Pendragon Forms
Version 4.0

Contents

Sample Forms

Pendragon Forms ships with some sample form designs, intended to illustrate the various features of the product.
You can send any of the sample form designs to the handheld.

See Appendix A for a list of the sample forms.

1. Getting Started

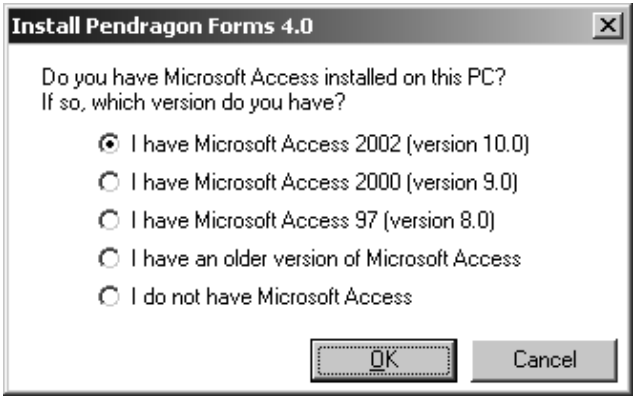
Installing Pendragon Forms

Installing Pendragon Forms consists of two steps:

1. Installing the Pendragon Forms Manager on your PC.
2. Installing Pendragon Forms on the handheld.

Step 1: Installing the Pendragon Forms Manager on your PC

1. Close any applications not in use, especially the Microsoft Office toolbar.
2. Insert the CD-ROM into the CD-ROM drive.
   If the CD-ROM program does not start, click the Start button and choose Run.
   Type **D:\SETUP**, where **D** is the drive letter referring to your CD-ROM drive.
3. Choose *Install Pendragon Forms 4.0*.
4. If you are upgrading from version 3.0/3.1/3.2, install to the same folder where Forms was installed - typically the C:\Program Files\Forms3 folder. Your original Forms database will be renamed, and when you open the new Forms Manager you will be prompted to import all of your form designs and data. If you are not prompted to import your existing forms and data, you can do a manual import - see page 201.
   DO NOT UNINSTALL THE EARLIER VERSION OF FORMS.
5. A Pendragon Forms Installation dialog box will prompt you to choose which version of Microsoft Access you have, if any. If you agree with the default option, click OK. Alternatively, click the correct option, then click OK.



6. If you do not have any version of Microsoft Access , then when prompted, choose a Typical installation.

7. You will be prompted to enter the product Unlock Code. This serial number is located on the inside back cover of your manual, or in the case of the electronic version of the product, the Unlock Code will have been e-mailed to you.

8. If you are upgrading from Forms version 3.0/3.1/3.2, choose to install to the same folder where Forms was previously installed, typically the C:\Progra~1\Forms3 folder, which means the C:\Program Files\Forms3 folder.

9. After installing the software, you may need to restart your system.

10. Click Start...Programs...Pendragon Forms...Pendragon Forms Manager 2000. (If you have Microsoft Access 97 the program is called Pendragon Forms Manager.) You will be prompted to enter your Palm device user name. (If you do not know what your Palm device user name is, tap the HotSync icon on the handheld and the user name should appear in the upper right corner of the screen.)

11. If you have a previous version of Pendragon Forms, see page 4 for information on whether you need to import your form designs and data from the previous version.

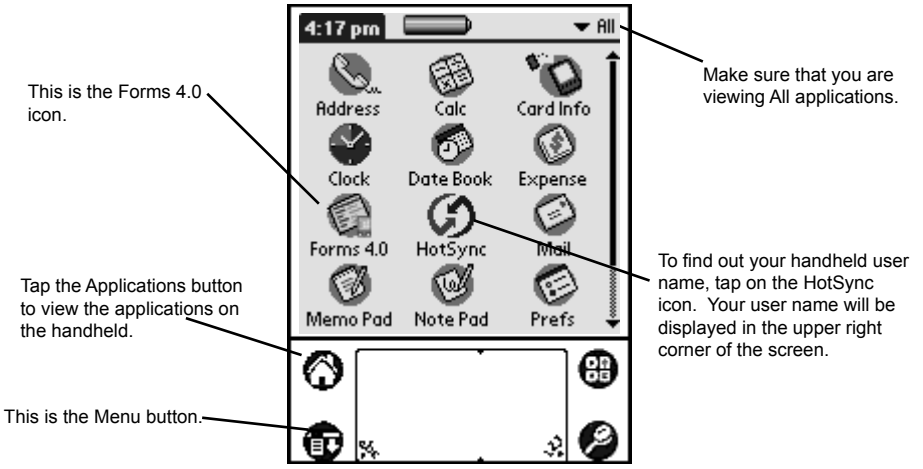
Step 2: Installing Pendragon Forms on the Handheld

1. On the PC, click on Start... Programs...Pendragon Forms 4.0...Install Forms 4.0 on Handheld.

2. A Select Palm User(s) window will be displayed. Click on the name of a handheld user, then click the Done button. If you have a Pendragon Forms license code for more than one user, you can select more than one handheld in the list. To un-select a name, click on the name a second time.

   If you do not know what your handheld user name is, tap the HotSync icon on the handheld and the user name should appear in the upper right corner of the screen.

3. Perform a HotSync data transfer. The Pendragon Forms program FORMS4.PRC will be installed on the handheld. Tap the Applications button of the handheld, and look for the Forms 4.0 icon. (See picture on next page.)



4. Once the Forms icon is on the handheld, you can begin creating forms. See page 6.

Installation Troubleshooting

Visit the Support page at our Web site, http://www.pendragonsoftware.com.

Here are some typical installation problems and their solutions.

During installation, the Setup program freezes and installation is never completed.
Check if you are using McAfee virus scanner. Version 3.2 of McAfee virus scanner has a bug which causes the PC to lock up when scanning Access databases.
An interim solution is to disable the automatic virus-checking of Access databases in McAfee. You can still manually virus-check Access databases. A permanent solution is to obtain a software upgrade from McAfee which solves the problem.

Installation works fine, but I am unable to send form designs to the handheld.
See Appendix B, *Troubleshooting*, page 434.

When I try to open the Pendragon Forms Manager program, I get a runtime error message saying cannot find project or library.
If you have the full version of Microsoft Access, a component of Access called Data Access Objects may not have been installed when Access was installed on your PC. Close the Pendragon Forms Manager. Then re-run the Microsoft Office Professional CD-ROM, and select to Add/Remove components for Microsoft Access. Check the box to add the component *Visual Basic Data Access Objects*. If this box is already checked, follow the instructions to register the Data Access Objects component, given in the next paragraph.

If you do not have the full version of Microsoft Access, or if you have Access and Data Access Objects are already installed, the problem may be that the Data Access Objects component is not registered. First close the Pendragon Forms Manager. Then, to register this component, click on Start...Programs...Pendragon Forms 4.0...Configuration Tool. In the Configuration Tool window, click on the Diagnostics tab and click the button labeled *Re-register Data Access Objects*.

Note for users of Microsoft Access 95 (version 7.0):

When you install Pendragon Forms, the installation program will install the Microsoft Access 97 runtime program. The runtime application then becomes the default application for opening all Microsoft Access databases. If you double-click on a Microsoft Access database, the runtime version will try to open the file. If the database is not a Microsoft Access 97 file, the runtime will prompt you to convert the file. Converting the file is NOT recommended.

You can continue to open Access databases with Access 95 by opening Access 95, then choosing the database you want to work with. You can also make Access 95 the default application for working with Access databases by reinstalling Access 95, or by changing the file association in Windows Explorer options. This will not affect the operation of the Pendragon Forms Manager.

Importing a previous version of Pendragon Forms

If you have been using a previous version of Pendragon Forms, you can import your existing forms and data into Pendragon Forms 4.0.

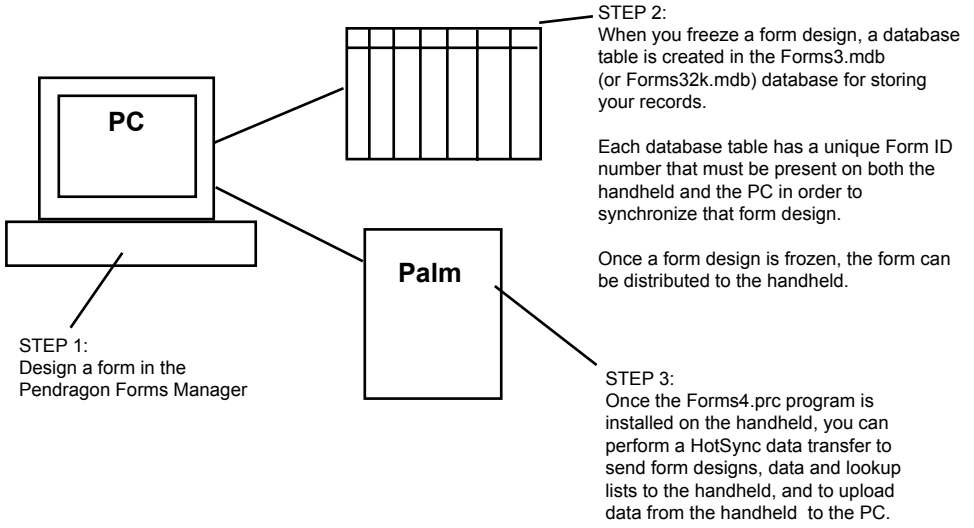
- If you have been using Pendragon Forms version 3.0, 3.1 or 3.2, and you chose to install version 4.0 into the same folder - typically the C:\Program Files\Forms3 folder - Pendragon Forms 4.0 will rename your Forms32k.mdb to OLDForms32k-1.mdb and replace the database with a new Forms32k.mdb. (For Access 97 users, Forms3.mdb is renamed to OLDForms3-1.mdb.) When you open the new Forms32k.mdb or Forms3.mdb, you will be prompted to import your form designs and data into the new database.

- If you chose not to install to the same folder, or if you have been using an earlier version of Pendragon Forms, see page 201 for information on how to import your form designs, data and lookup lists into Pendragon Forms version 4.0.
- See Appendix C, *Converting from designs from an earlier version of Forms*, on page 463, for some tips on converting form designs to take advantage of new Forms 4.0 features.

How Pendragon Forms Works

Pendragon Forms has three components:

- The Pendragon Forms Manager.
  This is an Access database on your PC, called Forms3.mdb if you have Access 97 or Forms32k.mdb if you have Access 2000 or Access 2002.
  The Pendragon Forms Manager is where you design forms that can be sent to the handheld, and where data is stored after synchronization.
- The Pendragon Forms conduit.
  This file is called Forms40.dll, or Forms40A.dll if you haveAccess 2000 or Access 2002.
  The Pendragon Forms conduit runs during a HotSync data transfer to send form designs, data and lookup lists from the PC to the handheld, and data from the handheld to the PC.
- The Pendragon Forms program for PalmOS.
  This program is called Forms4.prc and runs on your PalmOS handheld device.



