Hi-Light International, Inc.
Management Information System

Texas A&M University - Corpus Christi
Graduate Project

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ABSTRACT

This project is the development of a management information system for the Hi-Light International trading company in Taiwan, R.O.C. The project includes the creation and use of a multi-purpose database to manage information relating to customers, suppliers, products, orders, shipping, and other related activities. The system supports both English and Chinese user interfaces and also provides statistical information concerning business and employee performance.
INTRODUCTION

My sister owns Hi-Light International trading company in Taiwan. She asked me to develop a computer system to handle the company’s trade business. In addition to my personal interest in the company, I welcome the opportunity to do a project that can benefit an actual business.

Hi-Light’s major business activity is international trading in small hardware such as ball bearings, auto parts, and hand tools. It serves as an agent between customers from all over the world and suppliers from Taiwan and China. The services it provides to the customers include: locating proper suppliers who manufacture the desired items, providing quality control, arranging shipment for product delivery, and negotiating the payment terms. The complexity of Hi-Light’s business activities inherits from the relationships between sale, purchase, shipment, and Letter of Credit payment. For example: one sale can have several purchases, and one purchase may require several shipments; or several sales of similar items from different customers can be combined into a large purchase with an extensive multi-shipment schedule; and one Letter of Credit can be used to cover a sale, several sales, a single shipment or several shipments. An effective system must be flexible enough to accommodate all these requirements. Anything less than the required flexibility will result in extensive manual efforts.

Hi-Light’s current trade system is pre-packaged software running on a 236-PC file server. It has many flaws. In addition to the inflexibility, which is typical of most pre-packaged application software, it does not handle concurrent
data access well: data is locked at file level instead of record level. Furthermore, the slow processing speed and limited storage space make the current system very undesirable. Therefore, the decision was made to replace the whole system – both hardware and software – with 486 PC file server and work stations, and Paradox for Windows application programs.

This graduate project was a valuable learning experience for me. The project is a real life application with complicated user interfaces and data communication interfaces. I developed the system using object-oriented methodology which is totally new when compared to traditional procedural programming. It was well worth the effort!
Hi-Light's Management Information System (HL-MIS) is a tailored multi-user information system. It provides concurrent access to a relational database system which manages information related to customers, suppliers, products, orders, shipping, and Letter of Credit payment. It also provides statistical information on business and employee performance. This system is designed with a Graphical User Interface (GUI) to provide a user-friendly interface. Most of the functions are available by either selecting a menu item or clicking a button.

The system is designed to follow the activity flow of the company. Procedures that are more likely to be performed by an employee as a series of steps are grouped into a single subsystem. For example, upon receiving a customer's order, a salesperson generates a Sales Confirmation (SC) to the customer, one or more Purchase Orders (PO) to suppliers, and a shipment schedule. All these can be done in the Order Management sub-system. Further processing on the same order is performed at a later stage (when the order is ready for delivery) in the Shipment Management sub-system by a shipping clerk.

From the main menu of the system, users are able to select one of the following subsystems: Supplier Management, Customer Management, Item Management, Order Management, Shipment Management, Payment Management, System Management, and Reports. Detailed descriptions about each sub-system are provided in the rest of this section.
Supplier Management. This sub-system includes a Supplier Maintenance Form to provide the general maintenance of the Supplier Table and a Supplier-Items Form that uses two query functions for information retrieval of: (1) a list of all items (by category) available from a specific supplier, and (2) the detail information about an specific item available through that supplier. The Supplier Items Form can be accessed either from the sub-menu or from the Supplier Maintenance Form.

Customer Management. This sub-system is similar to the Supplier Management sub-system except that the query functions list: (1) every item that has ever been ordered by a specific customer, and (2) the order history of that item of that customer. Shipping Mark is a sub-module of Customer Management. It is for maintaining all different kinds of shipping marks that a customer uses.

Item Management. Item Management consists of the Item Maintenance Form for maintenance of an item, suppliers of that item, its packing methods, and its cost information. Items sold by Hi-Light may be available through one or more suppliers. Due to either the tier pricing or different price terms (e.g., CIF or FOB), each supplier may have more than one cost data for that item. The relationship of item, supplier, and cost is a one-to-many-to-many relationship. (That is, one item has many suppliers, and one supplier has many costs for that item.) To implement this relationship, the Item Maintenance Form links two detail tables (item_supplier and supplier_cost) to the master table (item) forming a two level hierarchy and allowing unlimited entries of the item's suppliers and cost.
In addition to the relationship to its suppliers and costs, the item also has an one-to-many relationship to the customer-item number. The customer-item number is a code that a customer uses on an order to identify an item. All the items are input into HL-MIS by using their customer-item number. Then HL-MIS maps the customer-item number to its own item number for further processing. Since a HL-MIS item number is only used internally, it is conveniently implemented as a serial number which is generated when the new item record is created. For the mapping to work correctly, the initial linking of an item number to all its customer-item numbers is required, and this is normally performed on the Item Maintenance Form. However, linking of a new customer-item number can also be performed during an order entry when the mapping fails and the system prompts the user to perform additional linking.

Order Management. Order Management is the most important and also the most complicated of the sub-systems. It initiates and controls all business activities. Users are able to select input options from a sub-menu that includes Quotation, Sales Confirmation, Purchase Order, Shipment Schedule, and Combine Orders.

