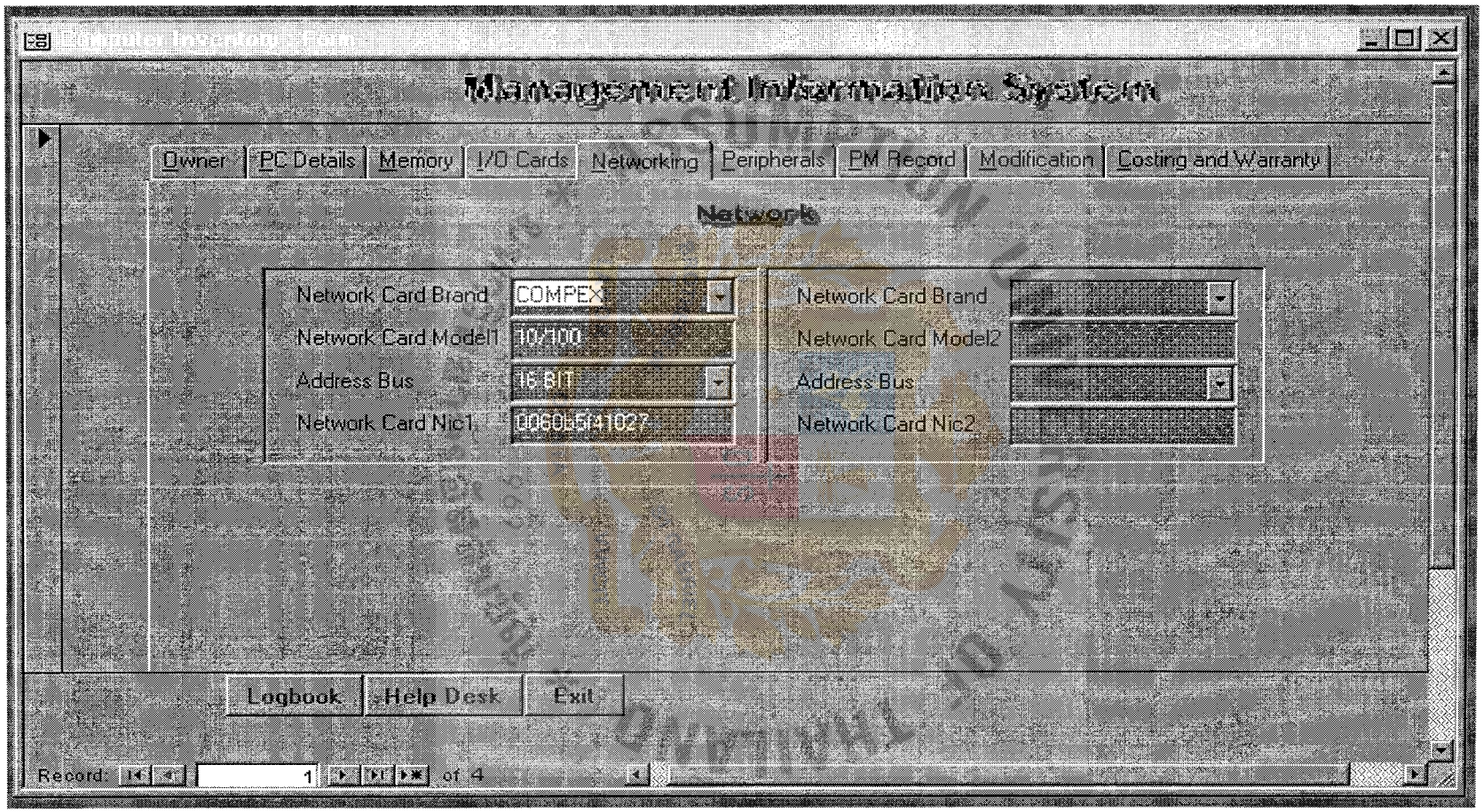

Figure C.6. Computer Information (Networking) Display Screen

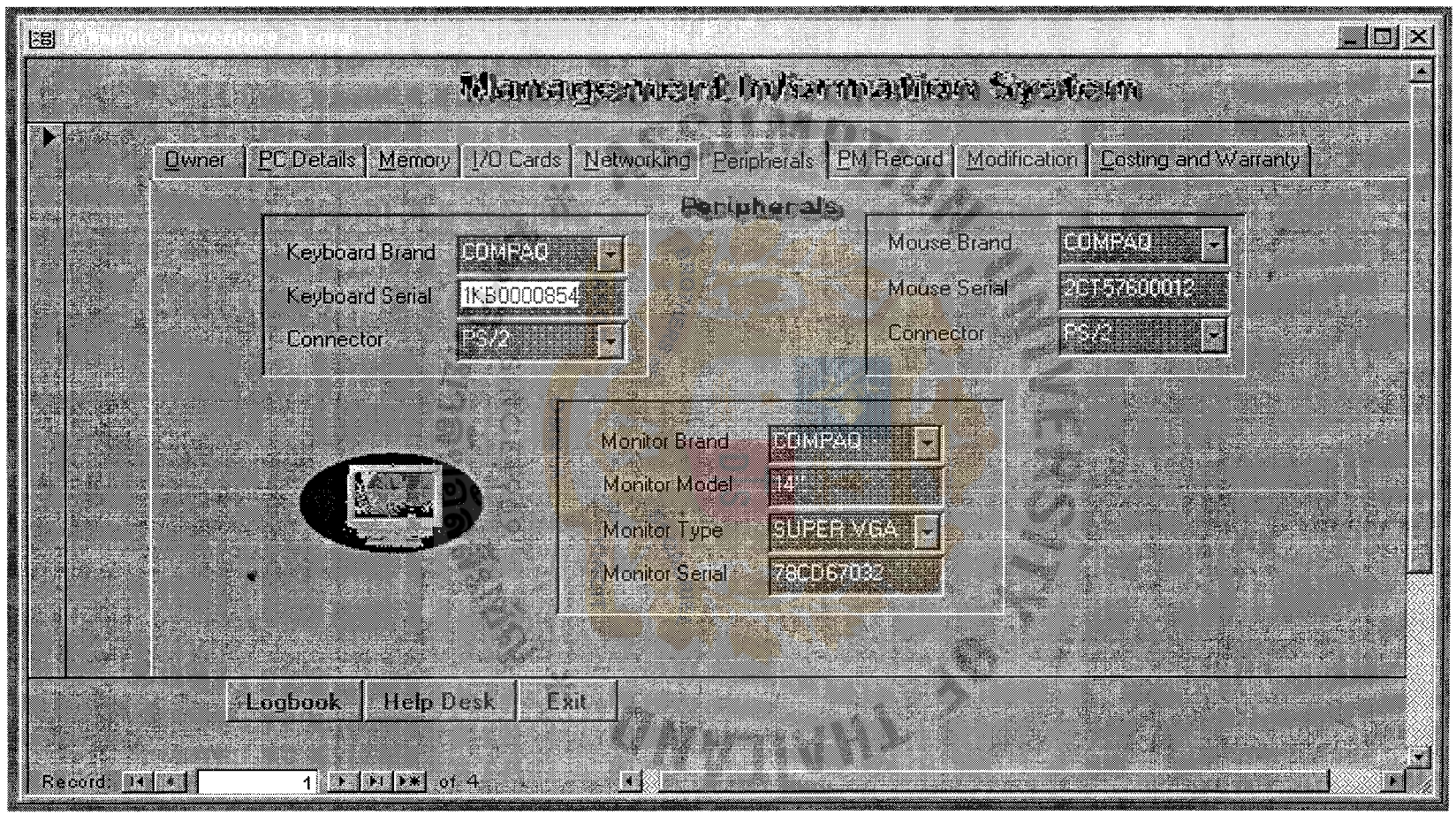

Figure C.7. Computer Information (Peripherals) Display Screen

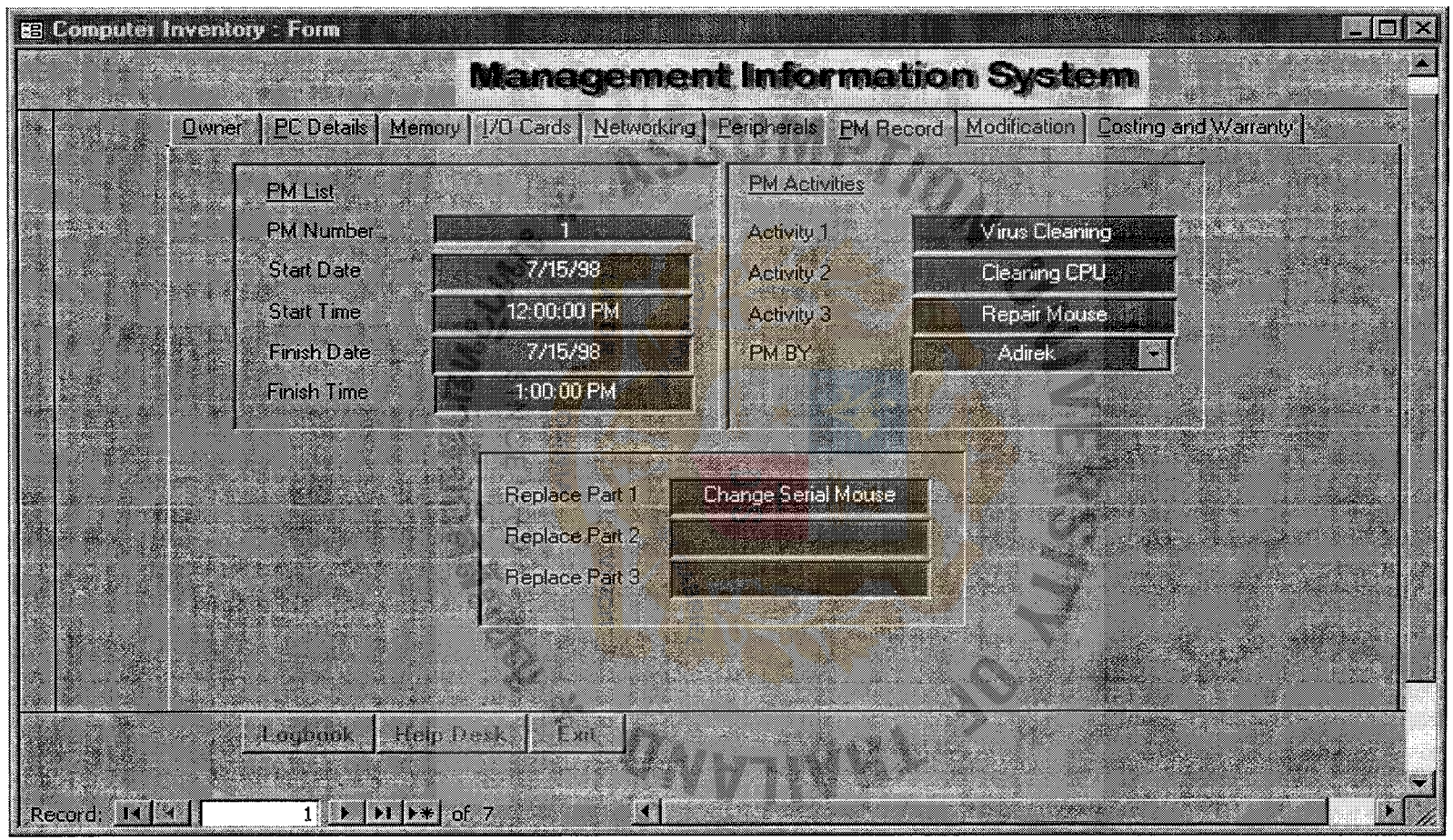

Figure C.8. Computer Information(PM Record) Display Screen

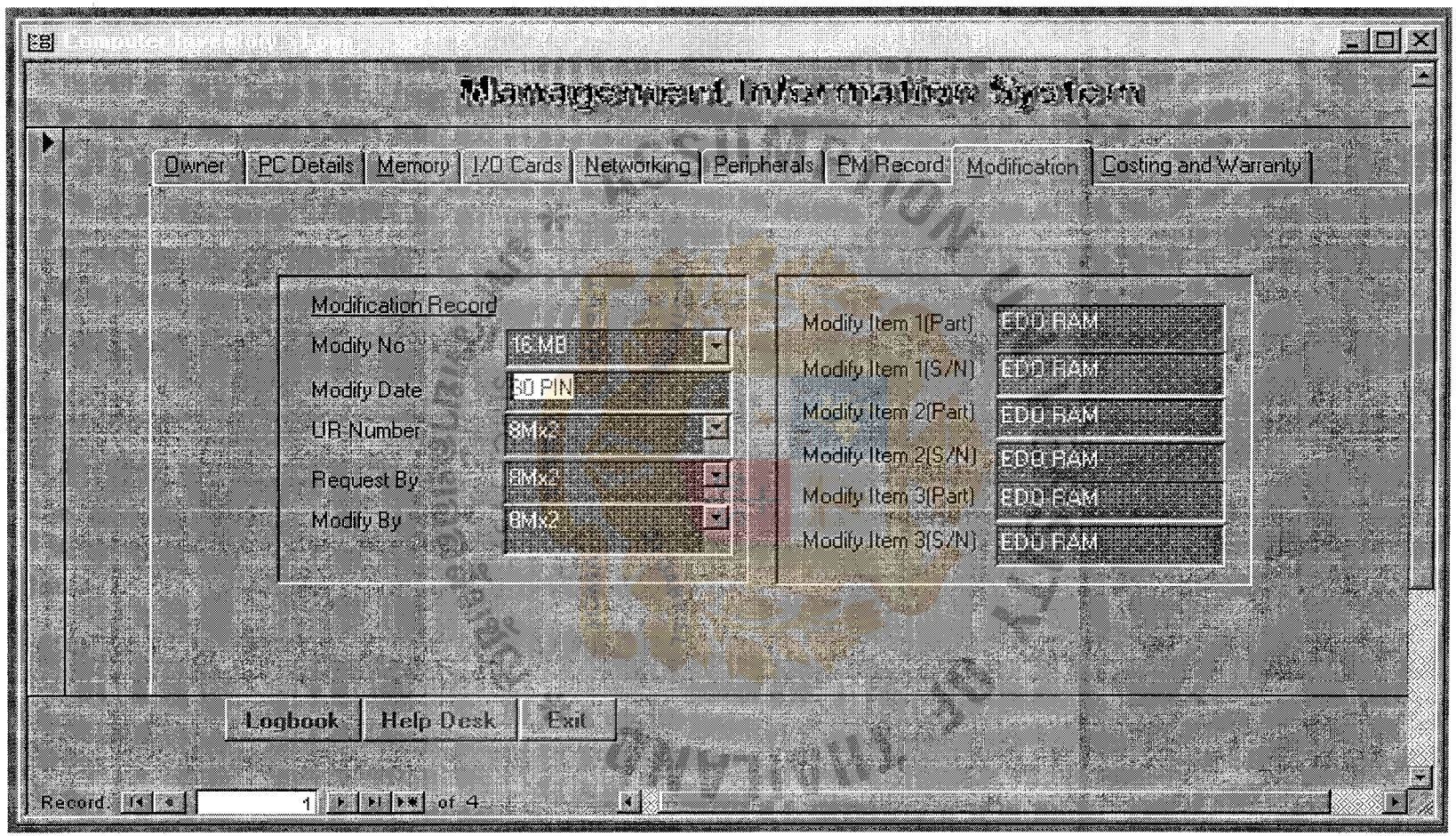