Bi-Directional Synchronization

Pendragon Forms supports bi-directional synchronization, meaning that records entered on the PC are automatically sent to the handheld, and records entered on the handheld are automatically sent to the PC during a HotSync data transfer. Data from the handheld goes directly into the Forms3.mdb or Forms32k.mdb database during the synchronization process.
If the same record is modified both on the PC and on the handheld, the synchronization rule is that the handheld will overwrite the PC.

2. Quick Guide to Using Forms

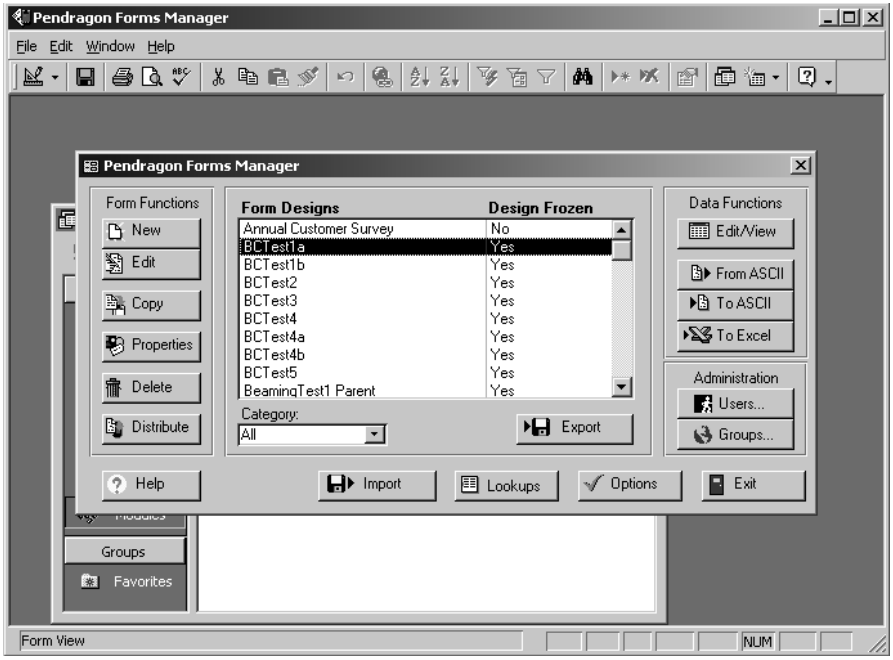
This chapter gives you an overview of how Pendragon Forms works.

On the PC, open the Forms Manager by clicking Start...Program Files...Pendragon Forms... Pendragon Forms Manager 2000.

The Forms Manager window in the foreground and is where you will design forms and view data.

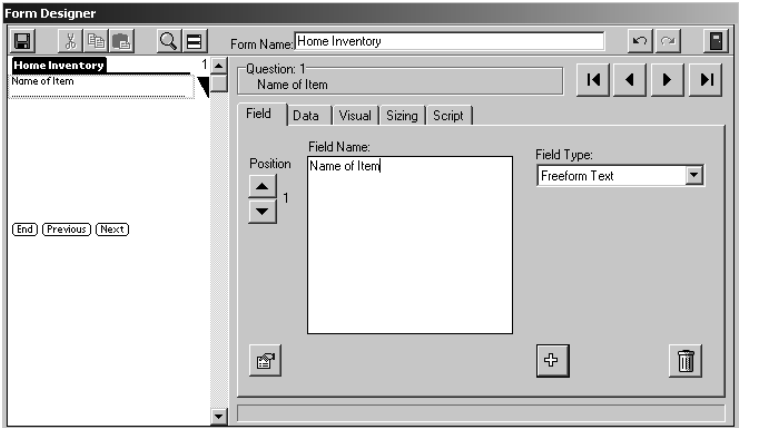
To create a new form, click the New button. 

If you are editing an existing form, click the name of the form to highlight it, and then click the Edit button.

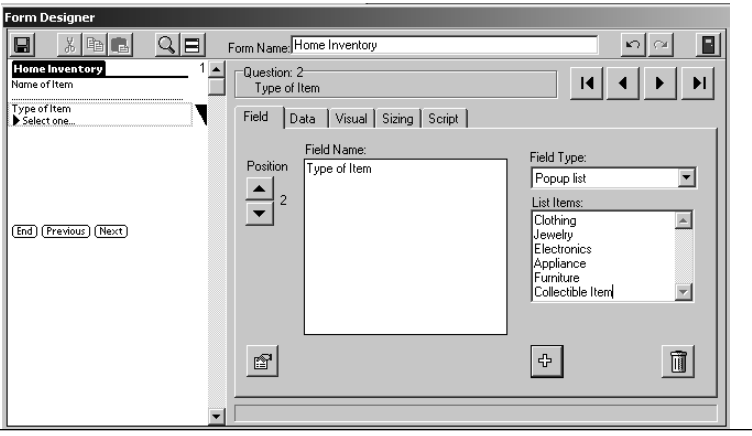


When you click the New or Edit button, the Form Designer window is displayed.
The Form Designer window is where you design your form.

- Fill in the Form Name field at the top of the window to give your form a name.
- Click in the Field Name field and type the name of the first field on your form.
- In the Field Type field, select the type of data that the handheld user can enter in this field.



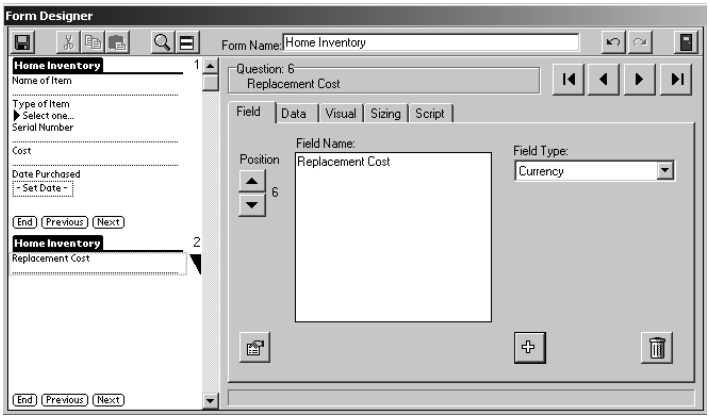
To add another field to the form, click the  button.
Or, if you are on the last field of the form, click the right arrow button to create a field. 
There are 23 field types that you can use. Several field types require you to enter additional information. For example, a Popup List field, shown below, requires you to enter the options that you want the user to see in the Popup List. See Chapter 7, *Field Types*, starting on page 60 for details about the 23 field types that you can use.



As you add fields to your form design, the Preview Area on the left side of the Form Designer window shows you a preview of what your form will look like on the handheld.

If your form design is several screens long, you can scroll up and down the Preview Area to find a particular screen.

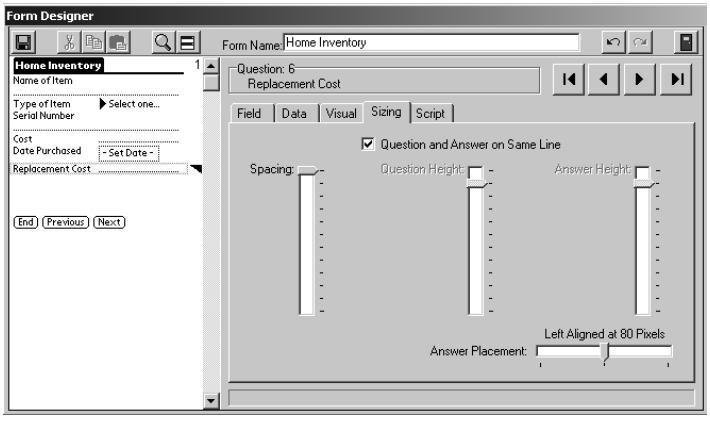
Click on a field in the Preview area to select that field to edit.
You can also use these buttons  to move from field to field.



The tabs in the Form Designer: Field, Data, Visual, Sizing and Script, apply to the selected field.

The Sizing tab lets you control how a field is displayed on the handheld screen. To reduce the screen space that a field occupies, check the Question and Answer on Same Line checkbox. The field name (question) and the handheld user's response (answer) will take up one line on screen.

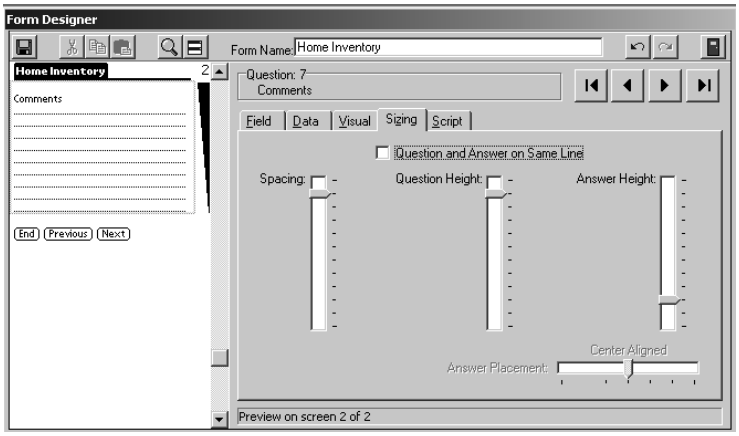
The Answer Placement control lets you position the answer to the left, middle or right of the screen.



Some fields display better if they take up more screen space, not less.

If the question and answer are on different lines, you can add Spacing before the question, and adjust the Question Height and the Answer Height as needed.

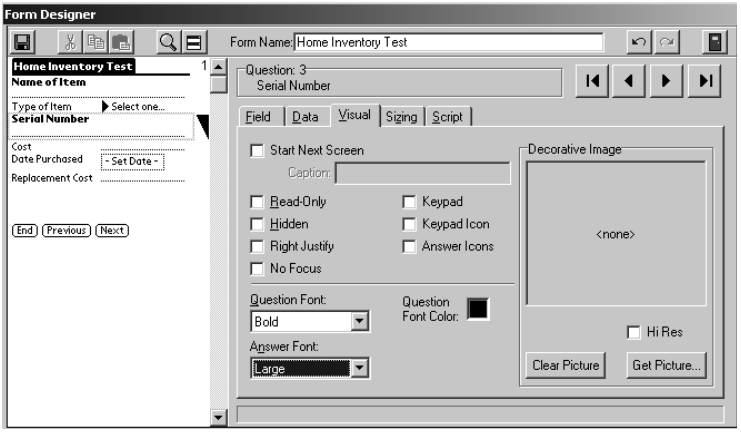
The question and answer components of a field cannot be larger than a single screen.



The Visual tab in the Form Designer window allows you to change the font for the question and answer components of the current field.

Fonts can be Standard, Bold, Large, or Large and Bold.

