Sales Invoice Systems

To fully understanding the value of relational databases you need to create a detailed system. In this chapter you will create an sales invoicing system for a computer mail order company, PC Direct, which sells computer peripherals through the mail. There are three main sections to the system, customers, products and the sales invoice.

In the creation of any relational database system you should do some careful planning. In general there are four steps that you should undertake.

1   Decide how many tables (files) you think you might need.

2   Decide how the tables will be related to one another.

3   List the fields in each table trying to avoid having the same field in more than one table. Decide which fields will be the MATCH fields to link the tables.

4   Decide what reports (or printouts) are required and which table they should be in.

In the case of PC Direct an initial FILE RELATIONSHIP diagram might be:

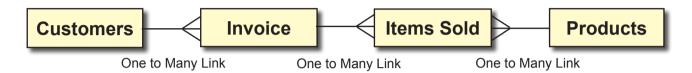## The Customer to Invoice Link

The CUSTOMER to INVOICE link of this structure forms a ONE TO MANY relationship. The ONE customer can have MANY invoices sent to them over time, but there will always be ONE invoice sent to ONE customer. So the customer file is the ONE side of the relationship and the invoice is the MANY side. A relationship can be set to link these two tables.

The Invoice to Products Link

There is a problem with the connection between the INVOICE and the PRODUCTS table. The one invoice can contain many products and the one product can be included in many invoices. A relational database cannot cater for a MANY TO MANY relationship as you cannot set multiple MATCH fields. A further problem exists, one invoice might contain a sale of 5 of a particular item, the next invoice might contain a sale of 2 of the same item. The company needs a way of adding these sales so that it knows how many items it has sold. So this initial FILE RELATIONSHIP will need modification.
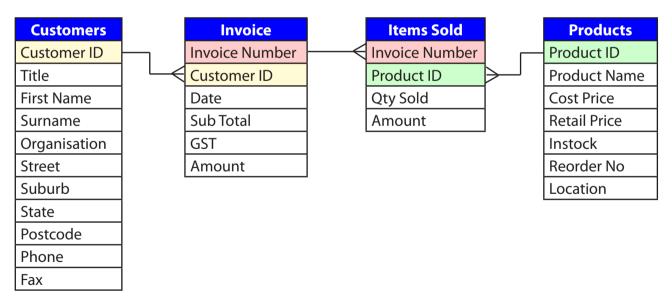
An Updated File Relationship Diagram

The easiest solution to these problems is to add a table between INVOICE and PRODUCTS. This table can store every item sold by the company as a single record allowing the company to keep track of every item sold. The new table can also provide data to the invoice. So a revised FILE RELATIONSHIP diagram becomes:

Customers	Invoice	Items Sold	Products
One to Many Link	One to Many Link	One to Many Link	

The ONE invoice can have MANY items sold within it. The ONE product can be sold MANY times. Adding the ITEMS SOLD table to the system allows a series of ONE TO MANY relationships to be created and a relational database system can accommodate these.

A File Structure Diagram

The next step is to decide on the fields to be placed in each table (or file). The following FILE STRUCTURE diagram shows one possibility. Remember, we do not want to store data more than once (except for MATCH fields).

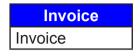| Customers	Invoice	Items Sold	Products
Customer ID	Invoice Number	Invoice Number	Product ID
Title	Customer ID	Product ID	Product Name
First Name	Date	Qty Sold	Cost Price
Surname	Sub Total	Amount	Retail Price
Organisation	GST		Instock
Street	Amount		Reorder No
Suburb			Location
State			
Postcode			
Phone			
Fax			

The MATCH fields need to be considered. The CUSTOMER ID is used to link the CUSTOMERS and INVOICE tables, INVOICE NUMBER is used to link the INVOICE and ITEMS SOLD tables and PRODUCT ID is used to link the ITEMS SOLD and PRODUCTS tables. The INVOICE table is not directly linked to the PRODUCTS table, it will obtain values from the PRODUCTS table via the ITEMS SOLD table.

The Required Reports

The final consideration in the planning is what reports will be required. The following diagram shows some of the reports that could be made from the various tables.

Customers	**Invoice**	**Items Sold**	**Products**
Customer Entry	Invoice	Item Lists	Product Entry
Customer List		Monthly Totals	Price List
Mailing Labels		Item Totals	

Looking at the Prepared Database

A database has been prepared for you. It contains a CUSTOMERS table, an INVOICE table and a PRODUCTS table. Your task will be to add an ITEMS SOLD table, complete the INVOICE and combine all 4 tables with relationships so that they operate as the one system.
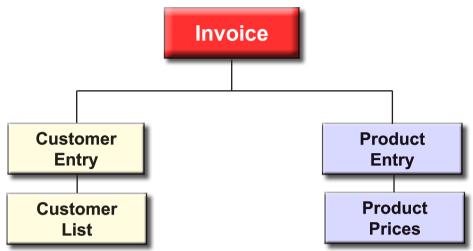
A   Loading the Invoice Database

1   Load FileMaker Pro 10, click on OPEN DATABASE and select BROWSE FILES. Or close the current file and select OPEN from the FILE menu.