Figure C.9. Computer Information (Modification Record) Display Screen

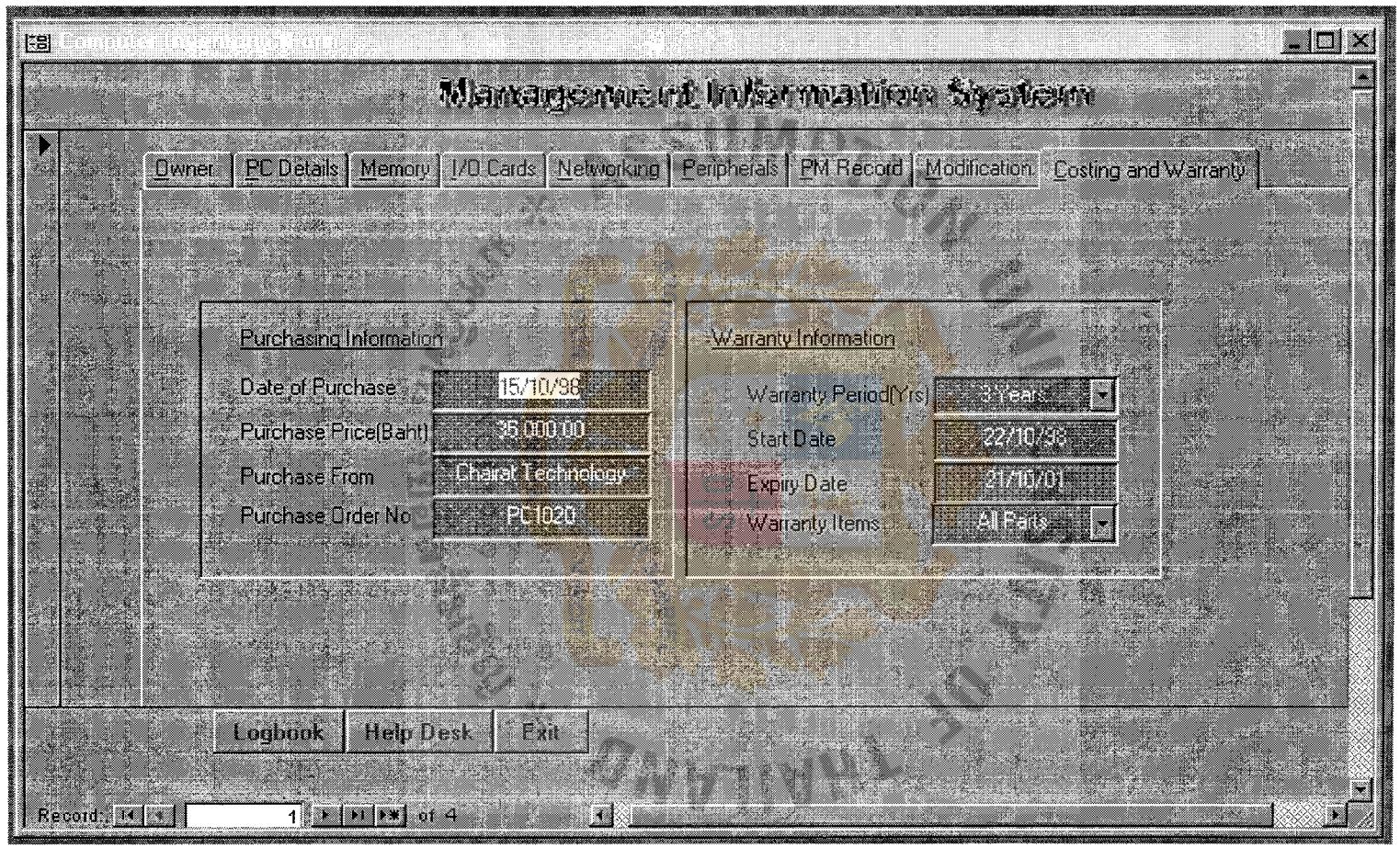

Figure C.10. Computer Information(Warranty&Cost) Display Screen

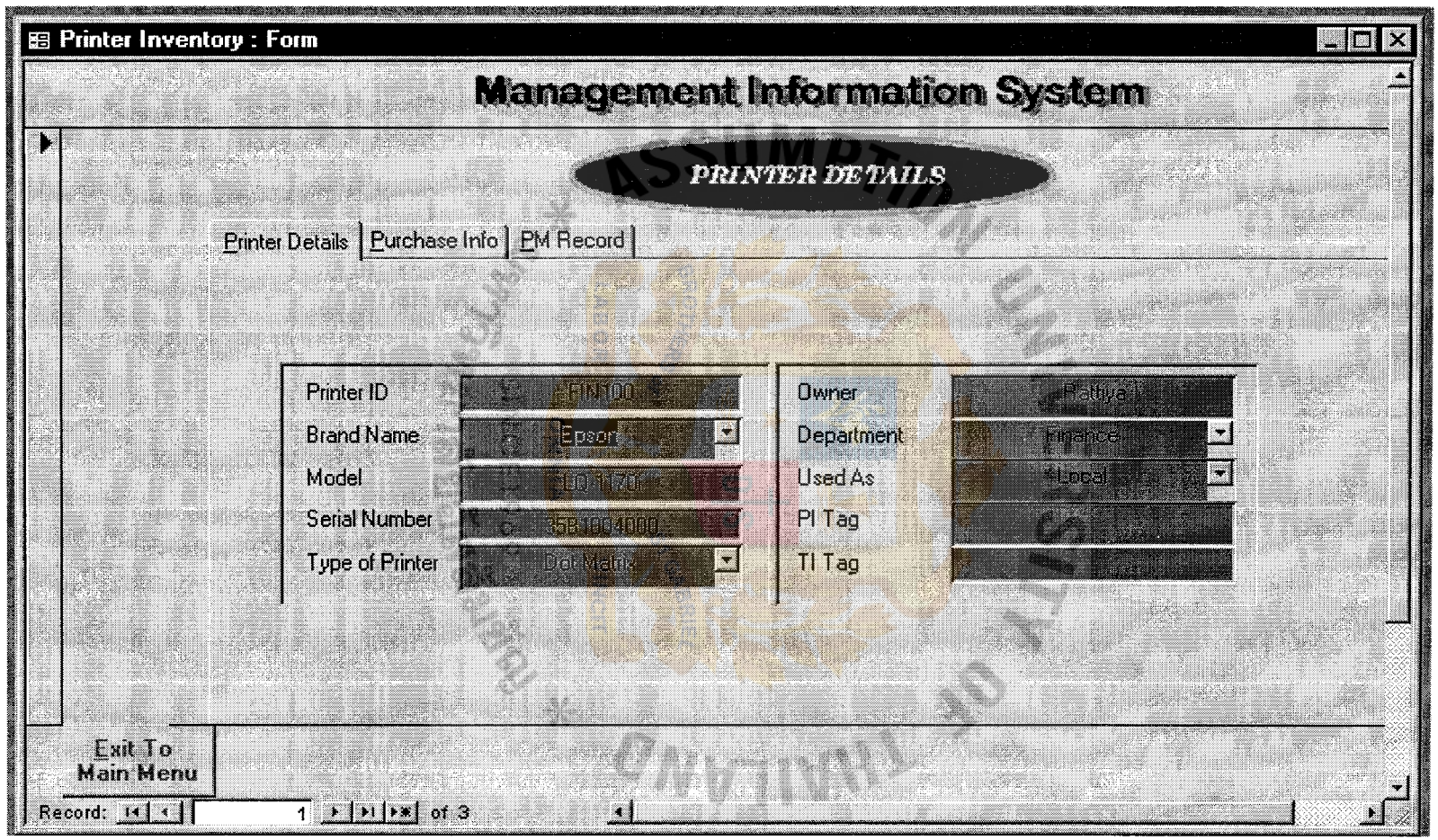

Figure C.11. Printer Information(H/W details) Display Screen

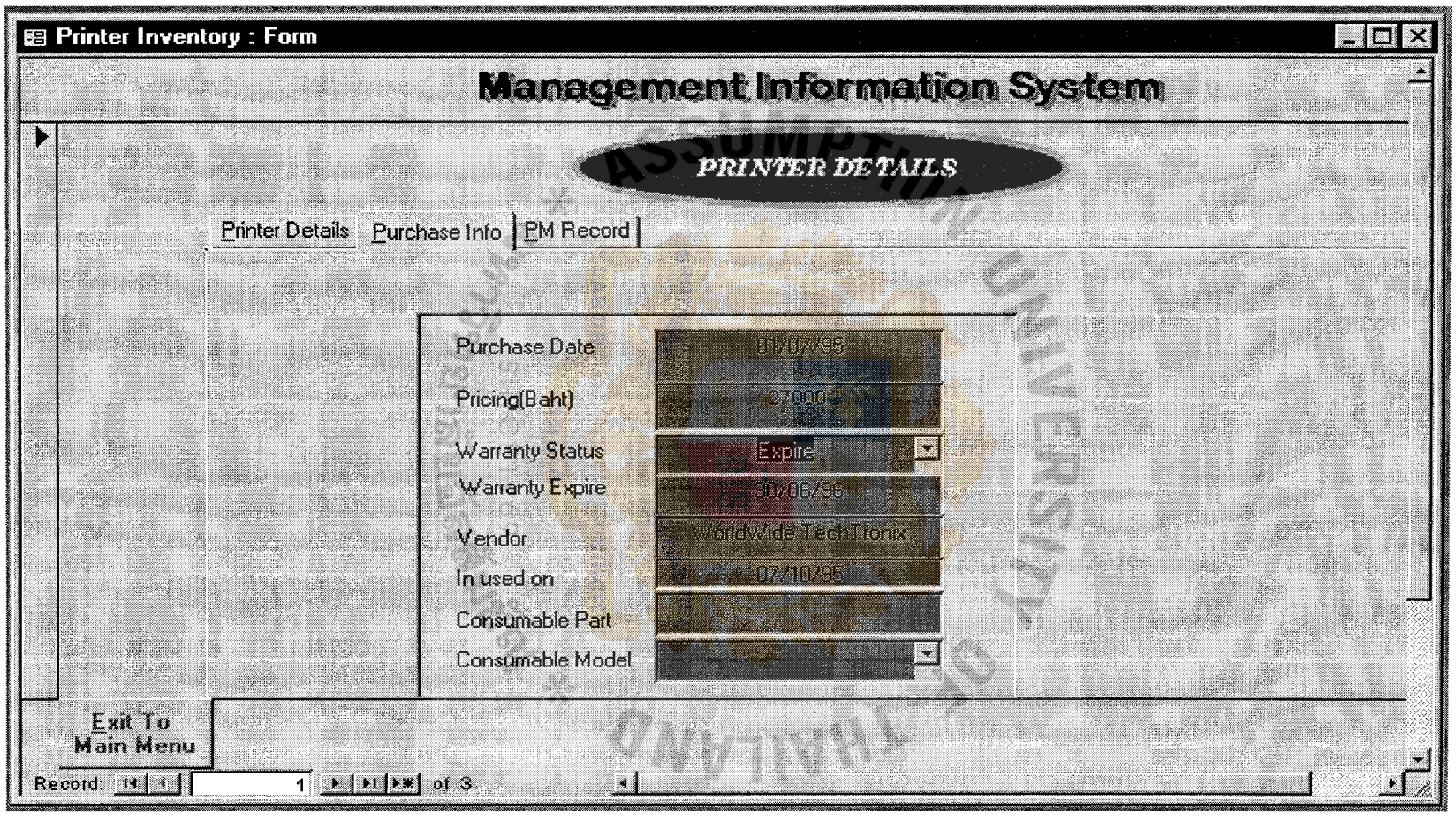

Figure C.12. Printer Information (Warranty&Cost) Display Screen

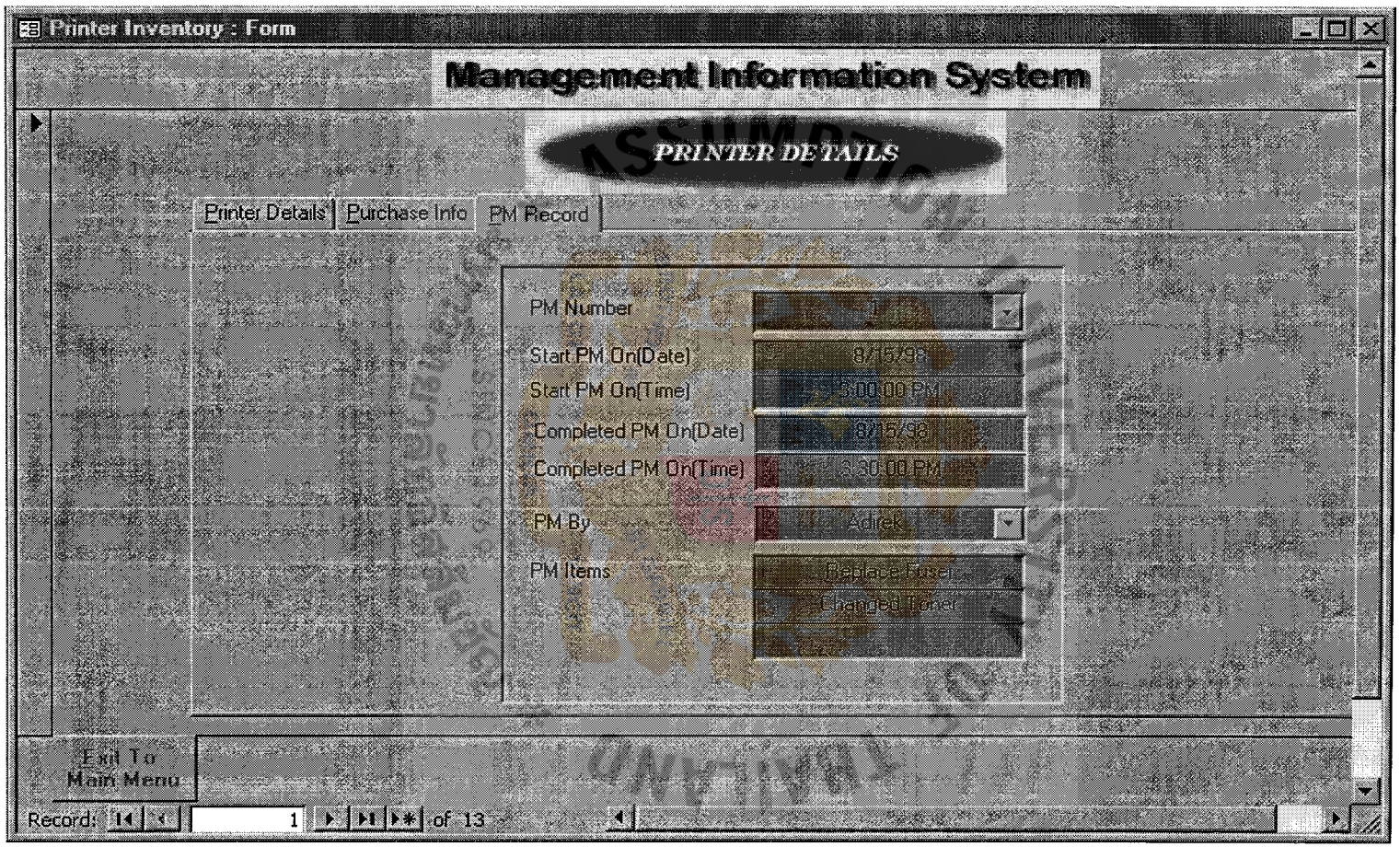