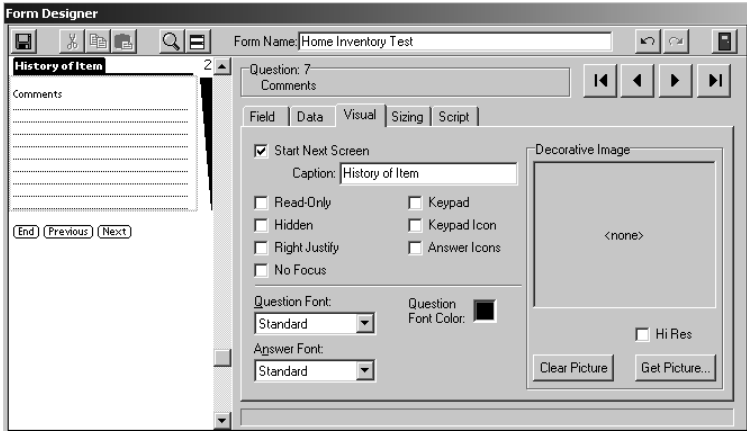
If you are designing for a color handheld device, you can also make the question font a color other than black.



If you have a field that you want to start at the top of a screen, you can check the Start Next Screen checkbox on the Visual tab.

In the Caption field, you can type an optional header for that screen.
If you leave the Caption field blank, the default header is the form name.

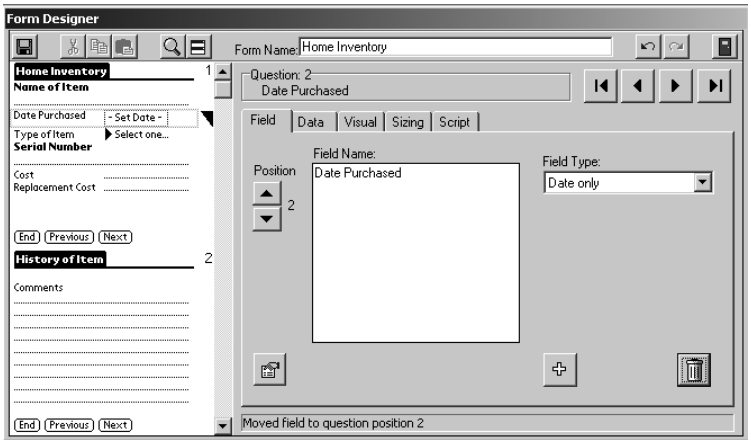
To learn more details of the Form Designer window, see Chapter 8, *Advanced Form Designer*, starting on page 132.



IMPORTANT:
If you are creating a form with a lot of fields, click the  Save button in the Form Designer window often, to save your work regularly.

To re-position a field, click on the field in the Preview Area to select that field.

Then click the Up or Down arrows to move the field to the previous or next position on the form.

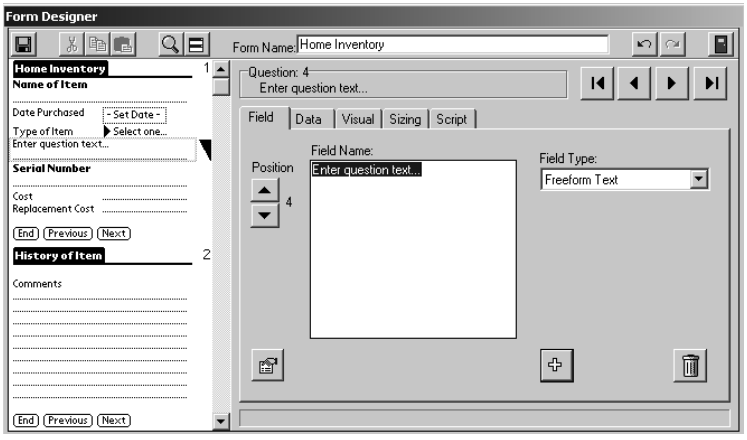


To insert a field in the middle of a form, click on a field in the Preview Area to select the field.

Click the  button to add a new field after the selected field. Remember to type a field name and select a field type for the new field.

To delete a field, click on the field in the Preview Area to select the field. Then click the Garbage Can button.

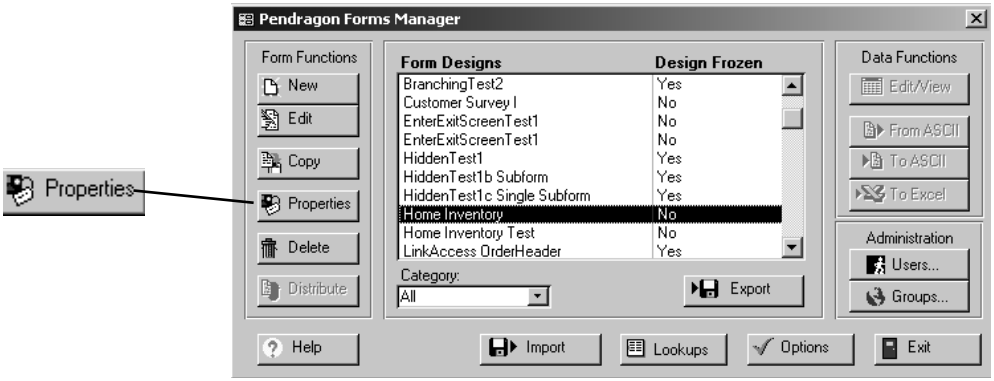
To save your form and exit the Form Designer, click the Exit button. 
Choose Yes when prompted to save the form.



The next step in the form design process is to select form properties and freeze the form design.

Freezing a form design creates a database table within the Forms Manager database for storing all the records associated with a form. You cannot add, delete or move fields once the form is frozen.

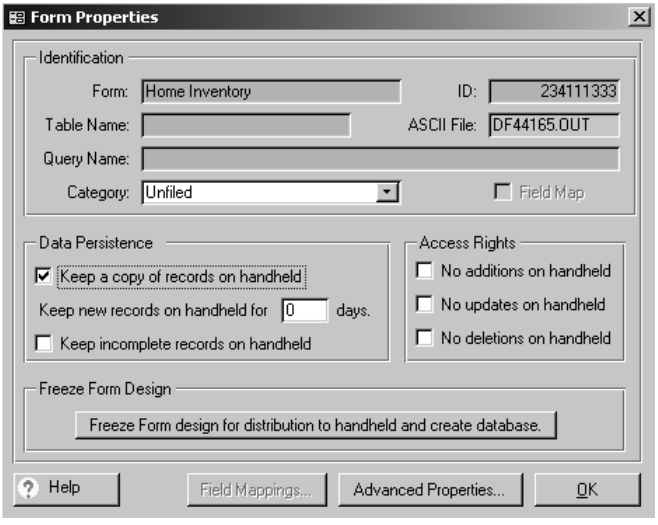
To freeze a form, click on the name of the form to highlight it, and then click the Properties button.



In the Data Persistence section of the Form Properties window, choose how long you want to keep records on the handheld after synchronization.

Check the Keep a Copy of Records on Handheld checkbox if you want the handheld to have a copy of the records after synchronization.

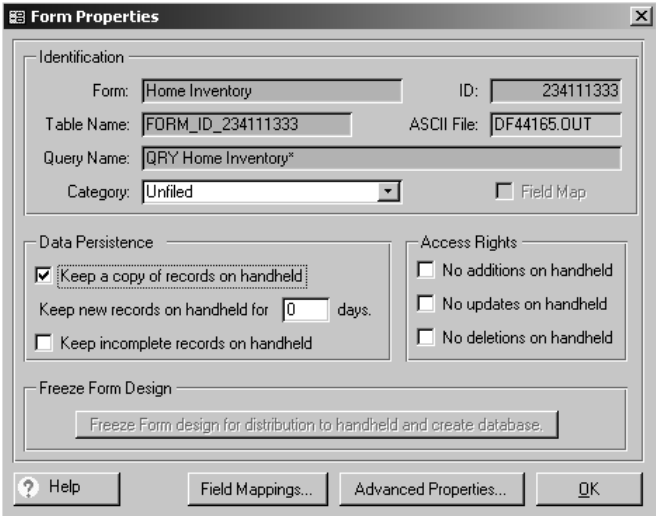
To freeze the form design, click the button labeled Freeze Form Design for distribution to handheld and create database.



Once the form is frozen, the Table Name field in the Form Properties window displays the name of the database table that was created for storing records for this form.

The ID field is a unique Form ID number. A form on the handheld has to match the Form ID on the PC for the form to be able to synchronize. It is therefore very important not to delete a form design from the PC if you are still using the form on the handheld.

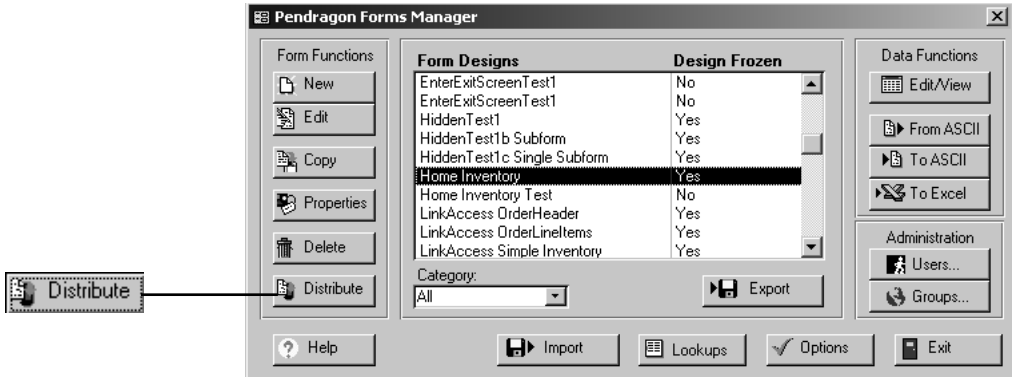
Click the OK button to close the Form Properties window.



Once you have frozen a form, the next step is to distribute the form to the handheld device.

Click on the name of the form in the Forms Manager window, then click the Distribute button.

The form will be added to the Default User Group, and members of that user group will receive the form design on their next synchronization.



If this is the first form that you are sending to the handheld, make sure that the Forms application is installed on the handheld.

To check that Forms is installed on the handheld, tap the Applications button on the handheld (the House icon). You should see an icon for Forms 4.0 on your handheld screen.
If you do not see the Forms icon, refer to the instructions in the Tip at right.

Once the Forms 4.0 icon is present on your handheld device, synchronize the handheld to receive your form designs.

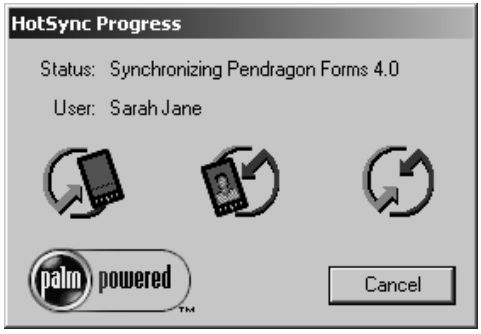
Tip:
If you do not see a Forms 4.0 icon on your handheld device, then on your PC click Start...Programs...Pendragon Forms... Install Forms 4.0 on Handheld.