A customer's inquiry is input as a quotation on Quotation Maintenance Form. A customer's order is input as a sales confirmation (SC) on the Sales Confirmation Maintenance Form. When the customer accepts a quotation and places the order, a SC can be generated from the quotation by using a SC generating function (SCgen) with only minor manual adjustments. Purchase
orders (PO) are normally generated from a SC by using POgen function to split one SC into several POs by grouping the SC's items by their supplier and generating one PO for each supplier. Manual input or updating of a PO can be performed on a Purchase Order Maintenance Form. The Shipment Schedule Maintenance Form is designed for SCs that require multiple shipments over a period of time. To provide an overall display of the shipment schedule, the Schedule Summary Display Form uses a crosstabs form to summarize the shipment information for each PO. This is particularly useful when the schedule is large, such as the twelve-month's rolling schedule that some suppliers use. The Schedule Summary Display Form can be accessed either from this sub-system or from the Shipment Management sub-system. For a more cost efficient production schedule, suppliers often prefer to have several SCs to be combined into one larger PO whenever possible. Combine Orders is a function designed for this purpose. When the supplier can fulfill several similar orders in a close time span, customer orders can be combined into one larger SC, then the purchase order is generated from that combined SC.

All the order forms (Sales Confirmation, Quotation and Purchase Order) in this sub-system have two sections. The upper section contains data of the order itself (master table) and the lower section contains data of ordered items (detail table) displayed in a tabular format. For quick references to an item, two windows are available for displaying information: the Item Inquiry Window displays a condensed version of Item Maintenance Form and the Order History Window displays two query results that list all the past orders from a specific customer of an specific item. Each window overlays the upper section and can be toggled from one to the other. The users can select the supplier and the
cost for each item in the order by referring to the Item Inquiry Window. The Order History Window displays prices of an item as quoted or sold in the past, along with the supplier and profit data, to provide the basis for determining the selling price of that item.

Other functions available in *Order Management* are:

*Copy Order*: A new order (any kind) can be duplicated from an existing one to save some manual keying efforts. It is especially useful for repeated orders.

*Print*: It is used to print external documents such as formal quotation, sales confirmation, and purchase order. (Note: internal reports are printed under *Report Management* sub-system.)

*Shipment Management*. The sub-menu in *Shipment Management* includes *Schedule Summary Display, Shipment Maintenance, Notice of Shipment*, and *Boarding Process*.

When the ordered items are ready for shipping, a shipment record is created. A shipment record can be either generated by the system or manually input on the Shipment Maintenance Form. The system generates a shipment record by using a sales confirmation number and a shipping sequence number to identify items that are due for shipping in the shipment schedule established in the Order Management. Manual input of the shipment record can provide more flexibility in shipment arrangement in case a shipment differs from its original
schedule and adjusting a system generated record is more cumbersome than manual input.

*Boarding* is a function used to process a shipment as being "on board." *Boarding* is a way to say the shipment is final, and no change should be made to it. When the *Boarding* function is used, the system does two things: 1) It fills the *ship_date* field with the system date, and 2) it adjusts the shipment schedule for any differences between actual shipped quantity and scheduled quantity. Then the quantity difference is added to the future shipments. The Packing List Maintenance Form is accessed from the Shipment Maintenance Form and is used to specify how the shipment is packaged. The items in each shipment are usually grouped into multiple packages (cartons). Therefore the contents, the quantity in each package, and total package measurements need to be specified. The Notice of Shipment Form specifies the information to be included in the cover letter (Notice of Shipment) to provide some customization in the letter. The *Print* functions provide printing of all external documents such as Shipping Invoice, Packing List, and Notice of Shipment.

**Payment Management.** This sub-system is used for managing Letter of Credits (LC). A LC is a payment from a customer that is used to cover an order, part of an order, several orders, a shipment, or several shipments. There is a many-to-many relationship between shipment and LC. Two sub-menu choices are used to implement this relationship: the Letter of Credit Form lists all the shipments that are covered by a LC, and the Negotiation Form shows which LC or LCs are applied toward a shipment. After the shipment is "on board," the user creates
a negotiation record where the negotiation amount entered on the Negotiation Form is subtracted from the total amount on the Letter of Credit Form to show a balance (unused portion) of the LC amount. The third sub-menu choice is Amend LC. It is used to amend certain data such as total LC amount, ship date, and expire date on a LC. Each amend creates an amend record to keep track of the history of LC amendments.

System Management. This sub-system serves two purposes: maintain look-up tables used by other sub-systems and provide utility functions. There are tables for company data, currency exchange rates, freight data, price terms, payment methods, and cover letter document list. The utility functions include: backup database, restore database, archive old records (copy to floppy), and restore old record.

Reports. This sub-system is dedicated for printing of all internal reports, as all external documents are printed in the appropriate sub-system for the activities performed. Reports are grouped into four categories: Activity Management Reports, Statistical and Analysis Reports, History Reports, and Miscellaneous Reports.
ENVIRONMENT

This relational database system was developed using Borland's Paradox For Windows version 1.0. The programming language supplied by Paradox For Windows is called ObjectPAL (Object Programming Application Language). The system is implemented on a PC network where all the stations and the file-server are 486DX IBM-compatible that have 8MB memory and a hard disk of 120MB or more. Other system interfaces are Novell Netware and C-Windows. C-Windows is an extension of MS-Windows with a Chinese language interface. This system is specially created for Hi-Light International, Inc., in Taiwan R.O.C.