Figure C.13. Printer Information(PM Record) Display Screen

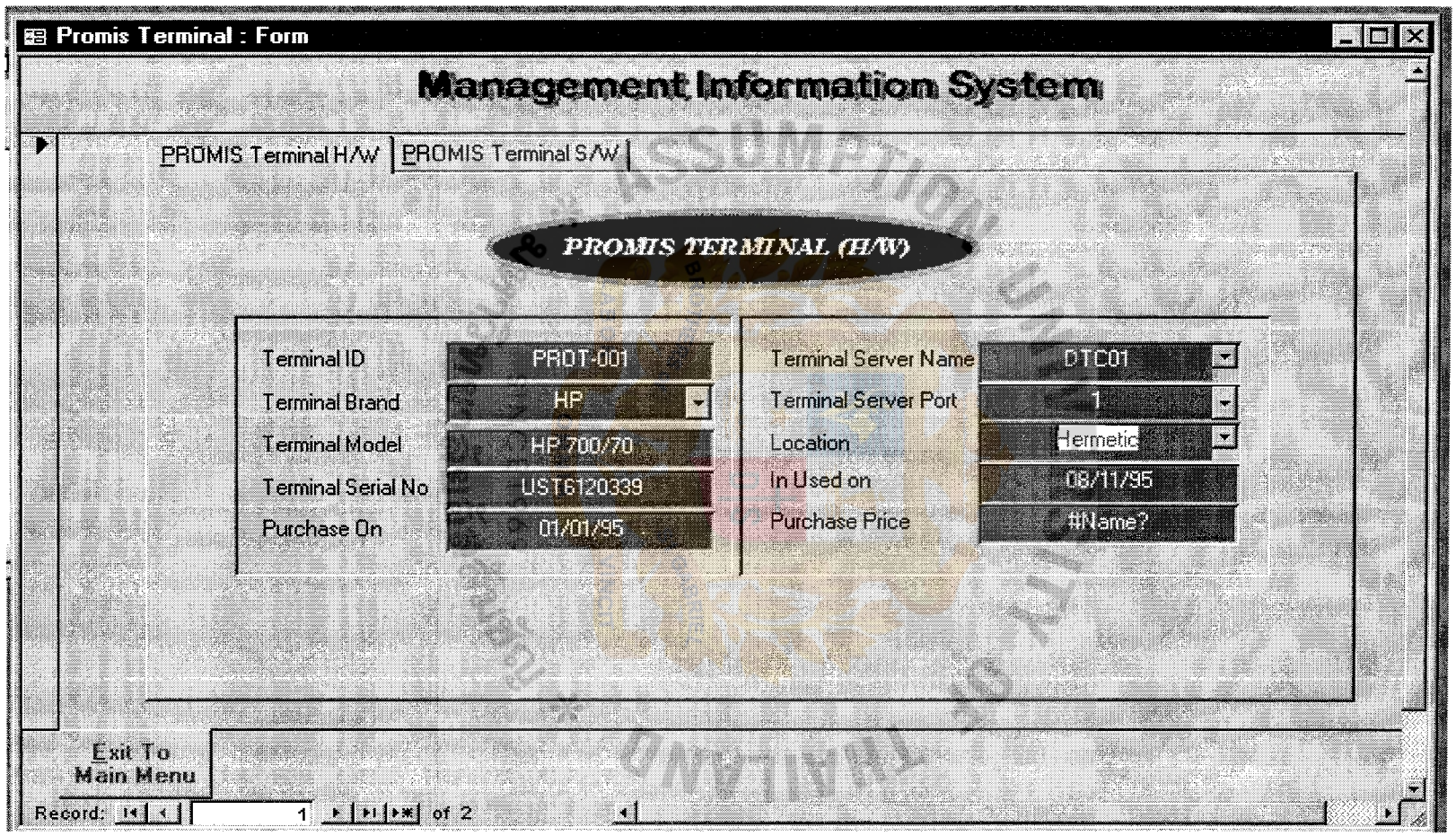

Figure C.14. Promis Terminal Information(H/W) Display Screen

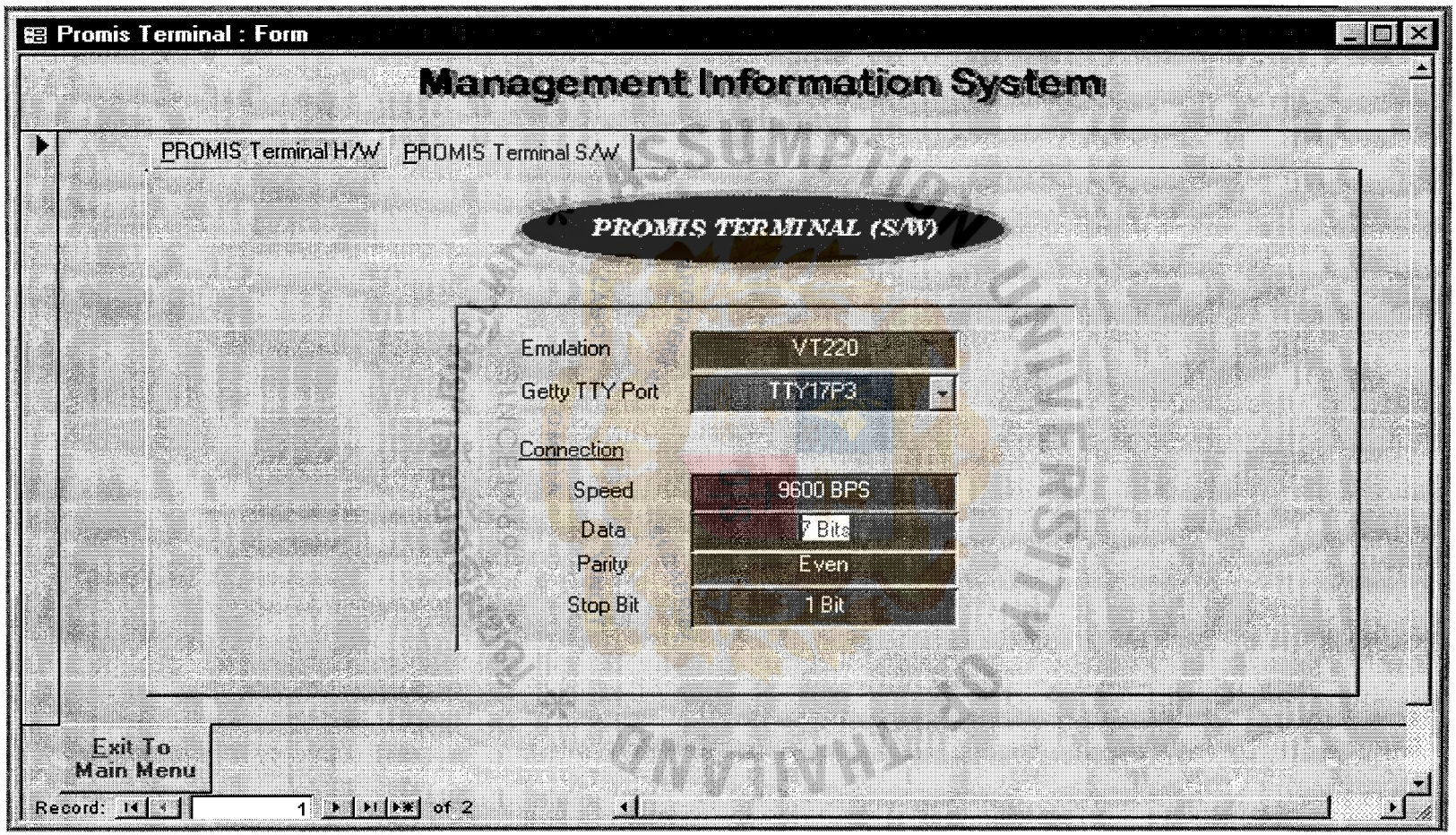

Figure C.15. Promis Terminal Information(S/W) Display Screen

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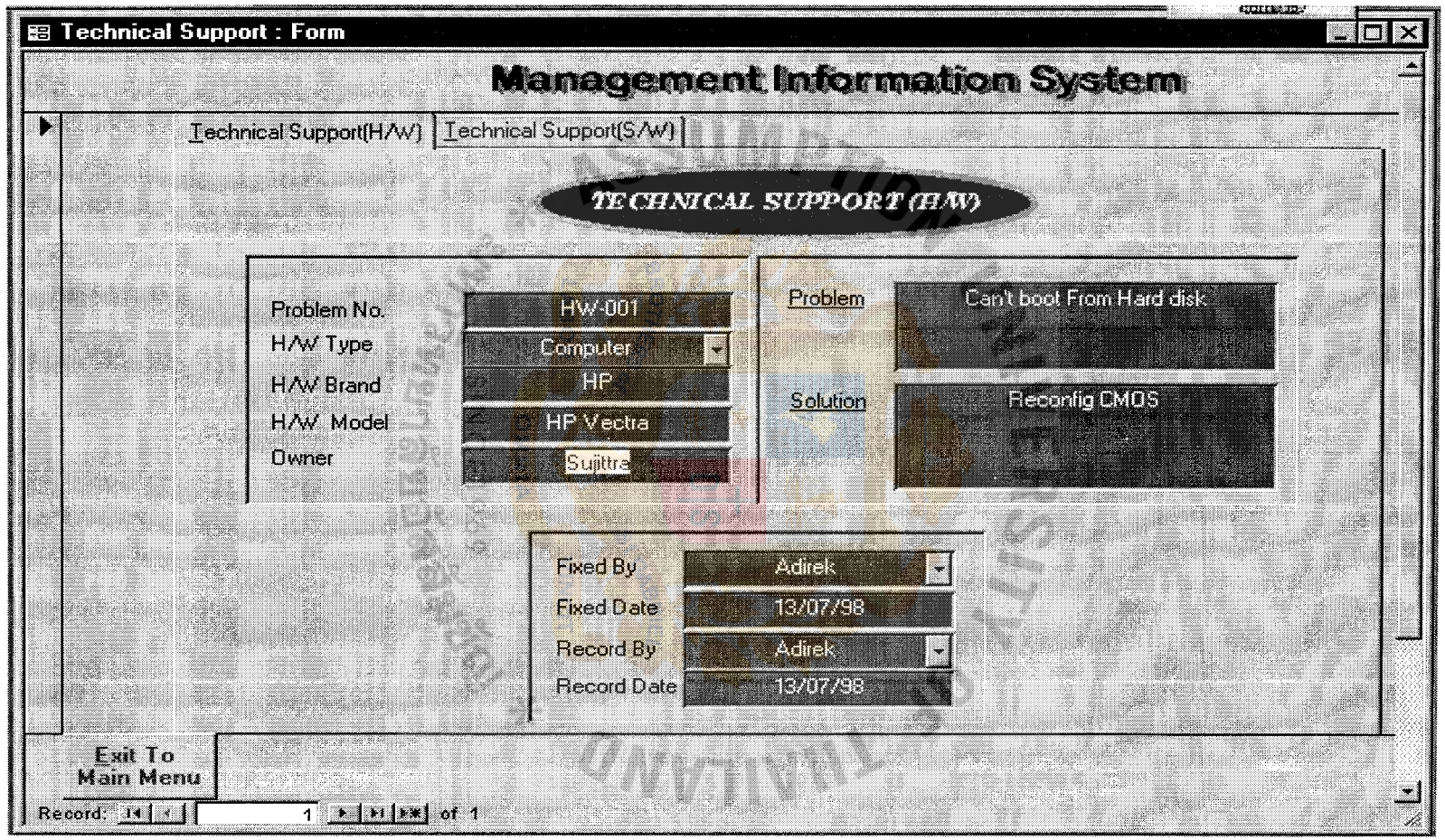