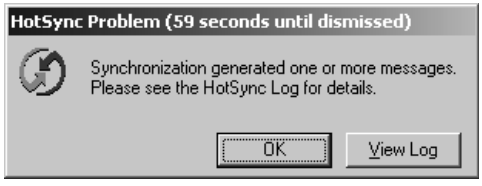
An Installation window will be displayed. Click on the name of a handheld device, then click Done. Perform a HotSync data transfer to install the Forms application on the handheld.

The Pendragon Forms conduit runs during the synchronization process.

The Forms conduit sends newly distributed form designs to the handheld, and sends any new or changed records from the handheld to the PC.

At the end of the synchronization, if a HotSync Problem dialog box appears on the PC, you should view the HotSync Log in case the Pendragon Forms conduit is reporting a problem that prevents data from going to the PC. See Appendix B, *Troubleshooting*, page 452.





After synchronization, tap the Forms 4.0 icon on the handheld to see the form designs that have been sent from the PC.

To fill in a form, tap the name of the form, then tap the New button.
This creates a new record, that is, a new instance of filling in the form.

To fill in a field, tap in the answer part of the field, and then select or write your answer.

If a form has more than one screen, tap the Next button when you are ready to move to the next screen.

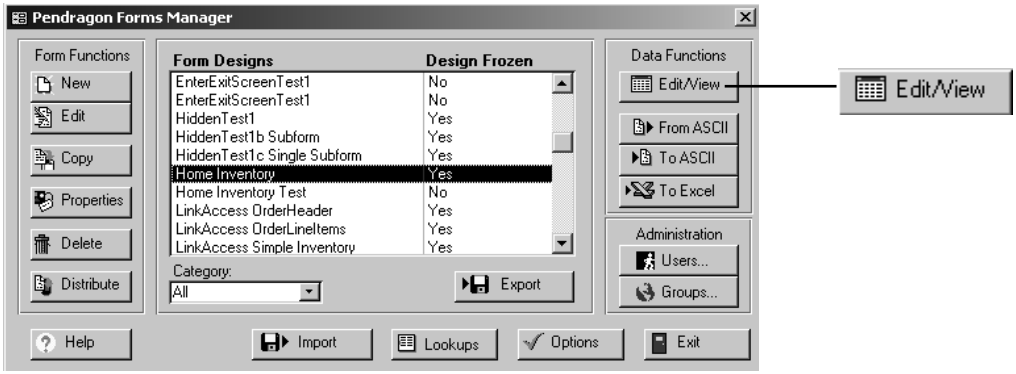
The Previous button takes you back to the previous screen.

If you are on the last field of the form, tapping the Next button will exit the record and return you to the main Forms screen.

You can also tap the End button to end the record and return to the Forms main menu.

To send your data from the handheld to the PC, synchronize the handheld.

To view your data on the PC, open the Forms Manager program. Click on the name of your form, and then click the Edit/View button.

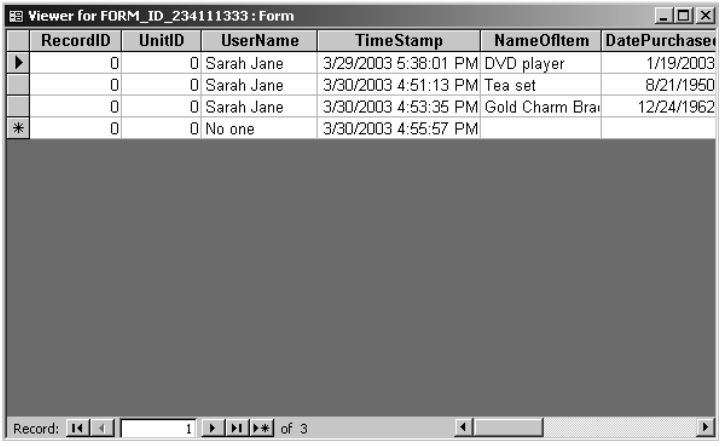


In the database table containing the records for your form, each field is a column in the database table, and each record is a separate row of the table.

Pendragon Forms adds four fields to the front of the database table, that the program uses internally: RecordID, UnitID, UserName and TimeStamp.

The Timestamp is the creation date and time of the record.
The UserName is the user name of the handheld device that most recently changed the record.

IMPORTANT: Never delete or change columns in the database table, or the form will not be able to synchronize to the database table.



3. Planning Your Data Collection System

Before you design a form in Pendragon Forms, it is a good idea to think about the entire data collection system that you are going to implement. You need to know the answers to the following questions in order to design a data collection system that works for your organization:

- Who will be using the forms?
- How many records can be stored on a handheld device?
- What are the limits of form designs?
- Do users need to share both form designs and records?
- Has synchronization been tested?
- How often should users synchronize?
- Who will be responsible for making backups to protect the data and the form designs?

This chapter looks at these questions, to show how the answers affect your form design and data collection system.

Who Will be Using the Forms?

It is important to think of the audience who will be using your forms on handheld devices. Instead of concentrating on making the data easy to analyze once it is on the PC, focus on making the form easy to use on a handheld device. If the handheld users find a form easy to use, they will be more likely to enter data correctly.

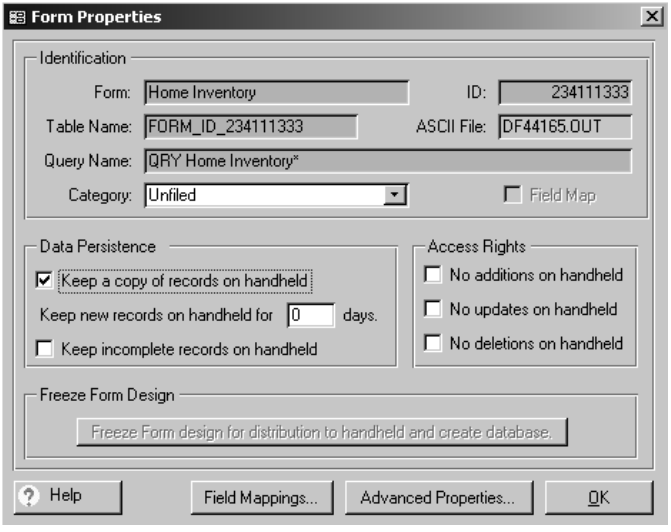
To help improve the accuracy of data entry, try to minimize the use of Text fields. If there is a question on your form for which there are several known responses, use a Popup List or a Lookup List field to let the handheld user select a response. The user will save time by not having to write text, and the data will be more accurate because it will not be prone to typographical errors.

How many records can be stored on a handheld device?

A handheld device has a limited amount of memory, and when you design your data collection system, it is important to think about how many records you want to keep on the handheld, and how to manage removing records from the handheld. If you remove records from the handheld on a regular basis, you will avoid exceeding the available memory on the handheld.

Data Persistence Options

The Form Properties window in the Pendragon Forms Manager gives you several Data Persistence options for removing records from the handheld. To access the Form Properties window, click the name of the form in the Forms Manager, and then click the Properties button.



The default Data Persistence option is that no checkboxes are checked. This means that after a successful synchronization, all records are removed from the handheld.

You can change the Data Persistence option to:

a) Keep a copy of records on the handheld indefinitely.

b) Keep records on the handheld for a limited time, such as 7 days or 30 days.

c) If you put a Completion Checkbox field on your form (see page 78), you can choose to Keep incomplete records on handheld. This means records stay on the handheld until the user checks the Completion Checkbox field to request removal of the record on the next synchronization.

To read more about the Form Properties, see Chapter 10, *Form Properties*, page 164.

How much space does Pendragon Forms require on the handheld?

The Pendragon Forms FORMS4.PRC program that is installed on the handheld takes up about 350 KB (kilobytes). This does not include any form designs or data.

A large form design may take up 35 KB.

The records in your form will take up the most space. A rough guide is that each field takes up 64 bytes on average, and so filling in one record of a 20-field form would be 20 x 64 = 1280 bytes.

If a 20-field form has 800 records, the total space used would be 1280 x 800 = 1,024,000 bytes or 1MB (megabyte).

To check how much space is being used by Pendragon Forms on the handheld, tap the Applications button (the House icon) on the handheld. Then tap the Menu button (the drop-down menu icon below the House icon). On the App menu, tap the Info menu option.

The Info screen on the handheld shows you how much free space is available on the handheld, and how much space Pendragon Forms 4.0 is taking up.

Storage Limit Per Form Design

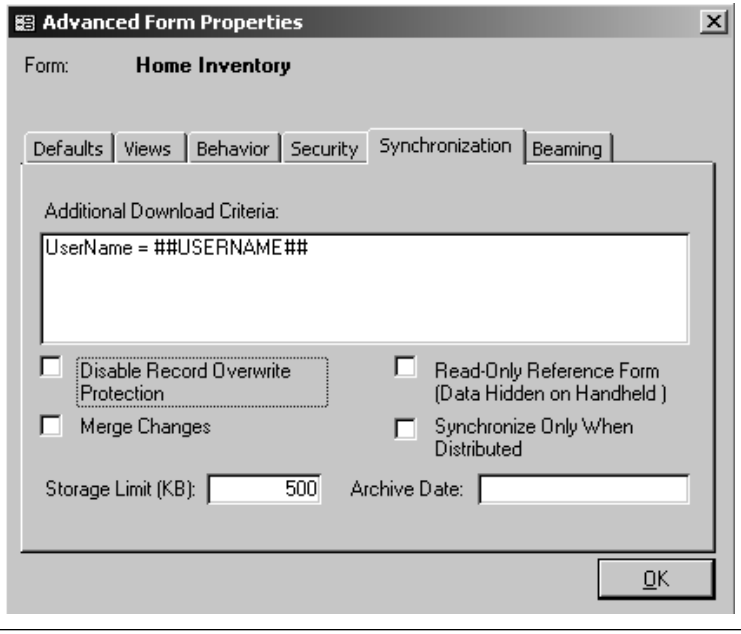
To prevent the handheld from being completely filled up with records, Pendragon Forms has a default Storage Limit per form design of 500KB (kilobytes). This means that by default, you can only maintain up to 500KB worth of records on the handheld per form design.
(Note: you can collect more than 500KB of new records on the handheld, but after synchronization only up to 500KB of records will be sent back to the handheld.)

If you have a lot of free space available on the handheld, you can choose to increase the Storage Limit for a particular form design, to store more than 500KB.

The Storage Limit is an Advanced Form Property. To access the Advanced Form Properties window, click the name of the form in the Forms Manager, then click the Properties button. In the Form Properties window, click the Advanced Properties button. Click the Synchronization tab to access the Storage Limit field.