2   Access the FMP10 SUPPORT FILES.

3   Open the CHAPTER 18 folder and load the file: CH18 INVOICE

4   The file must now be saved then opened from your STORAGE folder. Display the FILE menu and select SAVE A COPY AS.

5   Access your FMP10 FILES folder and save the file under the name:

<div align="center">CH18 INVOICE COPY</div>

6   Close the CH18 INVOICE file.

7   Select OPEN from the FILE menu and open the CH18 INVOICE COPY file from your FMP10 FILES folder.
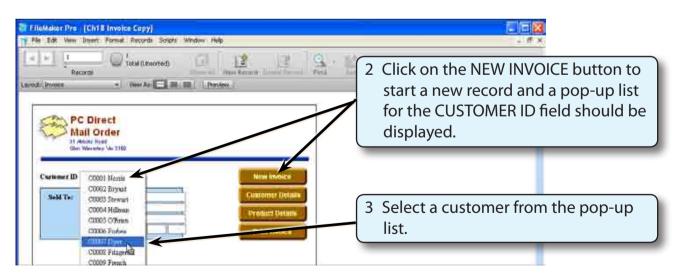
B   The Prepared Layouts

The following LAYOUT STRUCTURE diagram shows the arrangement of the current layouts.
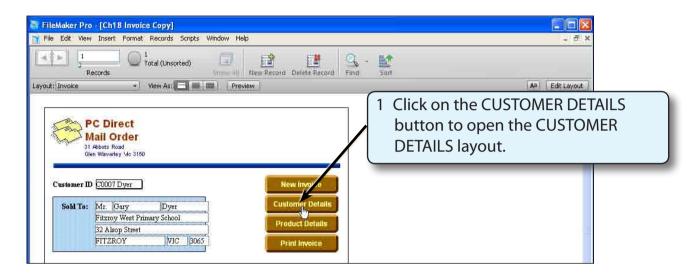

C   The Invoice Layout

1   The Invoice has been partially set up for you. It has a relationship to a CUSTOMERS table set and some buttons to operate the database.

2 Click on the NEW INVOICE button to start a new record and a pop-up list for the CUSTOMER ID field should be displayed.

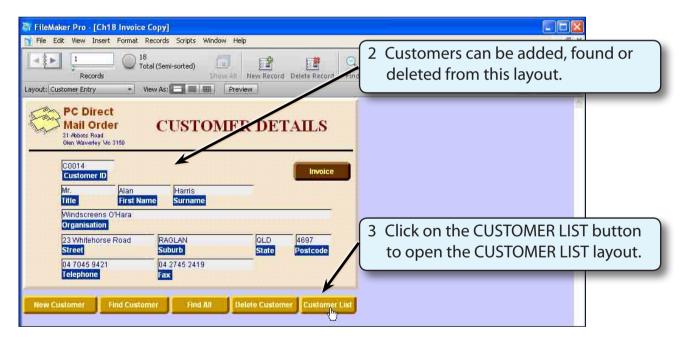3 Select a customer from the pop-up list.

NOTE: The CUSTOMER ID field is used to display data from the CUSTOMERS table. A value list was set up to display the CUSTOMER ID and SURNAME fields.
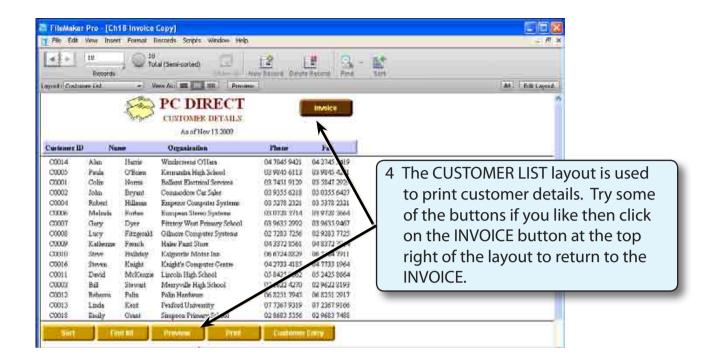
D   The Customer Table Layouts

There are two layouts based on the CUSTOMERS table. CUSTOMER ENTRY which is used to manage the company's customers and CUSTOMER LIST to print out the customer details.

1 Click on the CUSTOMER DETAILS button to open the CUSTOMER DETAILS layout.

2 Customers can be added, found or deleted from this layout.

3 Click on the CUSTOMER LIST button to open the CUSTOMER LIST layout.

NOTE: **You might like to look at some of the customer details records or use some of the buttons before opening the CUSTOMER LIST layout.**

4 The CUSTOMER LIST layout is used to print customer details. Try some of the buttons if you like then click on the INVOICE button at the top right of the layout to return to the INVOICE.

E   The Products Table Layouts

The products table is used to store details about each product that the company markets. This will be the only place that the product details are stored. There are two layouts, PRODUCT ENTRY where products are managed and PRODUCT PRICES which allows a price list to be printed.

1   Click on the PRODUCT DETAILS button in the INVOICE layout.

2 Products can be added, found or deleted from this layout.

3 Click on the PRICE LIST button to open the PRODUCT PRICES layout.