Figure C.16. Technical Support Information(H/W) Display Screen

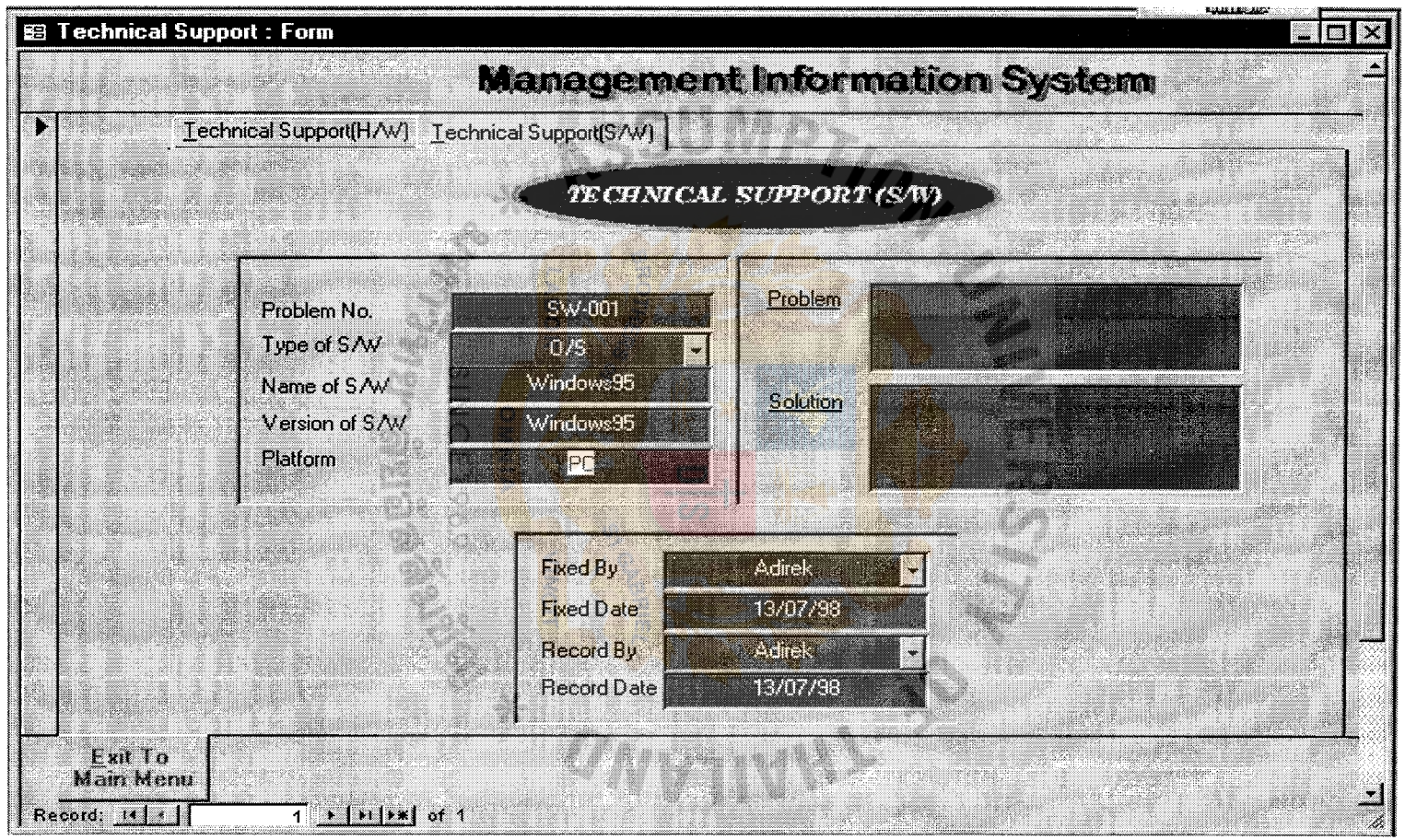

Figure C.17. Technical Support Information(S/W) Display Screen

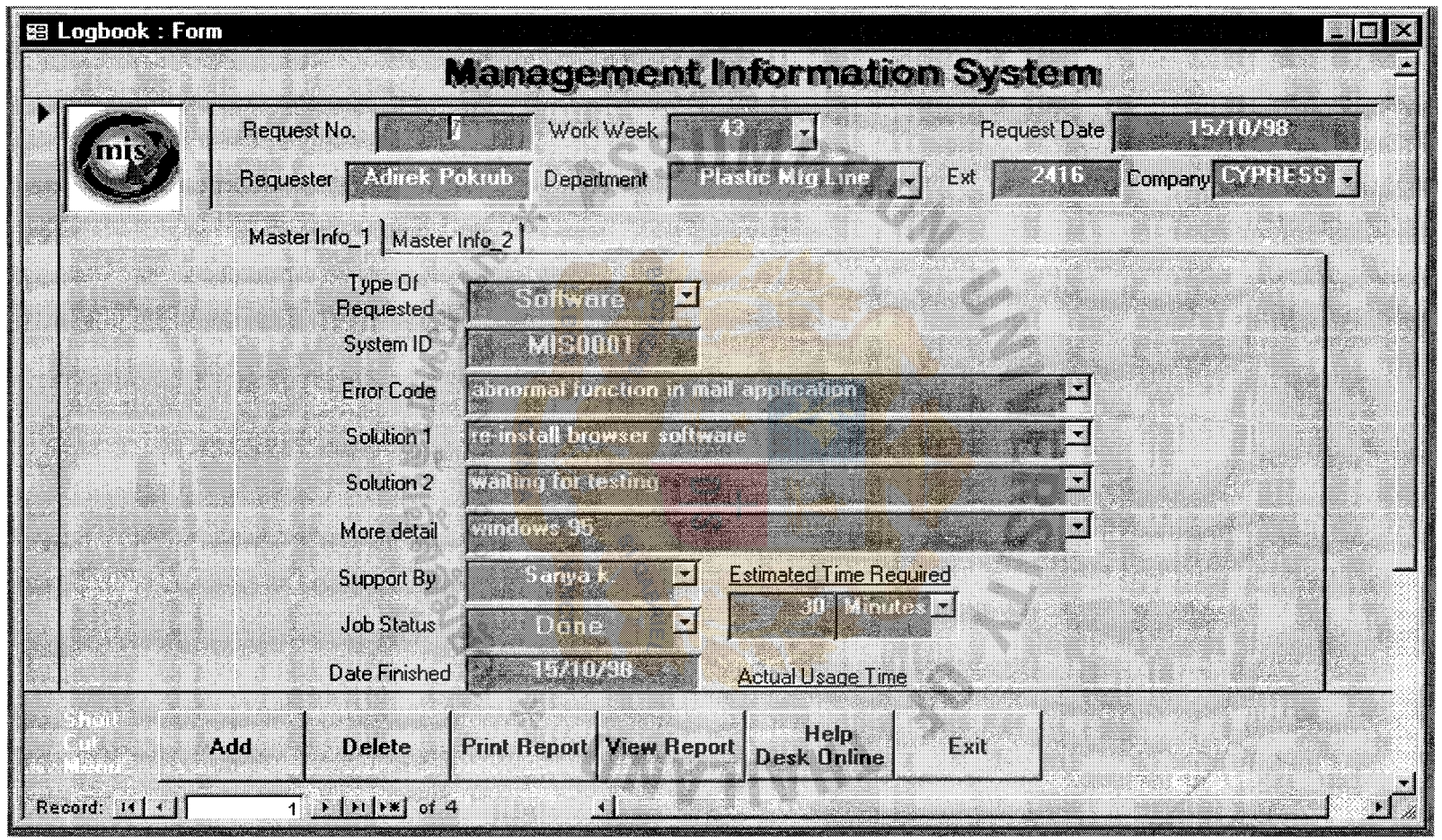

Figure C.18. User Request Information (Master 1) Display Screen

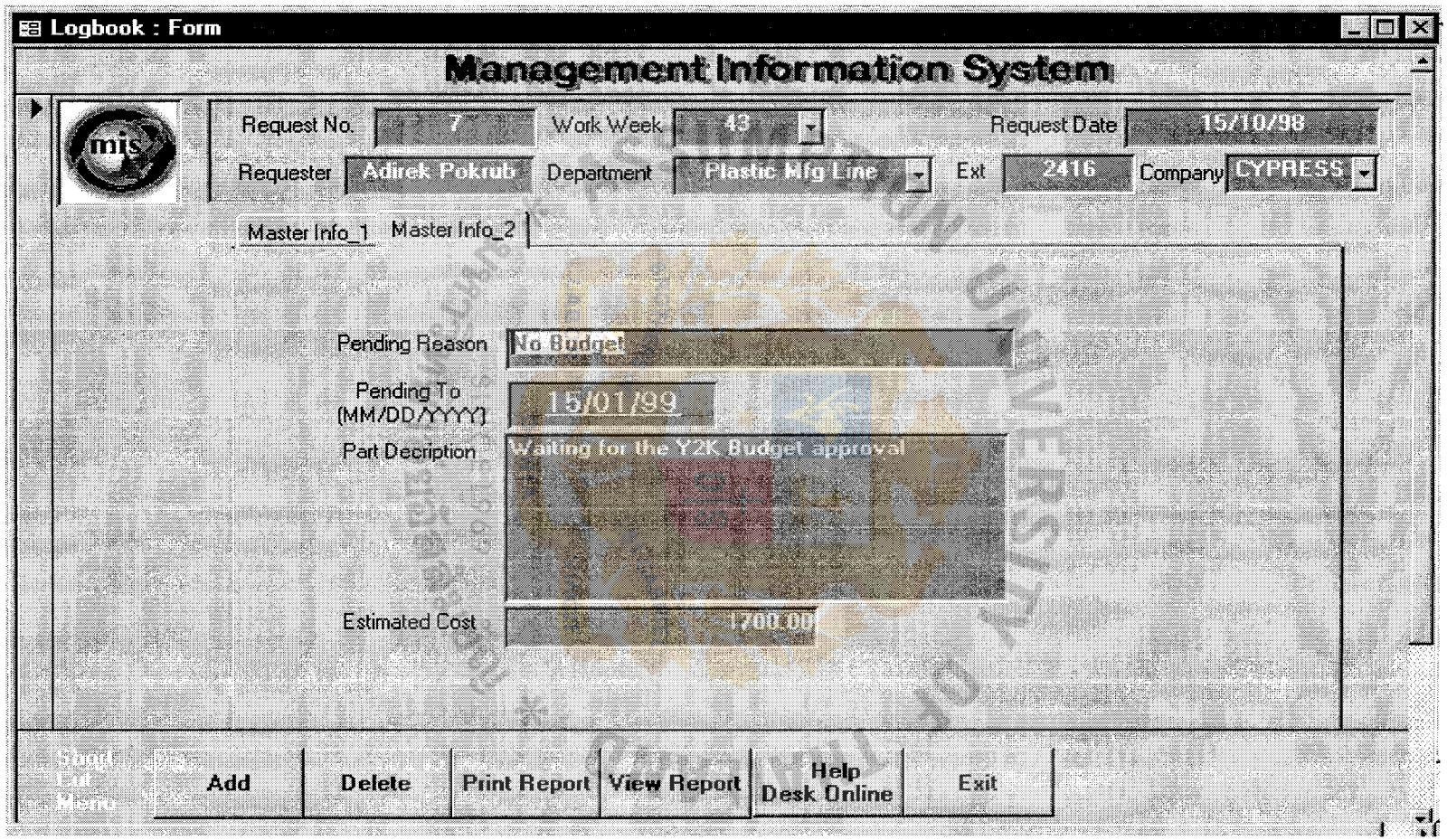

Figure C.19. User Request Information (Master 2) Display Screen

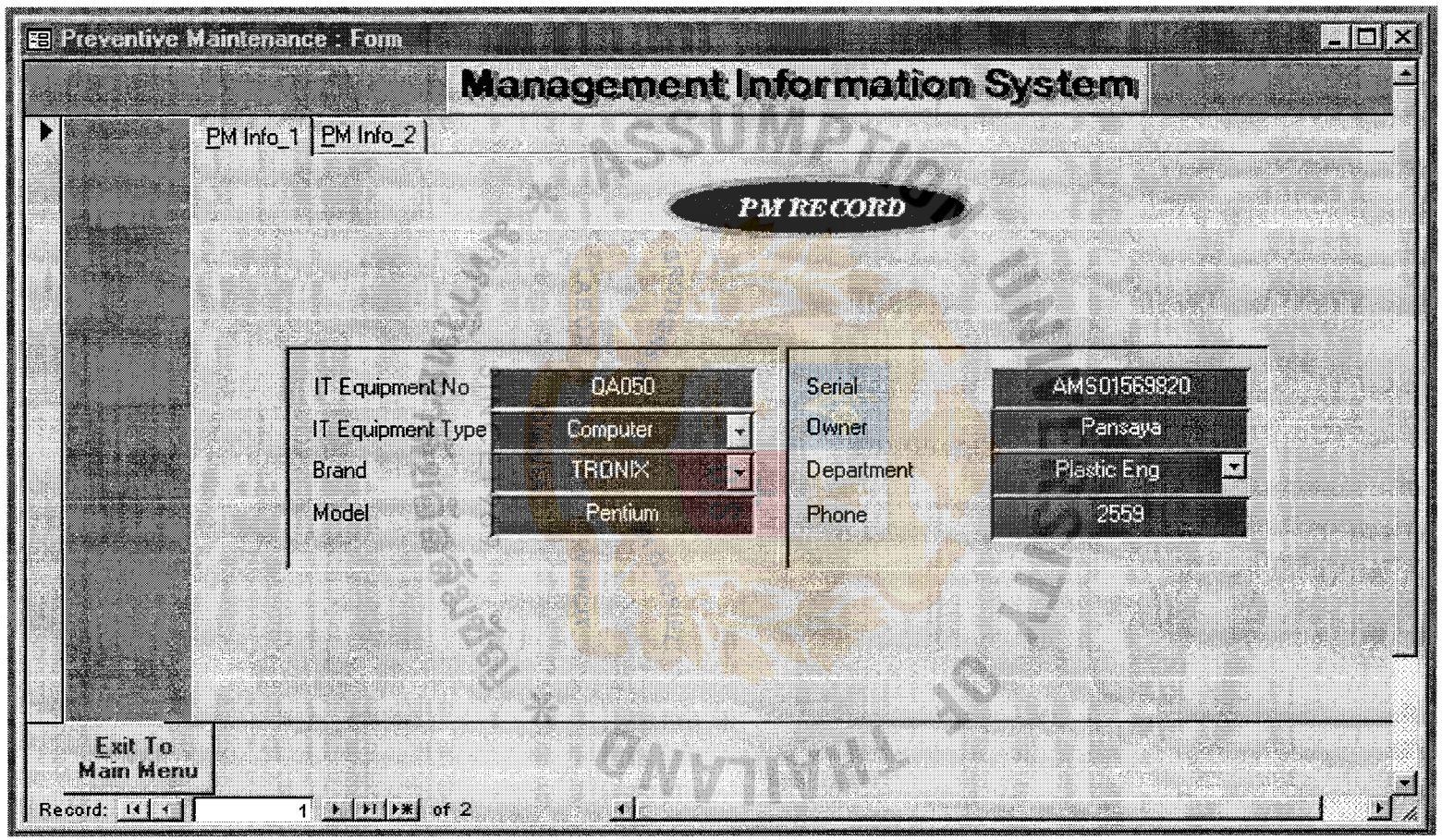

Figure C.20. Preventive Maintenance Information (PM 1) Display Screen

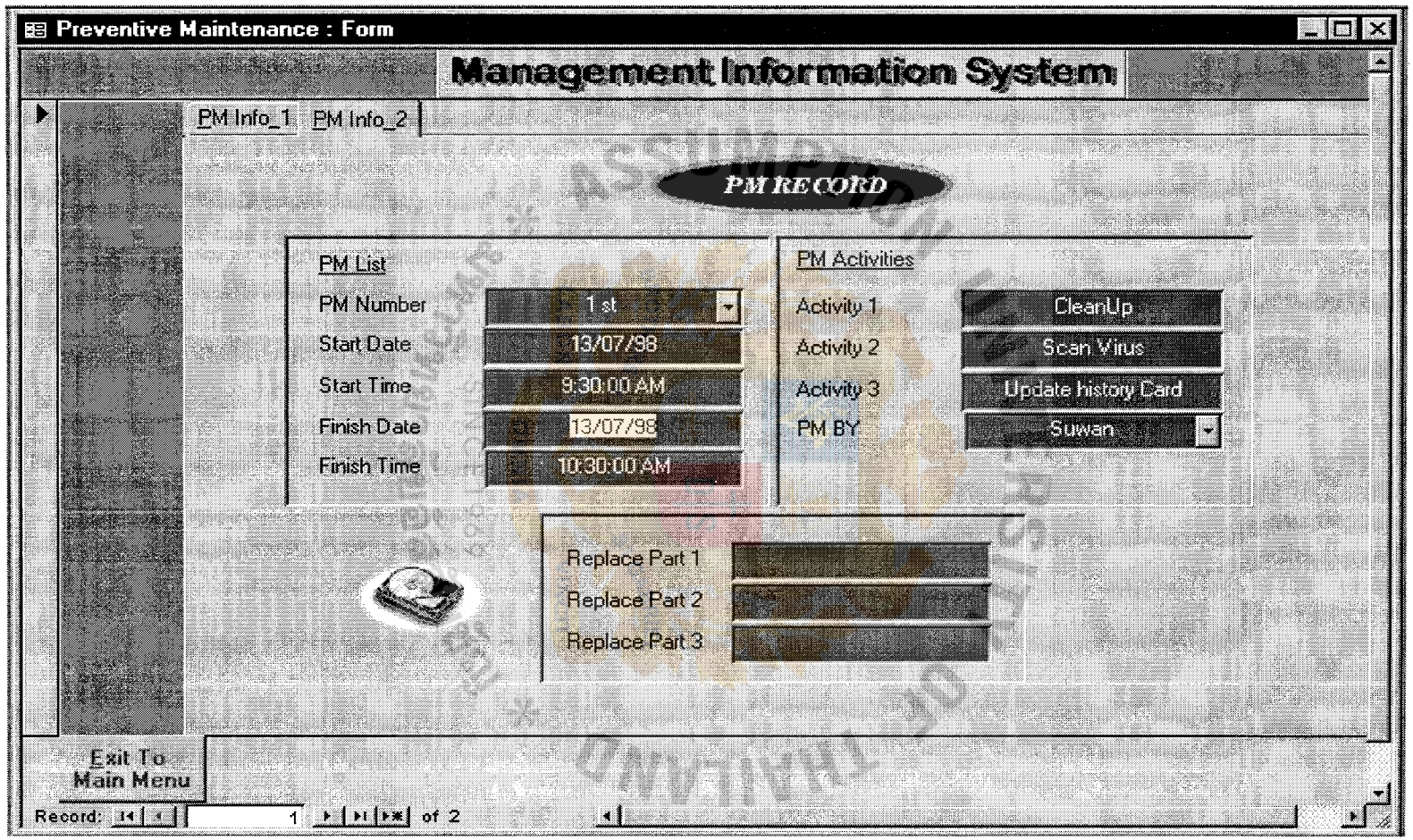

Figure C.21. Preventive Maintenance Information (PM 2) Display Screen

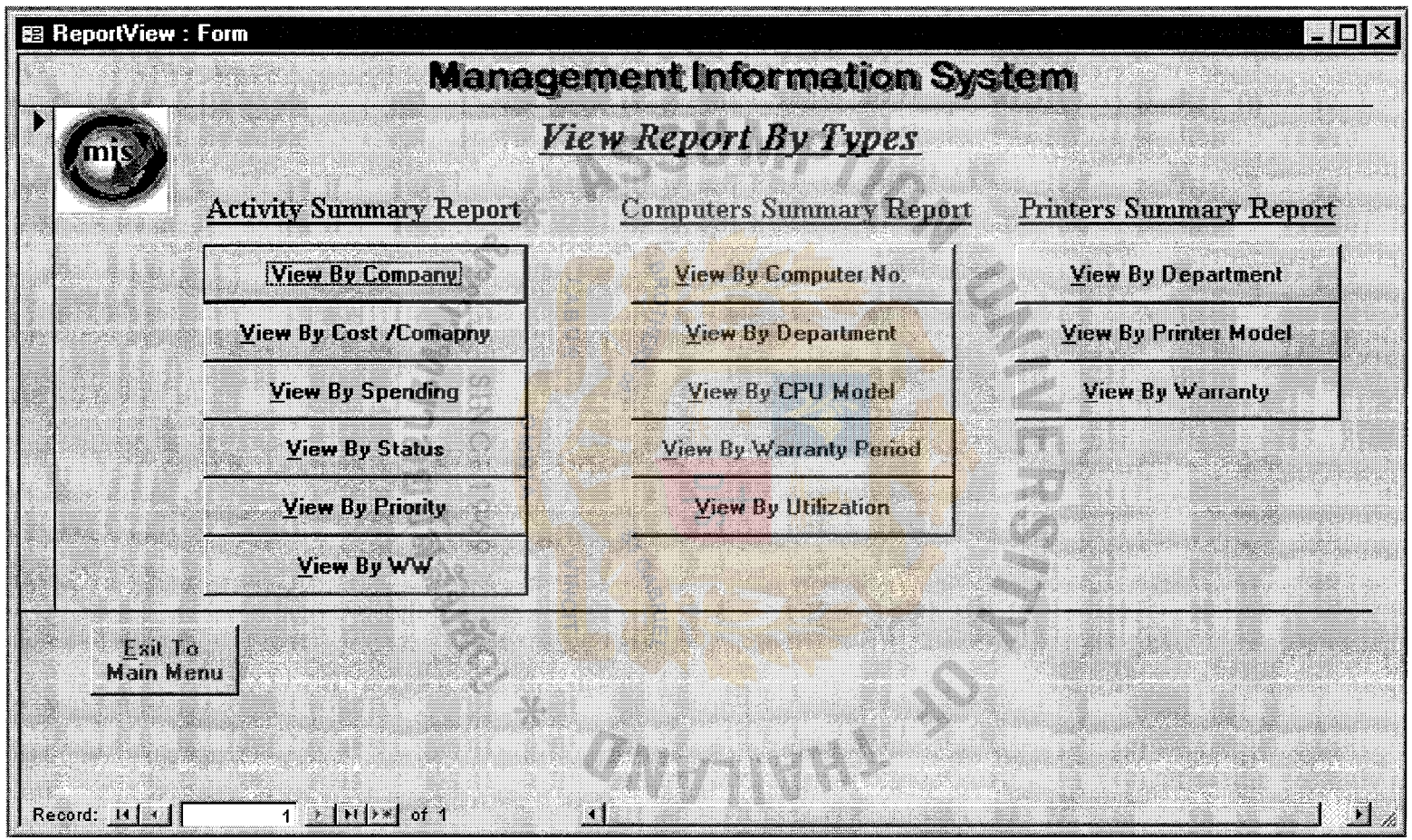

Figure C.22. View Report Display Screen

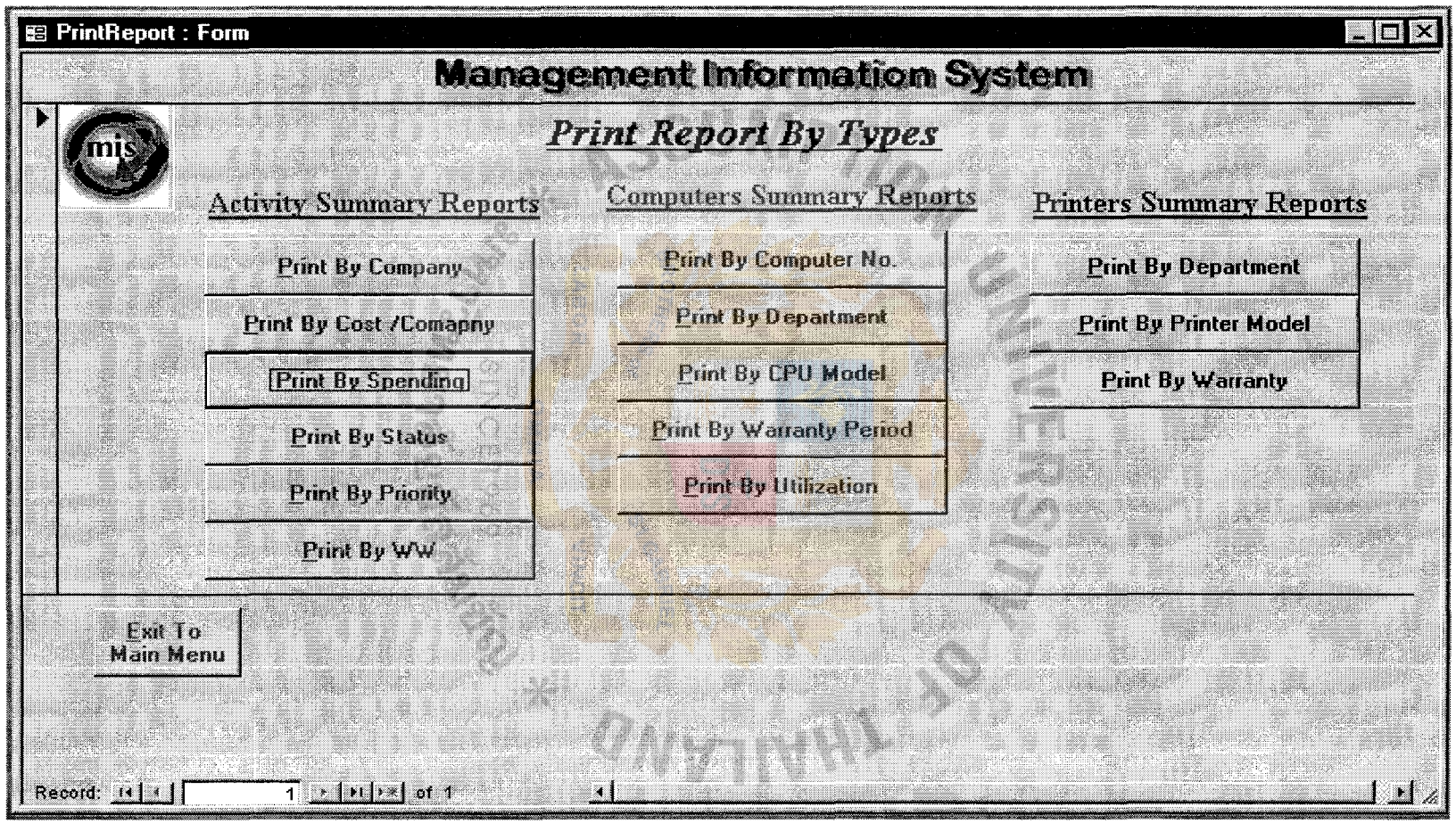

Figure C.23. Print Report Display Screen

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Activity Summary Report

(Group By Company)

Company	Requester	Dept.	Requsted Date	Type of Request	Description	Solution	Status
ATEC	Adirek	Logistic	9/15/98	Computer	borrow computer or printer for use in section	62	Done
ATEC	Rattiya	Finance	9/15/98	Printer	can't print file to local printer	14	Done
ATEC	Ajittra	CSR	10/20/98	ccMail	can't access E-mail from windows application	44	Done
ATEC	Sonida	Marketing	10/25/98	Upgrade	requested installation of office application	71	On Going
ATEC	Suwannee	Hermetic PC	11/7/98	Install	abnormal function in emulator software	77	Done
ATEC	Orawadee	NBD	11/7/98	Computer	computer no screen	102	Pending
CYPRES	Benjawan	QA	11/7/98	Emulator	can't access cypress system	54	Done
CYPRES	Sumrour	CSR	11/7/98	Computer	fan(CPU)out of order	83	Pending

Printed Date : 27-Jan-99

Page 1 of 1

Figure C.24. Activity Summary Report (By Company)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Activities Summary Report

(By Company)

WorkWeek	*Dept.*	*Type of Request*	*Service For*	*Type of Request*	*Job Status*	*System ID*	*Service Cost*
42	Finance	Printer	ATEC	Printer	Done	FIN100	1500.00
42	Logistic	Computer	ATEC	Computer	Done	LOG008	0.00
		As For Work Week :	42	**Company:**	ATEC	**Sub-Total(Baht)**	**1500.00**
43	Marketing	Upgrade	ATEC	Upgrade	On Going	MK023	0.00
43	CSR	ccMail	ATEC	ccMail	Done	CSR050	0.00
		As For Work Week :	43	**Company:**	ATEC	**Sub-Total(Baht)**	**1500.00**
44	NBD	Computer	ATEC	Computer	Pending	NBD012	800.00
44	Hermetic PC	Install	ATEC	Install	Done	HEM034	0.00
		As For Work Week :	44	**Company:**	ATEC	**Sub-Total(Baht)**	**2300.00**

Printed Date : *27-Jan-99* *Page 1 of 2*

Figure C.25. Activity Summary Report (By Cost & Company)

WorkWeek	*Dept.*	*Type of Request*	*Service For*	*Type of Request*	*Job Status*	*System ID*	*Service Cost*
44	CSR	Computer	CYPRESS	Computer	Pending	CSR017	500.00
44	QA	Emulator	CYPRESS	Emulator	Done	CY026	0.00
		As For Work Week : 44		**Company:** CYPRESS		**Sub-Total(Baht)**	**500.00**

Printed Date : *27-Jan-99* *Page 2 of 2*

Figure C.25. Activity Summary Report (By Cost & Company)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Activities Summary Report

(By Estimated Cost)

WorkWeek	Dept.	Type of Request	Service For	Type of Request	Job Status	System ID	Estimated Service Cost
43	CSR	ccMail	ATEC	ccMail	Done	CSR050	0.00
42	Finance	Printer	ATEC	Printer	Done	FIN100	1500.00