The default value in the Storage Limit field is 500, which stands for 500KB. You can change this value to 1000, 1500 or higher as needed. Close the Advanced Form Properties window and the Form Properties window, and then synchronize the handheld to receive the increased number of records.

To learn more about other Advanced Form Properties that can be used to control the number of records on the handheld, see page 180.



Wireless device considerations

If you make an implementation decision to use wireless handheld devices instead of synchronizing via a HotSync cradle, it is important to note that the synchronization speed of a wireless device is not the same as a local synchronization. This means that if you put the same amount of data on a wireless device as on a handheld that is synchronizing locally, the wireless device may take longer to synchronize.

Cradle speeds:
Local serial sync = 56,000 bps (bits per second)
Local USB sync = 400,000 bps

Wireless speeds:
GSM phone = 9600 bps
GPRS (hi-speed GSM upgrade) = typical 32,000 bps; max 64,000 bps
CDMA 2000 phone = 144,000 bps

If the synchronization time is taking longer than you would like, you can consider the following:

a) Reduce the number of records that are synchronizing on the handheld. If there are records that the user does not need to keep on the handheld, remove them. See Data Persistence on page 165 and Additional Download Criteria on page 181 for options on how to select which records are removed.

b) If there is a form that is providing reference information that the user does not modify, you can switch off synchronizing just that form design. See Advanced Form Properties, page 188.

What are the Limits of Form Designs and Records?

Pendragon Forms has some limits that apply to the size of your form designs, and the size of the records that can be created.

The maximum number of fields that you can have on a form is 250 fields.

If you need to create a form with more than 250 fields, you can create two forms. To create an application that allows the user to start filling out one form and then jump to a second form to finish, consider a parent form and a single subform. See page 109 for information on single subforms.

There are other limits on the handheld and in the Microsoft Access database on the PC that may restrict you to fewer than 250 fields in your form design.

Microsoft Access has some limits on the size of form designs that can be viewed on the desktop. Pendragon form designs with a large number of Signature, Sketch, Image or Text fields (with more than 255 characters) may run into this limitation which will prevent the form design from being frozen.

There is a 64KB limit on the handheld for the actual size of the form design, including field names, field types and scripts. If you create a lot of MultiSelection Lists or Popup Lists with many items in each list, or you have a lot of scripts on your form, you may exceed this size limit for the form design. If you run into this problem, the form design will not be downloaded to the handheld. The solution in this case is to create smaller forms.

Finally, Microsoft Access has limitations on the size of a record that can be stored in a database table. If you have a lot of Text fields on your form, and the handheld user enters the maximum number of characters in each Text field, you may run into the problem of a record being too large to fit in the Access database. Records that exceed this limit will generate a "Record is too large" message during synchronization. In this case, the only solution is to delete or abbreviate text from the offending record.

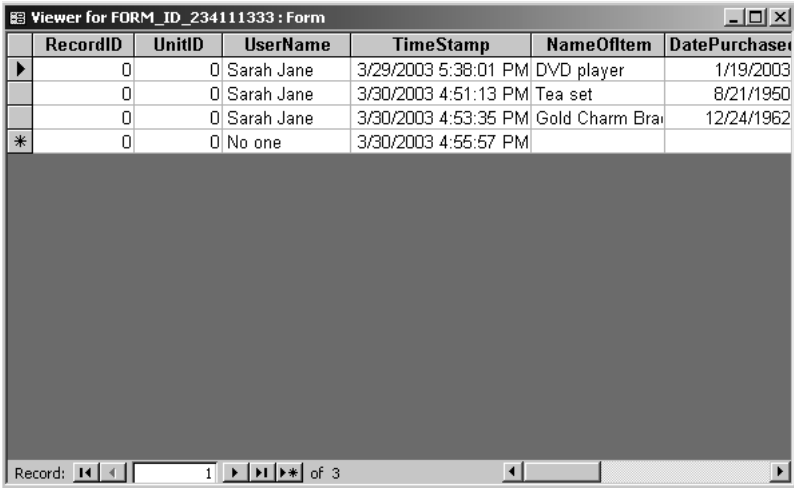
Do users need to share both form designs and records?

Pendragon Forms is optimized to facilitate users sharing the same form design, but not the same records. An example of this is a work order system in which work orders are assigned to various handheld users, who complete their assignments independently of each other.

In some instances, however, you may want handheld users to share records as well as sharing form designs. For example, a group of physicians may share the same patients, and would need the patient information to be available on each physician's handheld device.

By default, Pendragon Forms does two things to make it easy for separate handhelds to maintain separate records:

1. The default primary key that is created when a form is frozen consists of three fields: the UnitID, the handheld UserName and the creation Timestamp of the record. The primary key is unique for each record, and by including the handheld UserName in the default primary key, Pendragon Forms ensures that if two users were to create a record on their handhelds at exactly the same time (i.e. with the same Timestamp), their two records would still be considered different because each record would have a different UserName.
2. The default Advanced Form Property that determines which records from the PC are sent to the handheld, is called the Additional Download Criteria. The Additional Download Criteria is pre-set so that only the records assigned to a user are sent to that user's handheld device.



You can see the default primary key fields UnitID, UserName and Timestamp, when you click on a frozen form in the Forms Manager, and then click the Edit/View button.

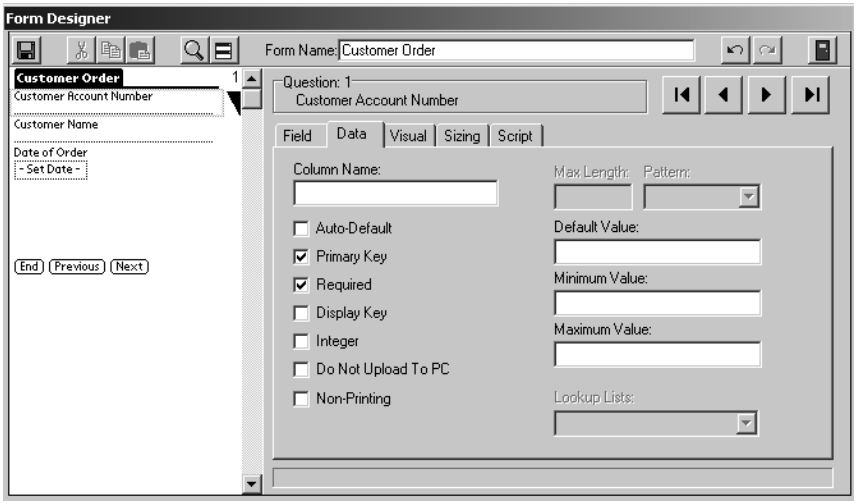
If you want users to be able to share records, here is what you will need to do to overcome the default settings that prevent the sharing of records:

1. Select your own primary key when you design your form, before freezing the form.

   With the default primary key (UnitID, UserName and Timestamp), if one user creates a record, the UserName of that user is assigned to the record. If the record is also on a second user's handheld, and that user changes the record, the UserName of the second user will be stored in the record. When both users synchronize, duplicate records will be created, because the primary keys of the two records will be different since the two UserNames are different.

   To avoid the problem of duplicate records, select your own primary key that does not depend on the UserName. The primary key has to be one or more fields that in combination will be different for every record. For instance, in the Customer Order form design shown below, the Customer Account Number is not unique if the same customer places more than one order. However if the Customer Account Number plus the Date of Order is unique for every order, then those two fields can be the primary key fields.

   To make a field a primary key, click the Data tab in the Forms Designer, and check the Primary Key checkbox. The Required checkbox is automatically checked as well, because primary key fields cannot be left blank. See Advanced Field Properties, page 155 for more information on primary keys.



2. Remove the Additional Download Criteria that causes records to be sent to a handheld only if the UserName of the record matches the UserName of the handheld.

   To access the Additional Download Criteria, click the name of the form in the Forms Manager, then click the Properties button, then click the Advanced Form Properties button. In the Advanced Form Properties window, click the Synchronization tab.

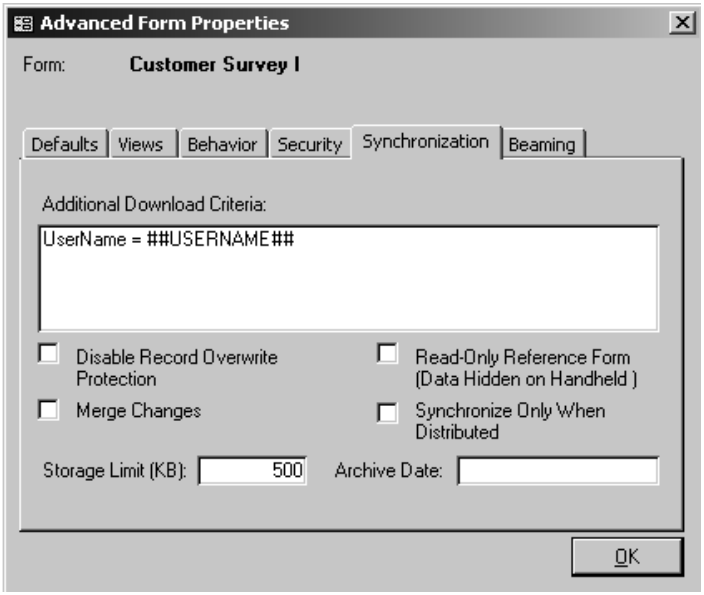
   The default Additional Download Criteria setting is:

   USERNAME = ##USERNAME##

   which means that the UserName field of the record has to match the Username of the handheld device for the record to be sent to the handheld.

   To allow all users to receive the record, delete the default download criteria.

   For further information on Additional Download Criteria, see page 181.



To allow users to receive a record no matter what the UserName, erase the default Additional Download Criteria so that the field is blank.

A final consideration when sharing records across handhelds is the order in which the handhelds will synchronize back to the PC. During synchronization of Pendragon Forms, new or changed records on the handheld overwrite the existing record on the PC. If two handhelds modify the same record, the first handheld to synchronize will upload its data to the PC, but then the second handheld to synchronize will overwrite the data from the first handheld. This can be a problem if the handheld with less-up-to-date information synchronizes last.

If users who change the same record are actually changing different fields of the record, it is possible to set an Advanced Form Property to merge changes. That way the first person who synchronizes will upload their changes to the PC, and then if the second person has changed different fields on the form, their changes will be merged into the record on the PC when they synchronize. See page 187 for information on merging changes. However, if the users change the same field of the same record, then the last user to synchronize will again overwrite the first, even with Merge Changes switched on.

If you do not want to risk one user accidently overwritng another's record, then you need to plan your form design so that users never modify the same record, and instead just create their own records. In the case of medical personnel sharing patient records, for example, you can create a parent form for storing the basic patient information, and a subform for storing the details of a patient visit. Each handheld user can access the parent form record but not modify it, and creates a separate subform record to log their observations when they see the patient. Since users are creating new subform records, they are not modifying the same record and will not overwrite each other. For information on using parent forms and subforms, see page 103.