44	Hermetic PC	Install	ATEC	Install	Done	HEM034	0.00
42	Logistic	Computer	ATEC	Computer	Done	LOG008	0.00
43	Marketing	Upgrade	ATEC	Upgrade	On Going	MK023	0.00
44	NBD	Computer	ATEC	Computer	Pending	NBD012	800.00
						Total Cost	**0**
44	CSR	Computer	CYPRESS	Computer	Pending	CSR017	500.00
44	QA	Emulator	CYPRESS	Emulator	Done	CY026	0.00
						Total Cost	**500**

Printed Date : 27-Jan-99

Page 1 of 1

Figure C.26. Activity Summary Report (By Estimated Cost)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Activities Summary Report

(Group By Status)

Status	Request #	Requester	Dept.	Requsted Date	Type of Request	Description	Solution
Done	11	Adirek	Logistic	9/15/98	Computer	borrow computer or printer for use in section	62
Done	12	Rattiya	Finance	9/15/98	Printer	can't print file to local printer	14
Done	13	Ajittra	CSR	10/20/98	ccMail	can't access E-mail from windows application	44
Done	15	Suwannee	Hermetic PC	11/7/98	Install	abnormal function in emulator software	77
Done	16	Benjawan	QA	11/7/98	Emulator	can't access cypress system	54
On Going	14	Sonida	Marketing	10/25/98	Upgrade	requested installation of office application	71
Pending	17	Sumrour	CSR	11/7/98	Computer	fan(CPU)out of order	83
Pending	18	Orawadee	NBD	11/7/98	Computer	computer no screen	102

Printed Date : 27-Jan-99

Page 1 of 1

Figure C.27. Activity Summary Report (By Status)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Activities Summary Report

(Group By Priority)

Priority	Requester	Dept.	Requsted Date	Type of Request	Description	Solution
High	Benjawan	QA	11/7/98	Emulator	can't access cypress system	54
High	Suwannee	Hermetic PC	11/7/98	Install	abnormal function in emulator software	77
High	Ajittra	CSR	10/20/98	ccMail	can't access E-mail from windows application	44
High	Rattiya	Finance	9/15/98	Printer	can't print file to local printer	14
Medium	Adirek	Logistic	9/15/98	Computer	borrow computer or printer for use in section	62
Medium	Sonida	Marketing	10/25/98	Upgrade	requested installation of office application	71
Medium	Orawadee	NBD	11/7/98	Computer	computer no screen	102
Medium	Sumrour	CSR	11/7/98	Computer	fan(CPU)out of order	83

Printed Date : *27-Jan-99* *Page 1 of 1*

Figure C.28. Activity Summary Report (By Priority)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Activities Summary Report

(Group By Work Week)

WorkWeek#	Requested No	Type of Request	Description	Solution	Status	Completed on
42	12	Printer	can't print file to local printer	14	Done	11/7/98
42	11	Computer	borrow computer or printer for use in section	62	Done	9/15/98
43	14	Upgrade	requested installation of office application	71	On Goin	10/27/98
43	13	ccMail	can't access E-mail from windows application	44	Done	10/20/98
44	18	Computer	computer no screen	102	Pending	11/7/98
44	17	Computer	fan(CPU)out of order	83	Pending	11/7/98
44	16	Emulator	can't access cypress system	54	Done	11/7/98
44	15	Install	abnormal function in emulator software	77	Done	11/7/98

Printed Date : 27-Jan-99

Page 1 of 1

Figure C.29. Activity Summary Report (By work week)

ABAC GRADUATE SCHOOL LIBRARY

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Computer Report

(Sorted By Computer No.)