Has synchronization been tested?

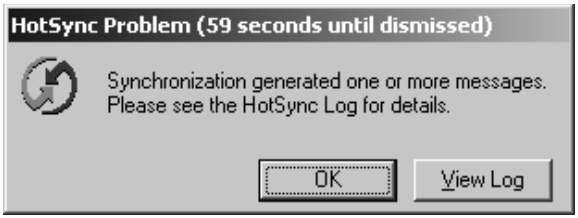
Putting a form design on a handheld device is only half of your data collection system. You need to make sure that records entered on the handheld can synchronize successfully to the Forms Manager database (or an external database) on the PC, before you deploy your application.

The Pendragon Forms conduit program runs during the HotSync data transfer process, and controls the sending of form designs and data between the Forms Manager database and the Forms application on the handheld.

If the Pendragon Forms conduit encounters a problem that prevents data from going to or from the handheld, the conduit will generate an error message in the HotSync Log. You will need to investigate and solve any synchronization problems before deploying your application.

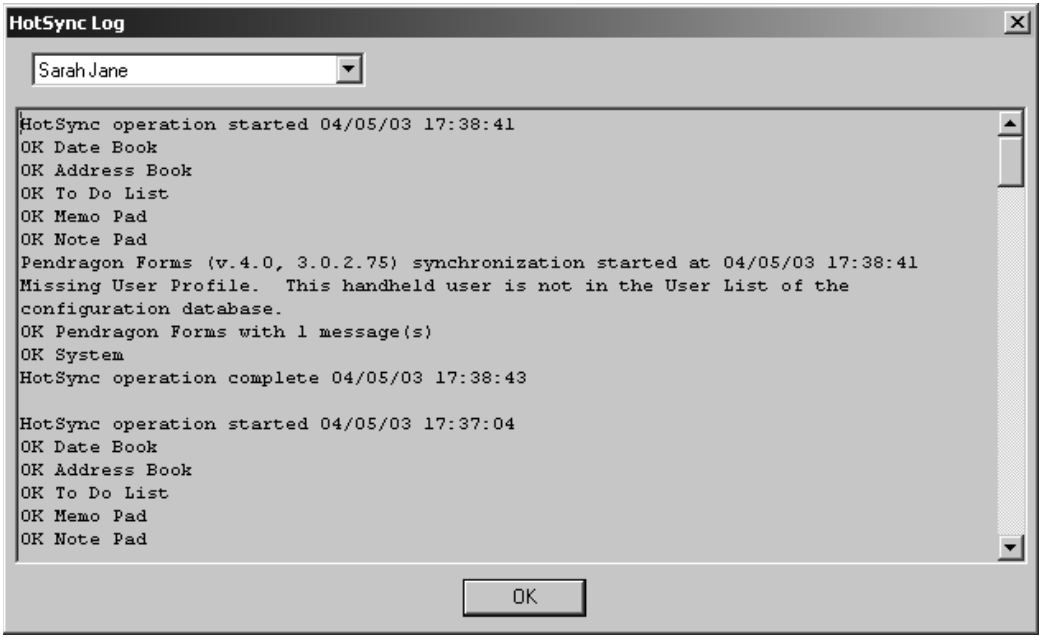
HotSync Error Messages

If an error occurs, the HotSync Manager will display a HotSync Problem dialog box on the PC to notify you. Click the View Log button to view the HotSync Log.



The HotSync Problem dialog box only stays visible on the PC for 60 seconds. If you are not at your desk to see the dialog box, you can manually check the HotSync Log to verify whether or not there was a problem during synchronization.

To manually check the HotSync Log, click the HotSync Manager icon on the PC (the red & blue arrows icon in the Windows Task tray), and choose View Log.



The HotSync Log lists the status of each application on the handheld during synchronization. The most recent synchronization is at the top of the HotSync Log screen.

The entry in the log that concerns Pendragon Forms starts with the line:
Pendragon Forms synchronization started at
and ends with the line
OK Pendragon Forms with 1 message(s)

If there are lines that appear in between the starting and ending lines, these are the Pendragon Forms error messages. In the picture above, the Forms error message is:
Missing User Profile. This handheld user is not in the User List of the configuration database.

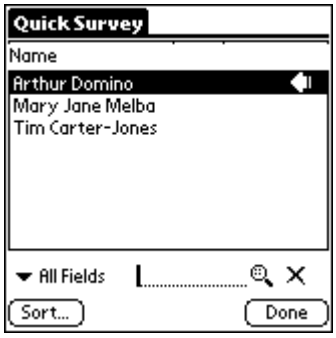
To see what this error message and other common HotSync error messages mean, see page 452.

Detecting problem records on the handheld

After synchronization, if there are any records on the handheld that could not be uploaded to the PC, these records will be marked with an arrow on the Review screen of the handheld.

To look at the records on the handheld, tap the name of the form on the handheld, then tap the Review button. The records that could not be uploaded to the PC will be marked with an arrow.

Check the HotSync Log to determine why the record could not be uploaded to the PC.
Do not collect any more data on the handheld until the problem is resolved.



How Often Should Users Synchronize?

It is recommended that users synchronize at least once a day if they are creating or modifying records on the handheld. The longer that they wait to synchronize, the higher the risk of losing data due to a mishap with the handheld device.

Pendragon Forms is stored in RAM on the handheld device, which means that losing battery power or accidentally dropping the device would cause a loss of your form designs and data. By synchronizing at least once a day, you will reduce the amount of data that is on the handheld but has not yet been backed up to the PC. Losing the handheld would mean recovering one day's worth of data collection, not weeks'. If you cannot risk losing a full day's worth of records, you should consider synchronizing more than once per day.

If you are going to be in an environment where you cannot synchronize once per day, you should consider using a handheld device that supports backing up data onto external media.
See pages 418 - 423.

Who is responsible for making backups?

The Pendragon Forms Manager database on the PC is where all of your form designs and data are stored. If you lose everything on your handheld device and you still have the database on the PC, you can recover all of your form designs, and all data up to the last time you synchronized.

Warning: The handheld is NOT a backup for the data on the PC!

If you lose the Pendragon Forms Manager database on the PC but you still have Pendragon Forms on the handheld, you will NOT be able to synchronize your forms just by re-installing Pendragon Forms from the CD-ROM. This is because each form design has a unique Form ID#, and there needs to be a match between the Form ID# of the form on the handheld, and the Form ID# of a form design in the database in order to synchronize.

As part of your data collection process, you need to backup the Pendragon Forms Manager database regularly, and even daily. If you are going to rely on electronic forms instead of paper forms, you need to take steps to protect your only copy of your data.

The Pendragon Forms Manager database is called:

- Forms3.mdb if you have Microsoft Access 97 (or if you do not have Access at all).
- Forms32k.mdb if you have Microsoft Access 2000 or Access XP (Access 2002).

The Forms Manager database is typically stored in the C:\Program Files\Forms3 folder.

Make a backup copy of the Forms database regularly, even daily, and store the backup on a zip disk or CD-ROM that is separate from the hard drive where Forms is installed.

Refer to page 416 for additional options for making backups of your form designs and data. See page 417 for information on recovering form designs. See pages 418-423 for information on performing backups on the handheld using external media.

4. Managing Form Designs

Your form designs may need to change over time. When you first create a form and send it to the handheld to test, you may discover that you need to change the form design in one way or another in order to make the form more user-friendly for the handheld users.

This chapter looks at the options available for changing form designs and organizing form designs within the Forms Manager.

Making Changes to a Frozen Form

After a form design has been frozen, there are some elements of the form design that can be changed, and some that cannot.

Items that can be changed after a form has been frozen include:

- Form names.
- Field names.
- Selection of which Lookup List to reference in a Lookup List field.
- Selection of which form name to reference in a Subform or Single Subform field.
- Some Advanced Field Properties. (Unavailable field properties will be grayed out.)
- Form Properties and Advanced Form Properties.
- Scripts.
- Selection of which Lookup List to reference in a Lookup List field.

If you make a change to a form, the form must be re-distributed and sent to the handheld in order for the changes to take effect. To re-distribute a form, click on the name of the form in the Forms Manager, then click the Distribute button. Then synchronize the handheld to receive the changes.

Things that cannot be changed after a form has been frozen include:

- Adding or deleting fields from the form.
- Changing the items in a Popup List or MultiSelection List.
- Changing the field type used in a given field.

If you need to change one of these, you can copy the form design and modify the copy.

Copying a Form Design

You may need to copy a form design if:

a. You want to use one form as the starting point for the design of a different form.

b. You need to modify a form which is frozen. If you copy a form which is frozen, the copy will not be frozen, and can be modified as necessary. When you make a copy of a form, only the form design is copied, not the data associated with the original form.

To Copy a Form:

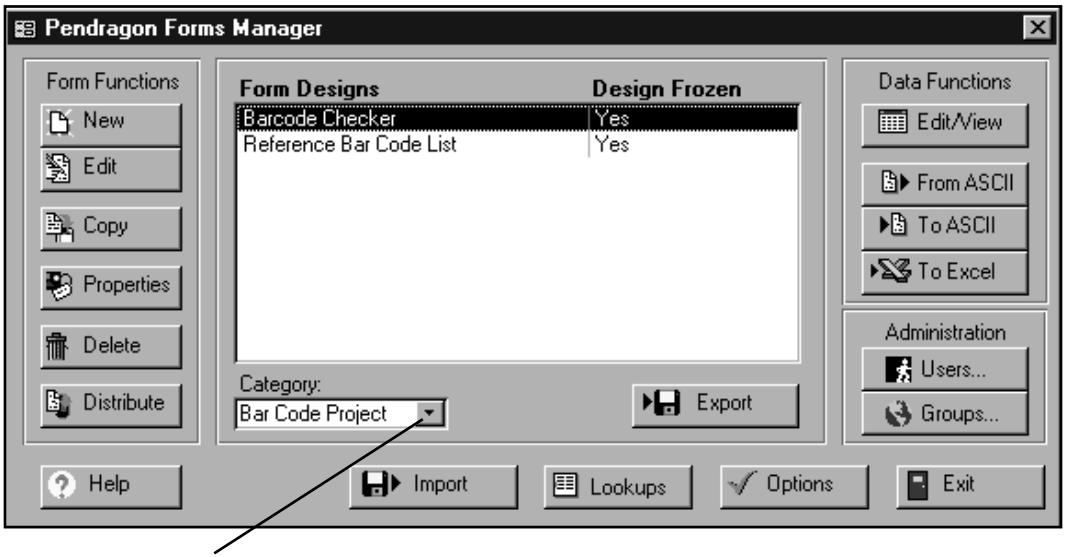
1. Click on the name of the form, then click the Copy button. You will be asked to confirm that you want to make a new copy of the selected form. Click Yes.
2. The name of the copy will be the name of the original form plus an asterisk (*) at the end of the name. Click on the Edit button to change the name of the new form, as well as to change, add or delete fields on the form.
3. When the copy is created, the database column names will remain the same as in the original form design. If you need to import the data from the original form into the copied form, you can do so by freezing the copy, then clicking on the Import button (see page 203).