ComputerNo	*Owner*	*Badge #*	*Dept*	*Brand Name*	*Model*	*Serial No.*	*CPU*	*CPU Model*	*Used For*
CSR0351	Sombat	3547	NBD	TRONIX	486DX2-66	27YB100097	INTEL	486DX2-66	ShopFloor(Promis)
CSR0392	Ricky	5640	CSR	ACER	AcerMate	USD0003267	INTEL	Pentium75	Office Work
FIN0131	Laksamee	3215	Finance	TRONIX	Pentium133	25B132458F	INTEL	Pentium133	Office Work
MIS0004	Angkana	0412	MIS	COMPAQ	DESKPRO	PR5371269	INTEL	PENTIUM166	Office Work
MIS0005	Worawee S.	5795	MIS	TRONIX	PENTIUM133	2B10C56321	INTEL	PENTIUM133	ShopFloor(Promis)
QA050	Benjawan	1223	FINANCE	DEC	PC3100	1QT1001271	INTEL	PENTIUM-233	Office Work
QA052	Pansaya	1883	QA	TRONIX	PENTIUM75	NLBB238543	INTEL	PENTIUM	Office Work

Printed Date : *27-Jan-99*

Page 1 of 1

Figure C.30. Computer Summary Report (By Computer Number)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Computer Summary Report

(Sorted By Department)

Dept.	Owner	Badge #	Ext.	ComputerNo	Brand Name	Model	Serial No.	CPU	CPU Model	Used For
CSR	Ricky	5640	2407	CSR0392	ACER	AcerMate	USD0003267	INTEL	Pentium75	Office Work
Finance	Laksamee	3215	2308	FIN0131	TRONIX	Pentium133	25B132458F	INTEL	Pentium133	Office Work
FINANCE	Benjawan	1223	2308	QA050	DEC	PC3100	1QT1001271	INTEL	PENTIUM-2	Office Work
MIS	Angkana	0412	2816	MIS0004	COMPAQ	DESKPRO	PR5371269	INTEL	PENTIUM16	Office Work
MIS	Worawee S.	5795	2416	MIS0005	TRONIX	PENTIUM1	2B10C56321	INTEL	PENTIUM13	ShopFloor(Pro
NBD	Sombat	3547	2419	CSR0351	TRONIX	486DX2-66	27YB100097	INTEL	486DX2-66	ShopFloor(Pro
QA	Pansaya	1883	2559	QA052	TRONIX	PENTIUM7	NLBB238543	INTEL	PENTIUM	Office Work

Printed Date : 10-Dec-98

Page 1 of 1

Figure C.31. Computer Summary Report (By Department)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Computer Summary Report

(Sorted By CPU Model)

CPU Model	CPU	Used For	Owner	Badge #	Dept.	ComputerNo	Brand	Model	Serial No.
486DX-66 (DX2)	INTEL	ShopFloor(P	Sombat	3547	NBD	CSR0351	TRONIX	486DX2-66	27YB100097
PENTIUM-75	INTEL	Office Work	Pansaya	1883	QA	QA052	TRONIX	PENTIUM	NLBB238543
PENTIUM-133	INTEL	Office Work	Laksamee	3215	Finance	FIN0131	TRONIX	Pentium133	25B132458F
PENTIUM-133	INTEL	ShopFloor(P	Worawee S.	5795	MIS	MIS0005	TRONIX	PENTIUM	2B10C56321
PENTIUM-166	INTEL	Office Work	Angkana	0412	MIS	MIS0004	COMPAQ	DESKPRO	PR5371269
PENTIUM-233 MMX	INTEL	Office Work	Benjawan	1223	FINANCE	QA050	DEC	PC3100	1QT1001271
PENTIUM-75	INTEL	Office Work	Ricky	5640	CSR	CSR0392	ACER	AcerMate	USD0003267

Printed Date : 10-Dec-98

Page 1 of 1

Figure C.32. Computer Summary Report (By CPU Model)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Computer Summary Report

(Sorted By Warranty)

Warranty									
Begin	*Expire*	*Period(Yrs)*	*Owner*	*Dept.*	*ComputerNo*	*Brand Name*	*Serial No.*	*CPU*	*CPU Model*
2/28/95	2/27/96	1 Year	Sombat	NBD	CSR0351	TRONIX	27YB100097	INTEL	486DX2-66
6/10/95	6/9/96	1 Year	Pansaya	QA	QA052	TRONIX	NLBB238543	INTEL	PENTIUM
6/1/96	5/30/97	1 Year	Worawee S.	MIS	MIS0005	TRONIX	2B10C56321	INTEL	PENTIUM133
10/8/96	10/7/97	1 Year	Ricky	CSR	CSR0392	ACER	USD0003267	INTEL	Pentium75
10/30/96	10/29/97	1 Year	Laksamee	Finance	FIN0131	TRONIX	25B132458F	INTEL	Pentium133
5/20/98	5/20/99	3 Years	Benjawan	FINANCE	QA050	DEC	1QT1001271	INTEL	PENTIUM-233
10/22/98	10/21/01	3 Years	Angkana	MIS	MIS0004	COMPAQ	PR5371269	INTEL	PENTIUM166

Printed Date : *10-Dec-98*

Page 1 of 1

Figure C.33. Computer Summary Report (By Warranty)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Computer Summary Report

(Sorted By Type of Used)

Used For	Owner	Badge #	Title	Dept.	ComputerN	Brand	Model	Serial No.	CPU	CPU Model
Office Work	Ricky	5640	Engineer	CSR	CSR0392	ACER	AcerMate	USD0003267	INTEL	Pentium75
Office Work	Pansaya	1883	Engineer	QA	QA052	TRONIX	PENTIUM75	NLBB238543	INTEL	PENTIUM
Office Work	Angkana	0412	Programmer	MIS	MIS0004	COMPAQ	DESKPRO	PR5371269	INTEL	PENTIUM166
Office Work	Laksamee	3215	Secretary	Finance	FIN0131	TRONIX	Pentium133	25B132458F	INTEL	Pentium133
Office Work	Benjawan	1223	Secretary	FINANCE	QA050	DEC	PC3100	1QT1001271	INTEL	PENTIUM-233
ShopFloor(P	Sombat	3547	Engineer	NBD	CSR0351	TRONIX	486DX2-66	27YB100097	INTEL	486DX2-66
ShopFloor(P	Worawee S.	5795	Manager	MIS	MIS0005	TRONIX	PENTIUM133	2B10C56321	INTEL	PENTIUM133

Printed Date : *10-Dec-98*

Page 1 of 1

Figure C.34. Computer Summary Report (By Utilization)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Printer Summary Report

(Sorted By Department)

Department	Printer ID	Brand Name	Type	Model	Serial No.	Purchase Date	Vendor	Pricing(US$)
Finance	FIN047	Epson	Dot Matrix	LQ1170	35B1000649	4/30/95	WorldWide Te	17000
Finance	FIN056	HP	LaserJet	LaserJet 4L	USBB628066	6/5/96	WorldWide Te	17000
Finance	FIN100	Epson	Dot Matrix	LQ-1170i	35B1004000	7/1/95	WorldWide Te	27000
Finance	IE082	Epson	Dot Matrix	LQ1170i	1QT1043315	5/30/95	WorldWideTec	18000
Hermetic	HEM062	HP	DeskJet	DESKJET 87	SG71M1414N	5/5/97	WorldWide Te	16000
Hermetic	HER079	HP	DeskJet	DESKJET 66	SG61F2C194	3/4/97	WorldWide Te	9700
HR	HR0067	HP	DeskJet	DESKJET PR	1Q1002854	10/11/96	SCTC Comput	19000
MIS	MIS0060	HP	LaserJet	HP6P	SGBB0033594	10/15/95	WorlWide Tec	45000
MIS	MIS071	HP	LaserJet	LaserJet 6P	USBB511154	7/16/96	WorldWide Te	45000
MIS	MIS084	HP	LaserJet	LaserJet 5Si	SGQD016800	4/20/96	WorldWide Te	56000
MIS	MIS087	HP	DeskJet	DESKJET 56	SG44C141MC	3/19/95	WorldWide Te	17000
Plastic	PL059	HP	LaserJet	LaserJet 4L	NLCC450485	7/15/95	WorldWide Te	15000
QA	QAH-002	HP	DeskJet	690C	41F0002978	8/8/98	SCTC Comput	4100

Printed Date : 10-Dec-98

Page 1 of 1

Figure C.35. Printer Summary Report (By Department)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Printer Summary Report

(Sorted By Model)

Model	*Brand Name*	*Type*	*Printer ID*	*Serial No.*	*Purchase Date*	*Vendor*
690C	HP	DeskJet	QAH-002	41F0002978	8/8/98	SCTC Computer
HP6P	HP	LaserJet	MIS0060	SGBB0033594	10/15/95	WorlWide TechTronix
LQ-1170i	Epson	Dot Matrix	FIN100	35B1004000	7/1/95	WorldWide TechTronix
LaserJet 4L	HP	LaserJet	FIN056	USBB628066	6/5/96	WorldWide TechTronix
DESKJET PRO	HP	DeskJet	HR0067	1Q1002854	10/11/96	SCTC Computers
DESKJET 870 C	HP	DeskJet	HEM062	SG71M1414N	5/5/97	WorldWide Techtronix
LaserJet 5Si	HP	LaserJet	MIS084	SGQD016800	4/20/96	WorldWide TechTronix
DESKJET 560C	HP	DeskJet	MIS087	SG44C141MC	3/19/95	WorldWide TechTronix
LQ1170i	Epson	Dot Matrix	IE082	1QT1043315	5/30/95	WorldWideTechTronix
LQ1170	Epson	Dot Matrix	FIN047	35B1000649	4/30/95	WorldWide TechTronix
DESKJET 660C	HP	DeskJet	HER079	SG61F2C194	3/4/97	WorldWide TechTronix
LaserJet 4L	HP	LaserJet	PL059	NLCC450485	7/15/95	WorldWide TechTronix
LaserJet 6P	HP	LaserJet	MIS071	USBB511154	7/16/96	WorldWide TechTronix

Printed Date : *10-Dec-98* ***Page 1 of 1***

Figure C.36. Printer Summary Report (By Model)

Alphatec BANGKOK

Alphatec Electronics Public Co., Ltd.

Printer Summary Report

(Sorted By Warranty)

Warranty Status	Period	Printer ID	Brand Name	Type	Model	Serial No.	Purchase Date	Vendor	Used By
OnWarranty	7/8/99	QAH-002	HP	DeskJet	690C	41F0002978	8/8/98	SCTC Comput	QA
Expire	10/14/96	MIS0060	HP	LaserJet	HP6P	SGBB0033594	10/15/95	WorlWide Tec	MIS
Expire	6/30/96	FIN100	Epson	Dot Matrix	LQ-1170i	35B1004000	7/1/95	WorldWide Te	Finance
Expire	4/6/97	FIN056	HP	LaserJet	LaserJet 4L	USBB628066	6/5/96	WorldWide Te	Finance
Expire	10/10/97	HR0067	HP	DeskJet	DESKJET PR	1Q1002854	10/11/96	SCTC Comput	HR
Expire	4/5/98	HEM062	HP	DeskJet	DESKJET 87	SG71M1414N	5/5/97	WorldWide Te	Hermetic
Expire	4/19/97	MIS084	HP	LaserJet	LaserJet 5Si	SGQD016800	4/20/96	WorldWide Te	MIS
Expire	3/18/96	MIS087	HP	DeskJet	DESKJET 56	SG44C141MC	3/19/95	WorldWide Te	MIS
Expire	5/29/96	IE082	Epson	Dot Matrix	LQ1170i	1QT1043315	5/30/95	WorldWideTec	Finance
Expire	4/29/96	FIN047	Epson	Dot Matrix	LQ1170	35B1000649	4/30/95	WorldWide Te	Finance
Expire	2/3/98	HER079	HP	DeskJet	DESKJET 66	SG61F2C194	3/4/97	WorldWide Te	Hermetic
Expire	7/14/96	PL059	HP	LaserJet	LaserJet 4L	NLCC450485	7/15/95	WorldWide Te	Plastic
Expire	7/15/97	MIS071	HP	LaserJet	LaserJet 6P	USBB511154	7/16/96	WorldWide Te	MIS

Printed Date : 10-Dec-98

Page 1 of 1

Figure C.37. Printer Summary Report (By Warranty)