If you encounter any problems when trying to freeze a copied form, see Appendix B, *Troubleshooting*, page 439.

Tip:
Avoid having multiple form designs with exactly the same name. If you are copying a form to modify an existing form, and you plan to use the same form name, rename your old form immediately to avoid confusion. Alternatively, consider using version numbers in your form designs, e.g.: Inspection v1.0, Inspection v2.0 etc.

Organizing Form Designs into Categories

If you are working on a project that involves several form designs, it may be useful to group the forms into one category for ease of use.



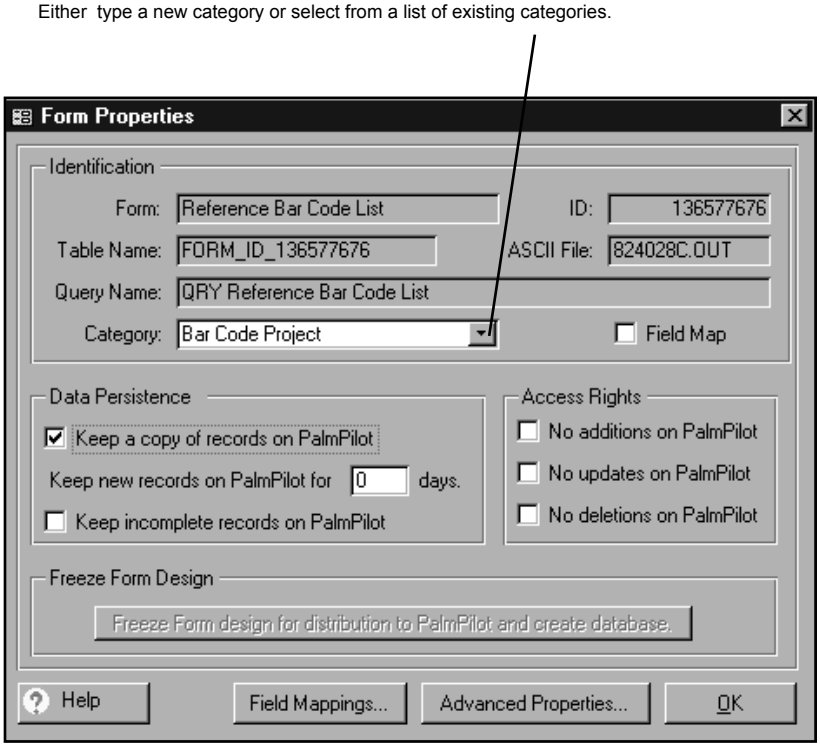
To assign a form design to a category:

1. Click the name of a form, then click the Properties window. (See picture on next page.)
2. In the Category field, type the name of a new category. Or, if you have already created a category, click the arrow to select that category from the list.

If you are viewing a category and then you click the New button to create a new form design, the new form will not appear in the list until you assign the form to the category.

The category **All** allows you to view all form designs that you have created, regardless of category.

The **Samples** category is a special category containing Pendragon Forms sample form designs. Form designs in the Samples category do not appear in the list when you choose the All category.



Recycle Bin

The Recycle Bin is a special category. When you delete a form design from the PC, the form is re-assigned to the Recycle Bin category. If the form design is still on the handheld, the next time you synchronize, data will still be sent to the PC and then the form will be removed from the handheld.

If you need to retrieve a form design from the Recycle Bin, view the Recycle Bin category, then click the name of the form and click the Properties button. Assign the form to a different category (for example the Unfiled category).

A form on the handheld will not synchronize unless the Form ID# on the handheld matches the Form ID# in the database. The Recycle Bin provides some protection from accidentally deleting a form from the PC that is still being used on the handheld. Only if you are certain that a form design is not on the handheld should you delete form designs from the Recycle Bin category. To delete a form and its data from the Recycle Bin, view the Recycle Bin category, then click the name of the form and click the Delete button in the Forms Manager.

Printing a Form Design

As you design a form, you may want to print the form design so that you can see the order of the fields on the form.

To Print a Form Design:

1. Click on the name of the form.
2. Click the File menu. Select a report option:
   - Form Design Report displays 9 fields per page.
   - Detailed Form Design Report displays 2 fields per page and includes scripts. If you are using this option, you may want to set your printer properties to print 2 pages per paper page, so that you reduce the amount of paper that is used.
   - Screen Preview Report displays 4 fields per page and shows what the handheld screen will look like in Field View (displaying one record at a time.)
3. A print preview window will appear. You can click the < and > arrows at the bottom of the window to move from page to page. Press CTRL P to print the report.

Deleting a Form from the PC

In order to synchronize, the Form ID# of a form on the handheld must exactly match the Form ID# of a form in the Pendragon Forms Manager database. If you permanently delete a form from the database on the PC, you will lose your ability to synchronize that form, even if the form is still on the handheld.

Before deleting any form designs, refer to *How to Delete Forms*, in the chapter on Synchronization Rules, page 42.

If you delete a form design from the PC by accident, refer to the Recycle Bin, page 34.

5. Synchronization Rules

Pendragon Forms 4.0 has bidirectional synchronization, meaning that during a HotSync data transfer, records which are created on the handheld will be sent to the PC, and records which are entered on the PC will be sent to the handheld. The program is designed to be centrally managed on the PC, which means that the selection of which forms and data go to which handheld is controlled on the PC.

The Synchronization Process

During a HotSync data transfer, the Pendragon Forms conduit executes the following sequence:

1. All form designs, records and Lookup Lists are uploaded from the handheld into the desktop's memory.
2. The Forms32k.mdb (or Forms3.mdb if you have Access 97) database file is opened and the handheld user is verified as an active user, authorized to synchronize Pendragon Forms.
3. For each form which should be synchronized with the handheld:
   - The database on the desktop is opened. (May be an external database.)
   - Changes are uploaded to the database.
     New records from the handheld are inserted into the database.
     Changed records from the handheld will update existing database records.
     (If a Changed record on the handheld cannot find an existing record on the desktop, an insert into the database will be performed.)
   - All records on the handheld are marked for deletion, except records which were unable to be placed into the database.
   - If the form design is New or has been modified and re-distributed, it is marked for installation to the handheld.
   - A query is run to determine which records should be sent to the handheld.
     Records are selected based on form properties and download criteria.
   - Forms which are to be deleted, along with their records, are marked for deletion on the handheld.
4. The Last HotSync date is updated in the User List on the desktop.
5. Deleted form designs and records are removed from the handheld. Form designs, records and Lookup Lists are sent from the desktop to the handheld.

Users and User Groups

The Pendragon Forms Manager maintains a list of active handheld units which are to be synchronized during a HotSync data transfer.

When the Pendragon Forms Manager is first installed on the PC or server, the installation process prompts the user to enter a handheld user name, and this user name is added to the User list.

If a multi-user license for Pendragon Forms is activated, additional users can be added by clicking on the **Users** button in the Pendragon Forms Manager.

Once a handheld unit has been listed in the Users list, the **Groups** button is used to associate handheld users with form designs.

Through the use of Users and User Groups, it is possible to centrally select a form to be sent to several handhelds. Each handheld in the group will receive the form whenever next that handheld performs a HotSync data transfer.

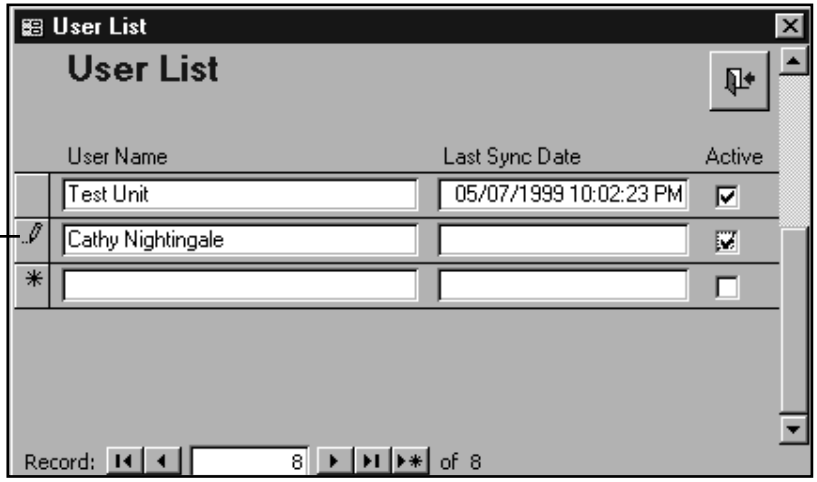
It is also possible to centrally select a form for removal from various handhelds, by removing the form from a User Group. The next time that the handhelds in that group synchronize, the form will be removed.

Details on Users and User Groups are explained on the pages which follow.

Adding Handheld Users to the User List

To add a user:

1. Type the handheld user name in the User Name field. If you do not know the handheld user name, tap the HotSync icon on the handheld, and the user name will be displayed in the upper right corner of the handheld screen. Use the same upper and lower case letters and spaces in the Pendragon Forms User List as you see on the handheld.
2. Check the Active box to make the user active. Close the User List window.
3. Add the user to a User Group - either the Default Group or another group. (See next page.)



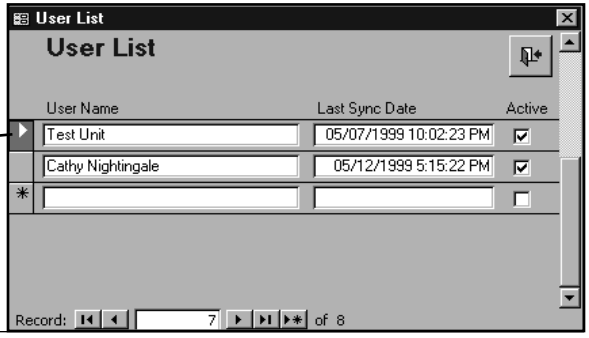
To save a record, click the pencil icon until it changes to a solid black triangle. Or you can press TAB until the cursor moves to the next row.

Deleting Users

If a handheld unit is no longer being used, you can either un-check the Active box to make the user inactive, or you can choose to delete the user from the list of users.