APPENDIX D

Structure Chart

ASSUMPTION UNIVERSITY OF THAILAND
BROTHERS OF ST GABRIEL
LABOR OMNIA VINCIT
SINCE1969
มหาวิทยาลัยอัสสัมชัญ

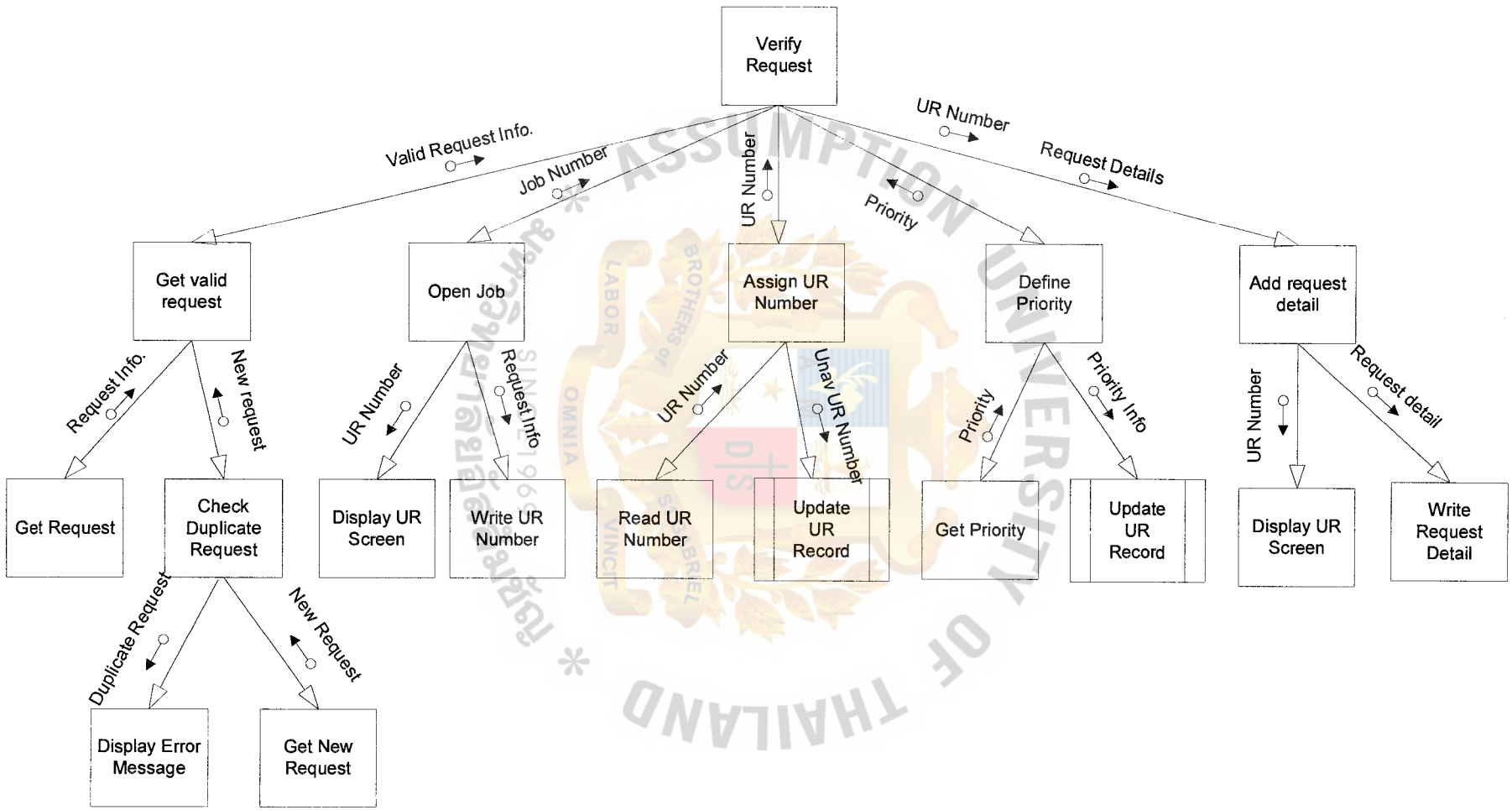

Figure D.1. Structure Chart of Process 1.0

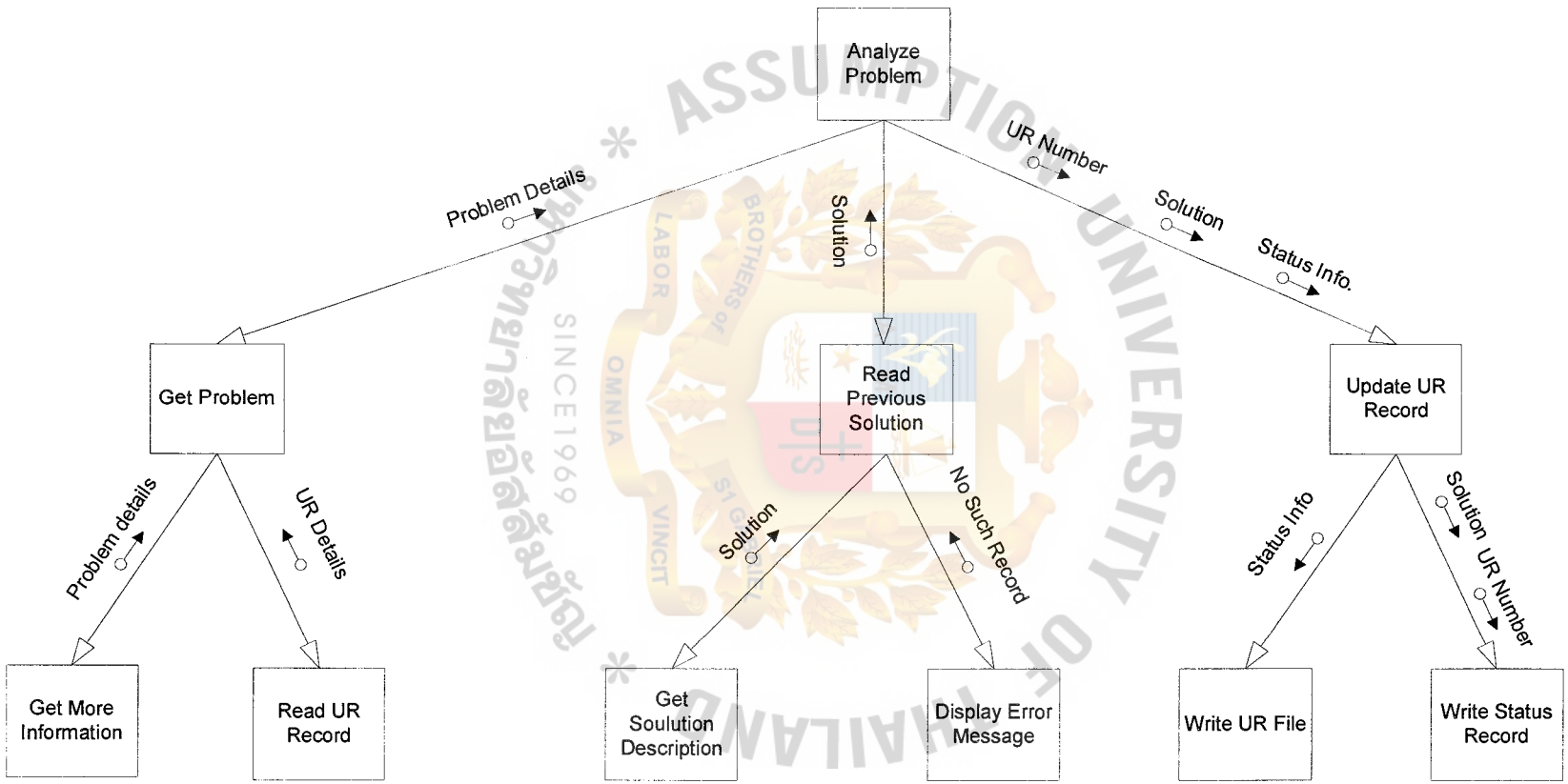

Figure D.2. Structure Chart of Process 2.0

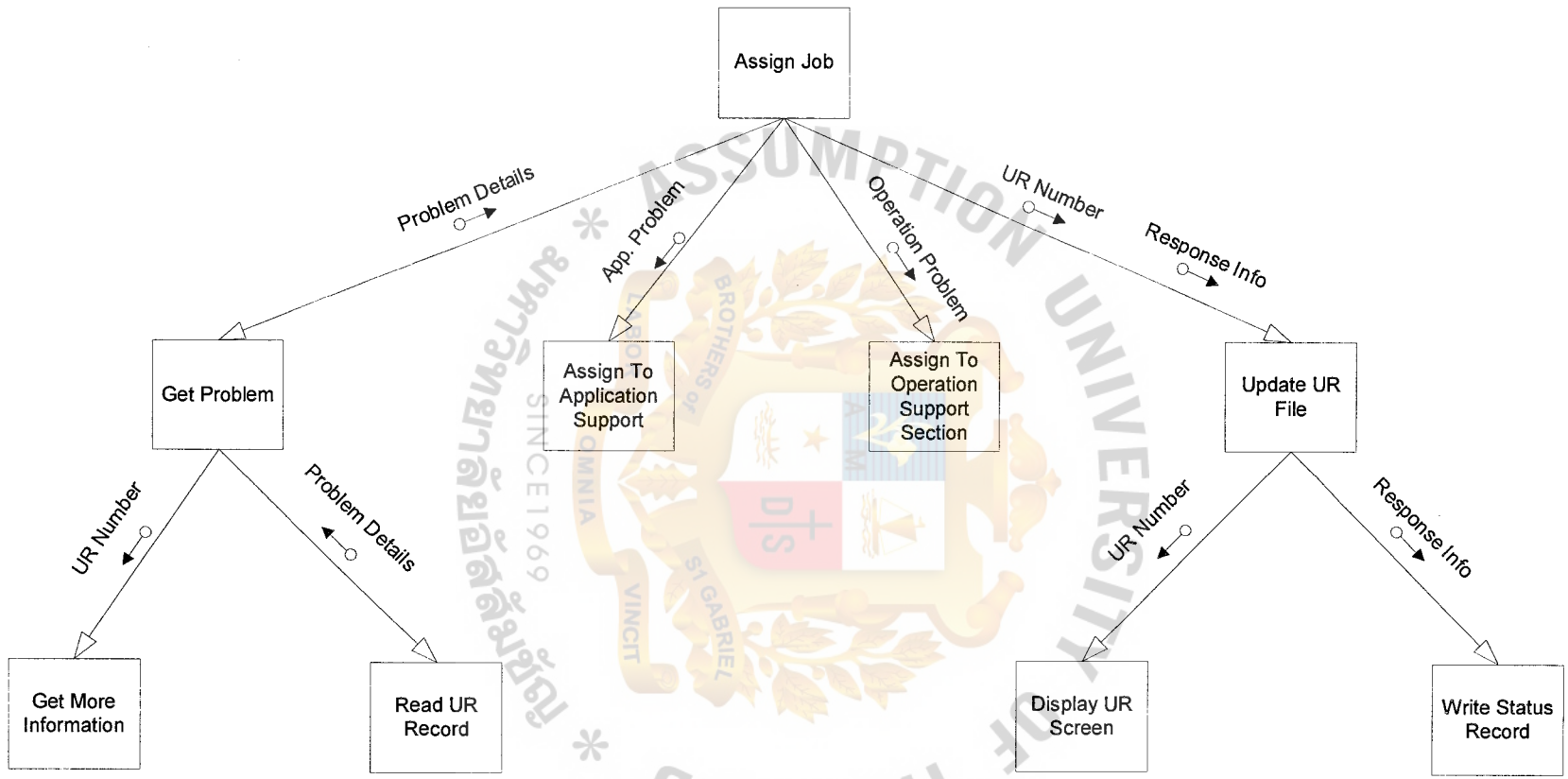

Figure D.3. Structure Chart of Process 3.0

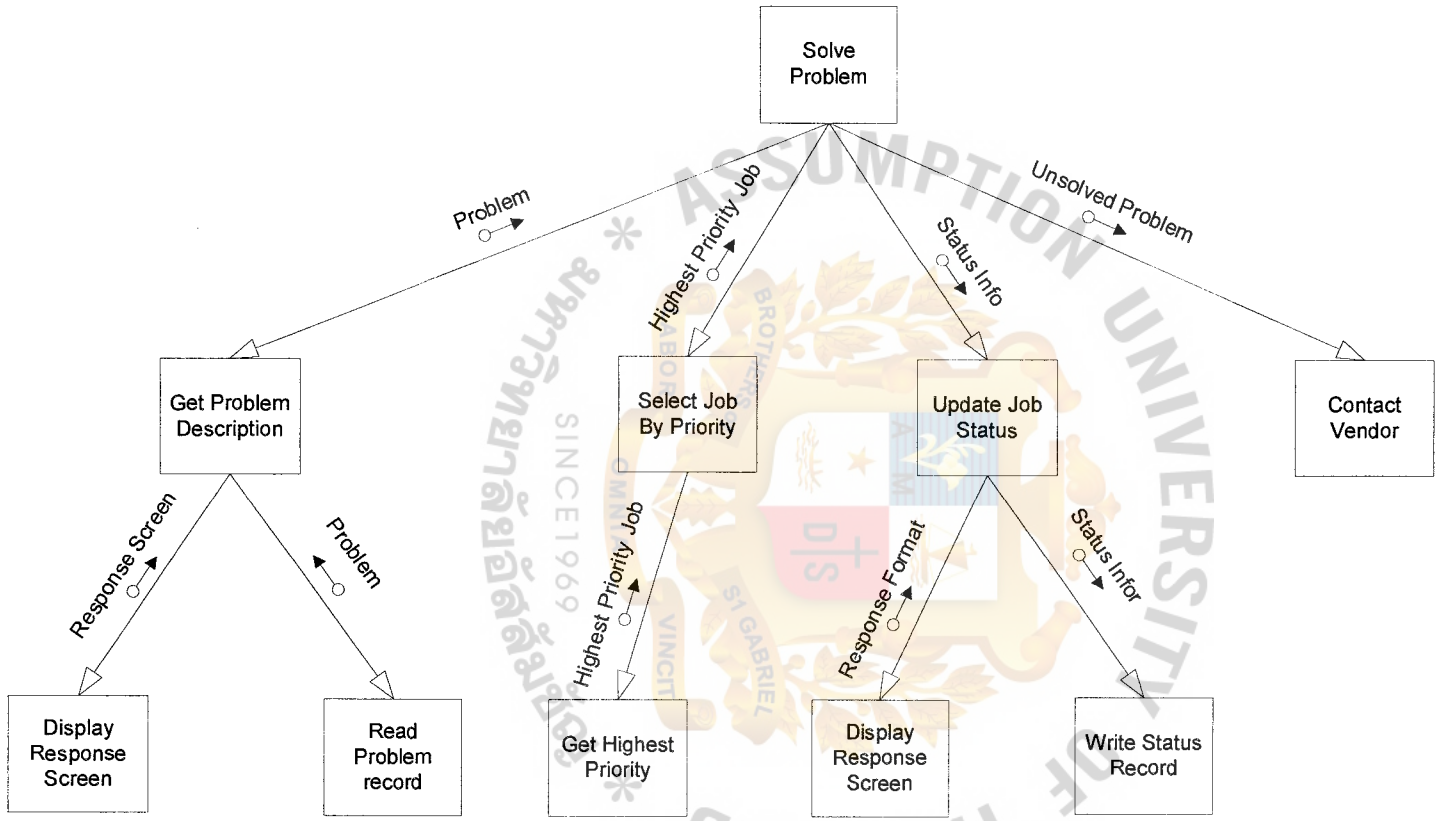

Figure D.5. Structure Chart of Process 5.0

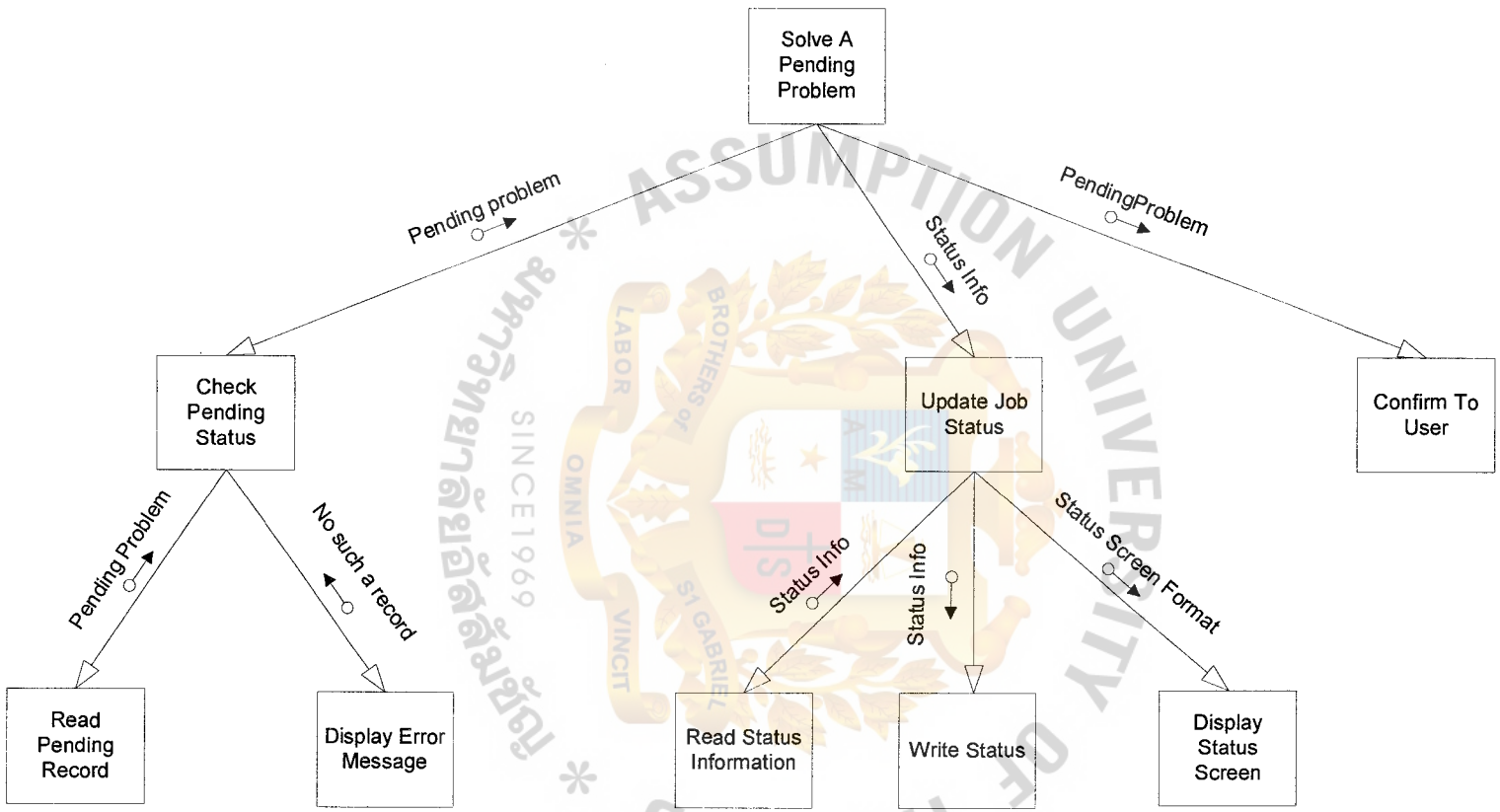

Figure D.6. Structure Chart of Process 6.0

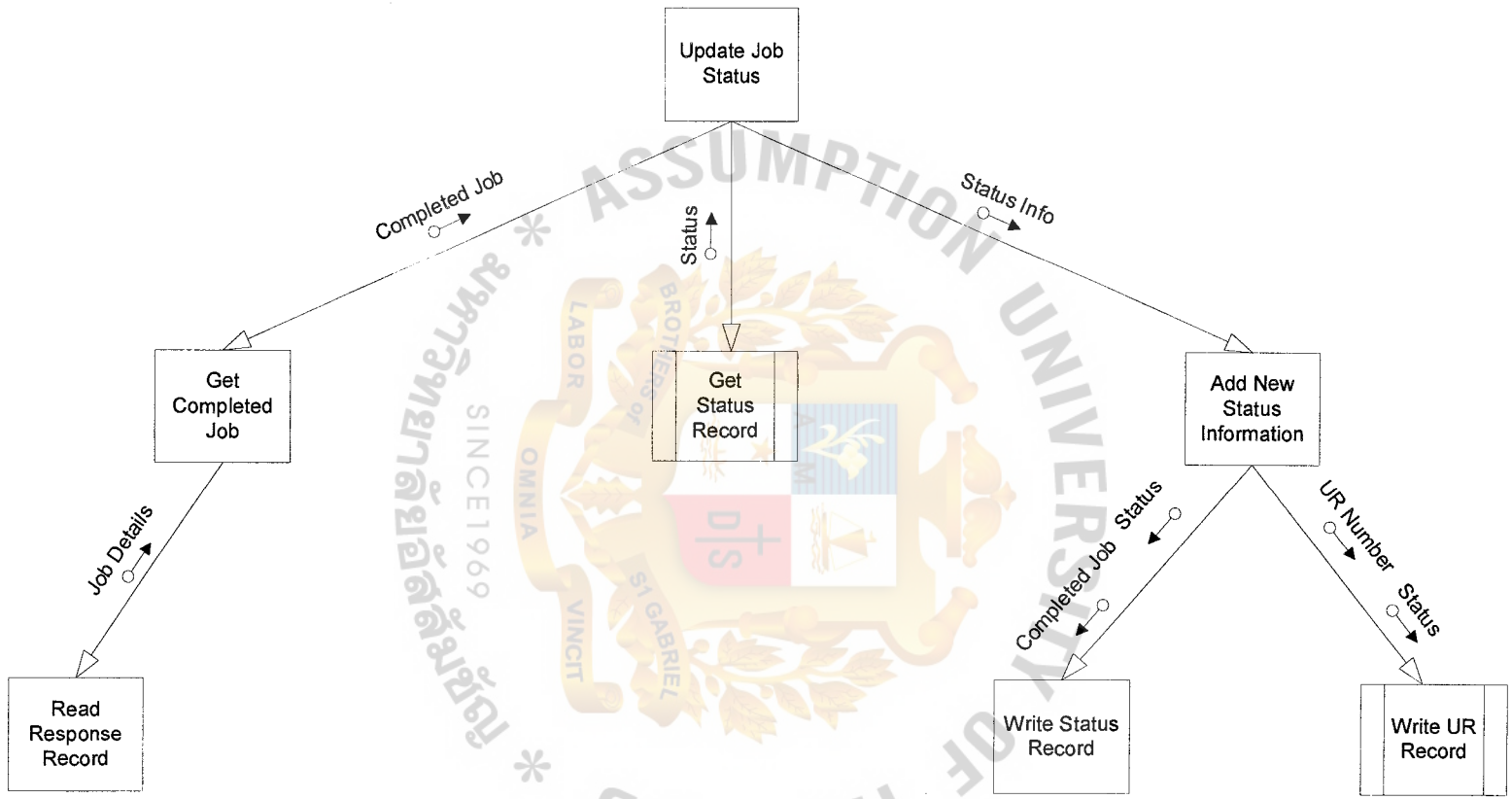

Figure D.7. Structure Chart of Process 7.0

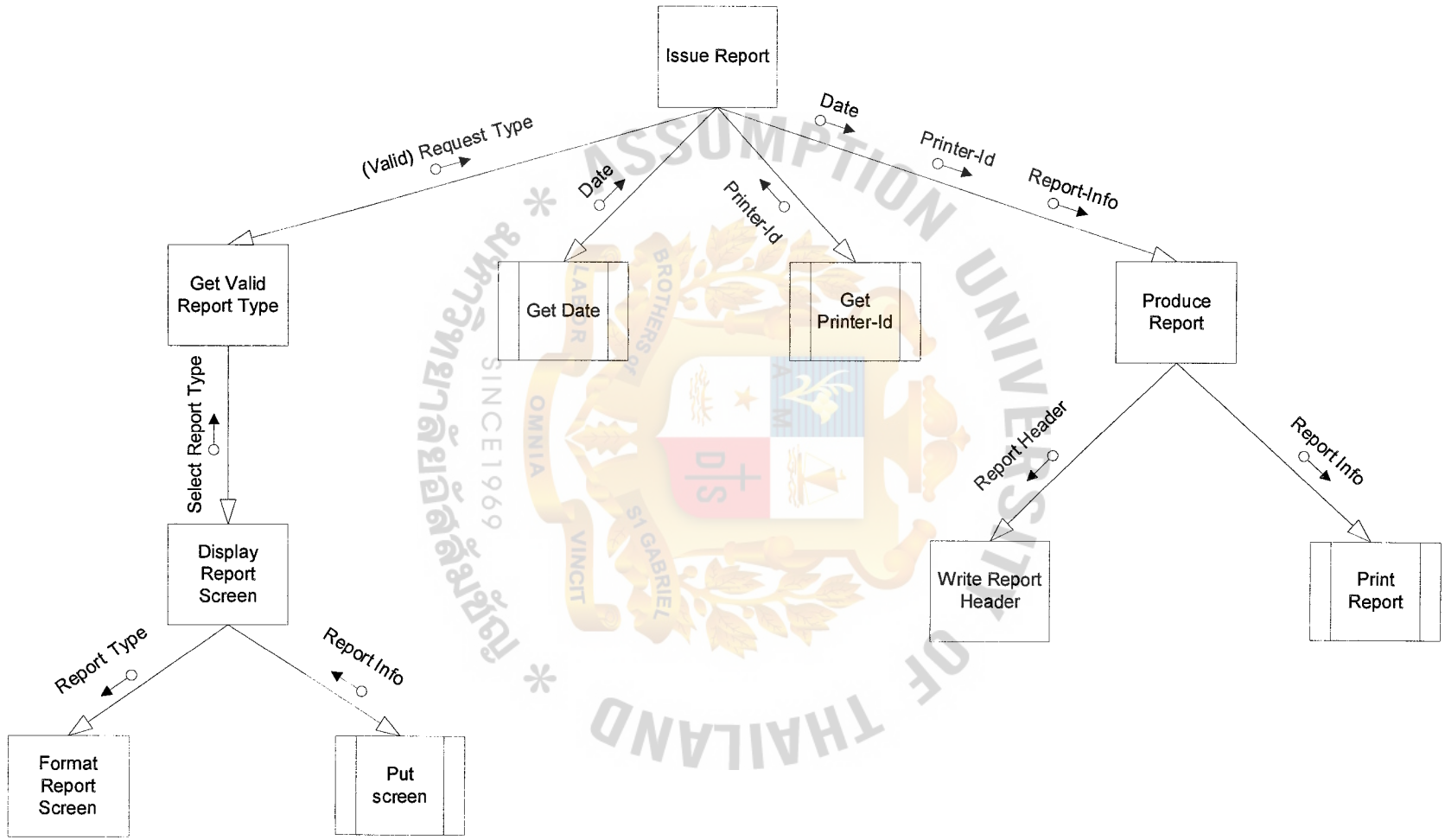

Figure D.8. Structure Chart of Process 8.0

APPENDIX E

Data Dictionary

ASSUMPTION UNIVERSITY OF THAILAND
BROTHERS OF ST GABRIEL
LABOR OMNIA VINCIT
SINCE1969
มหาวิทยาลัยอัสสัมชัญ

Data Dictionary

USER	=	* An end-user who request for services from MIS department *
request	=	* A request for services to MIS department *
invalid request	=	* An incompleted or duplicated request to MIS department *
app-pblm	=	* A problem is related to application support section to take responsible *
opr-pblm	=	* A problem is related to Technical and Operation support section to take responsible *
APPLICATION SUPPORT	=	* A section within MIS department who support user about the applications problem and application request*
OPERATION SUPPORT	=	* A section within MIS department who support user about the Technical and Operation problem and Any request related to technical/operation *
p.o. details	=	* The details of equipment and vendor that are issued to Purchasing Department to buy a new equipment *
PURCHASE	=	* A department which is responsible for buying a new equipment from vendor *
new eqpt-details	=	{ equipment-details }
	=	* The information about the new equipment that is needed to record in the MIS system * @equipment name + description + equipment function

req-details = { request-details }

= * The information about a request for services from MIS department *

@user name + dept .+ telephone + date required + description + amount + priority

user name = first-name + last name

first-name = * A user's first name *

last-name = * A user's last name *

dept. = { department }

date required = * The date that user expected to receive a service from MIS *

dd / mm / yyyy

description = * The information about the details of service's need of user *

priority = * A level of request that identifies the important level in each request *

["high" | "medium" | "low"]

problem details = * An information about the problem that needs to be solved by the responsible section *

pending = * The unsolved problem or status in UR record = pending *

pblm-status = { problem-status }

= * The information that identifies the status of the user request *

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user	=	* The information which was received the from the user to confirm that the acceptance job is completed *
print-id + report type	=	* To identify the printer that needs to print out report and specify the selected report *
report	=	* A document that describes the summaries of request and was generated by the printer *

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APPENDIX F

Process Specification

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PROCESS 1.2 : OPEN JOB

```
BEGIN
        CHECK request details in USER REQUEST RECORD
        IF find fname,laname,dept,date required,description
                THEN accepted UR
                ELSE display message " invalid request"
        ENDIF
        DO WHILE accepted UR = "yes"
                CREATE open job
                INPUT request details
        END DO
END
```

PROCESS 1.3 : CREATE UR NUMBER

```
BEGIN
        DO WHILE received open job = "yes"
                READ assigned number from UR NUMBER RECORD
                INPUT UR number in UR form
                UPDATE UR NUMBER RECORD
        END DO
END
```

PROCESS 1.4 : DEFINE PRIORITY

```
BEGIN
        DO WHILE there are no more PRIORITY in UR RECORD
                READ user request description from UR RECORD
```

```
        DO CASE
                CASE  request is impact to the whole system
                      SET priority = "high"
                CASE  request can be done by other system temporary
                      SET priority = "medium"
                CASE  request is a normal request
                      SET priority = "low"
        END CASE
                UPADET UR RECORD
        END DO
    END
```

PROCESS 1.5 : ENTER REQUEST DATA

```
    BEGIN
        DISPLAY SCREEN for accept request from REQUEST RECORD
        ACCEPT ( UR number, priority, fname, lname,
                 department,description,company, ext no )
        WRITE REQUEST RECORD
    END
```

PROCESS 2.2 : RECORD SOLUTION

```
    BEGIN
        DISPLAY  status screen
        INPUT  ur number
        FIND  problem with matching to current ur number
```

```
            IF   there are no such record
               THEN  display " No such record"
               ELSE  display screen to update solution details
                     INPUT solution details
            ENDIF
END
```

PROCESS 2.3 : DISTRIBUTE PENDING REQUEST

```
BEGIN
      SELECT  status from UR RECORD
              and status = "pending"
      READ   description from UR RECORD
      DO CASE
            CASE description related to technical support and operation
                  Problem
               FORWARD to technical and operation support
            CASE description related to application problem
               FORWARD to application support
      ENDDO
      IF status = "pending" cannot be found
            THEN DISPLAY message  " No such a  pending request "
            ENDIF
      END
```

PROCESS 5.1 : SELECT JOB

```
BEGIN
        GET UR RECORD
        FIND  priority in UR RECORD
        IF  there are no more priority in UR RECORD
          THEN DISPLAY  " Not found any record "
        ELSE
                DOCASE
                    CASE  priority = high
                        GOTO solve problem process
                    CASE  priority = medium
                        APPEND  in high priority queue
                    CASE  priority  = low
                        FIND  priority = medium in UR  RECORD
                            IF there are no more priority = medium
                                THEN APPEND in high priority queue
                                ELSE APPEND in medium priority queue
                            ENDIF
                END  CASE
        ENDIF
END
```

PROCESS 5.2 : SOLVE PROBLEM

```
BEGIN
        GET selected job
        READ problem description from UR RECORD
        GOTO solve problem
                IF a problem can be solved
                 THEN DISPLAY UR SCREEN
                  EDIT status in UR RECORD with status = "completed"
                ELSE DISPLAY UR screen
                  EDIT status in UR RECORD with status = "pending"
                  GOTO contact vendor process
                ENDIF
END
```

PROCESS 5.3 : UPDATE STATUS

```
BEGIN
        READ UR RECORD
        DISPLAY status
        GET action in RESPONISBLE RECORD
                IF in-completed job
                        THEN SET status = " pending'
                        ELSE SET status = "completed"
                ENDIF
```

```
        WRITE  UR  RECORD
    END
```

PROCESS 6.1 : RETRIVE PENDING RECORD

```
    BEGIN
        READ  UR RECORD
        FIND  status  in UR  RECORD  and status = "pending"
            IF  there are no more pending status
                THEN  EXIT
                ELSE  READ   problem  description, responsible section
                        GOTO  solve a problem  process
            ENDIF
    END
```

PROCESS 6.2 : SOLVE PENDING PROBLEM

```
    BEGIN
        READ  problem  description, status in UR  RECORD
        DO WHILE   status  = "pending"
                    solve a problem
                    RETURN  solution  details
                    REPLACE  status  = "pending" with status = "completed"
                            in UR  RECORD
```

END DO

END

PROCESS 7.1 : GET COMPLETED JOB

BEGIN

GET completed job details

DISPLAY UR screen

PUT solution, description, in UR RECORD

WRITE UR RECORD

END

PROCESS 7.2 : CLOSE USER REQUEST JOB

BEGIN

FIND status in UR RECORD and status = "completed"

IF found a completed status record

THEN SET status= "close"

ENDIF

END

PROCESS 8.1 : SELECT REPORT TYPE

BEGIN

FIND report type in REPORT RECORD with matching to report-id

IF record can be found

THEN PUT report type to request for printing process

```
                    ELSE EXIT
                END IF
END
```

PROCESS 8.2 : REQUEST FOR PRINTING

```
BEGIN
    GET  report type, report details
    DEFINE printer name, queue name
        IF  printer is available
          THEN print out a report
          ELSE select a new queue name
        ENDIF
END
```

PROCESS 8.3 : SEND TO MANAGEMENT

```
BEGIN
    DO WHILE there are more reports in REPORT RECORD
        GET next reports
        REPEAT UNTIL there are no more reports
        RETURN to management
    END DO
END
```


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