To delete a user:

1. Click to the left of a row to highlight that row.
2. Press the Delete button on the keyboard.



Creating User Groups

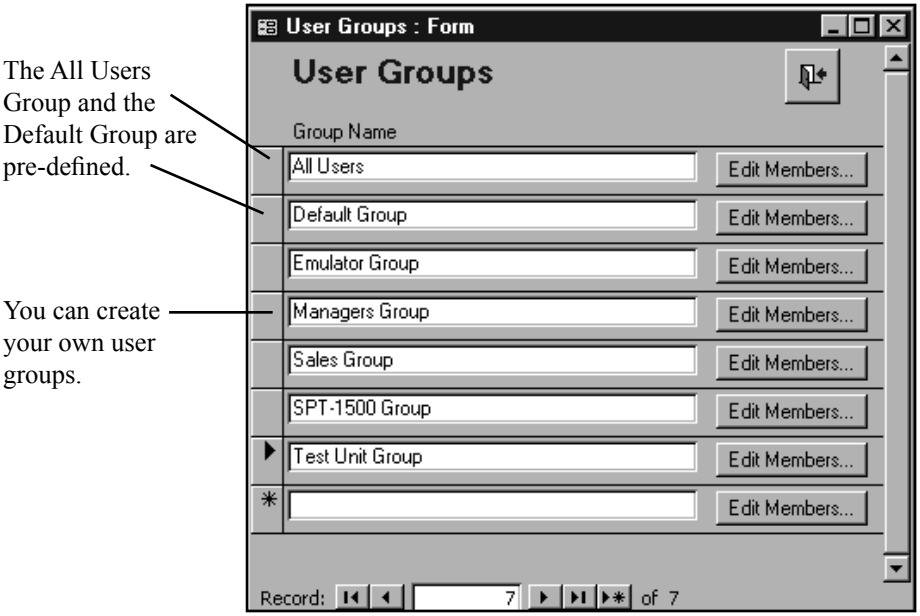
There are two special user groups:

- **Default Group**
  When you click the Distribute button to send a form to the handheld, if the form is not yet assigned to a user group, the form is added to the Default Group. Handheld users who are in the Default Group will receive the form the next time they synchronize.

  If you are using Pendragon Forms in a single-user capacity, you do not need to create any other User Groups. When you first install Pendragon Forms, you are prompted to enter a handheld user name. This user name is automatically added to the Default Group.

  If you are using Pendragon Forms in a multi-user capacity, you can add all of your users to the Default Group if everyone uses the same forms. Or you can create your own groups if you want to assign different forms to different groups of users.

- **All Users Group**
  The All Users Group is not used at this time.



To create a new user group:

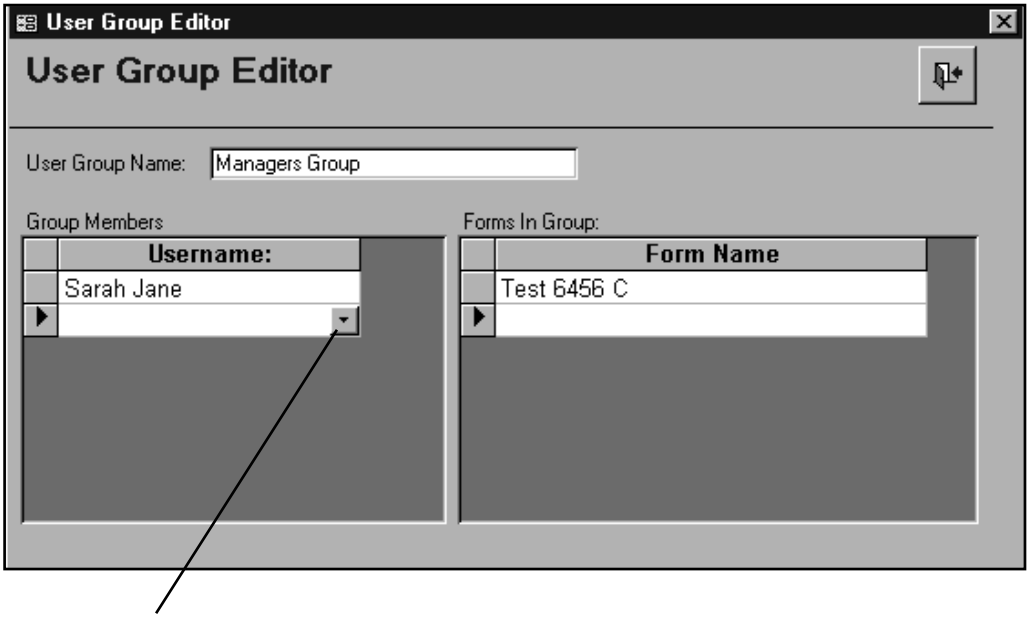
1. Click in an empty row and type a name for the user group.
2. Click the Edit Members button to select which users belong to the user group, and which forms will be sent to this group. (See next page.)

Adding users and forms to a User Group

Once you have created a User Group, you can select which users belong to this group, and which forms members of the group will receive.

To add users and forms to a User Group:

1. Click the Groups button in the Forms Manager, then click the Edit Members button for a selected group.



2. To add a user to this group, click the arrow in a blank row of the Username list to select a user. Only users who have been added to the User list can be selected for membership in a group.
3. To add a form for this group, click the arrow in a blank row of the Form Name list to select a form. Only forms which are frozen and have been distributed will appear in the list.

To delete a user or a form from a group:

1. Click in the gray cell to the left of the User Name or Form Name, to select that row.
2. Press the Delete key on the keyboard.

How User Groups affect Synchronization of Form Designs

During a HotSync data transfer, the Pendragon Forms conduit program checks the following:

Is the User listed as Active in the User List?
If a handheld unit is not listed as active in the User List, then Pendragon Forms will not synchronize during the HotSync data transfer process.

Which form designs should be added to the handheld?
If a new form is distributed and added to a user group, then all handheld units in that user group will receive the new form.

Which form designs should be updated on the handheld?
If a form which is already in a user group is modified (for example, by changing field names or scripts), then the form will need to be re-distributed in order to be updated on the handheld. When the handheld synchronizes, the conduit will compare the last HotSync date with the date of re-distribution of the form. If the last HotSync date is before the re-distribution date, then the updated form design will be sent to the handheld.

To re-distribute a form, click on the name of the form and then click the Distribute button.

Which form designs should be removed from the Handheld?
If a form is deleted from a user group, then when handheld users in that group perform a HotSync data transfer, any records in that form on the handheld are first sent to the database, and then both the form design and the records for that form are removed from the handheld.

WARNING: If a form is deleted from the database on the PC, handheld units will not have anywhere to send records, and consequently neither the form design nor the records for that form will be synchronized or removed from the handheld. If the form and its data on the handheld is not needed, the form can be manually deleted from the handheld. If the data is needed, it may be possible to retrieve the form design (see page 417) to retrieve the data. See page 42 for the proper procedure for deleting forms.

How to Delete Forms

The following is the proper sequence for deleting forms from the handheld:

1. In the Pendragon Forms Manager, click on the Groups button, then click the Edit Members button of the user group containing the form to be deleted.
   - The Default Group contains your form designs if you have not created any groups.

2. In the User Group Editor, click in the gray cell to the left of the form name, then press the Delete button on the keyboard to delete the form design from the group.

3. Wait until each handheld has had an opportunity to perform a HotSync data transfer. During each synchronization, records for the form will be sent to the PC, and then both the form design and the associated records will be removed from the handheld.

   NOTE: In a multi-user scenario it may take several days before each handheld user has had an opportunity to perform a HotSync.

4. After each handheld has had an opportunity to synchronize, you can either:
   - Keep the form and its data in the Pendragon Forms database.
   - Delete both the form design and its data by clicking on the name of the form in the Forms Manager, then clicking the Delete button. Deleting the form design will re-assign the form to the Recycle Bin category (see page 34). You may want to wait a while before deleting the form design from the Recycle Bin, in the event that there is a handheld user who is still entering data in the form.

Troubleshooting Tips on Deleting forms

- If you delete a form manually from the handheld and the form returns after a HotSync data transfer, you may want to check that the form has been removed from the Default user group and any other user groups to which your handheld unit belongs.

- If you delete a form from the PC by clicking the Delete button in the Forms Manager, but you still have new records on the handheld, the records will be able to synchronize to the PC only as long as the form design remains in the Recycle Bin (see page 34). If you delete a form from the Recycle Bin, you will have to attempt to retrieve the form design first before you can retrieve the data from the handheld. See page 417.

Limiting the number of records on the Handheld

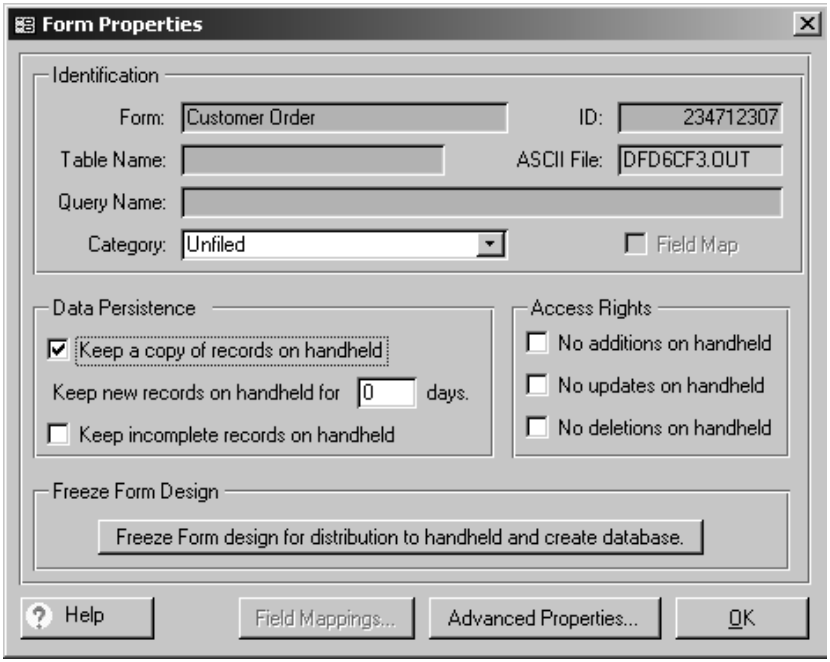
The database on the PC can store many more records than the handheld. During the synchronization process, the database is queried to determine which records should be sent to the handheld. Form Properties and Advanced Form Properties offer several ways to limit the number of records which are kept on the handheld, as described here.

Data Persistence

Data Persistence options on the Form Properties window are the easiest way to limit the number of records that stay on the handheld. You can choose to:

- Remove all records from the handheld during synchronization.
- Keep a copy of records on the handheld.
- Keep records on the handheld for a certain number of days.
- Keep imcomplete records on the handheld. (Requires a Completion Checkbox field on the form.)

See page 165 for information on how to set Data Persistence options.



The Advanced Form Properties window has more options for limiting the number of records on the handheld:

Storage Limit

There is a built-in storage limit of 500KB for each form design, meaning that up to 500KB of records for a given form will be sent to the handheld. If you need to keep a large number of records on the handheld, you can increase the Storage Limit - see page 189.

Archive Date

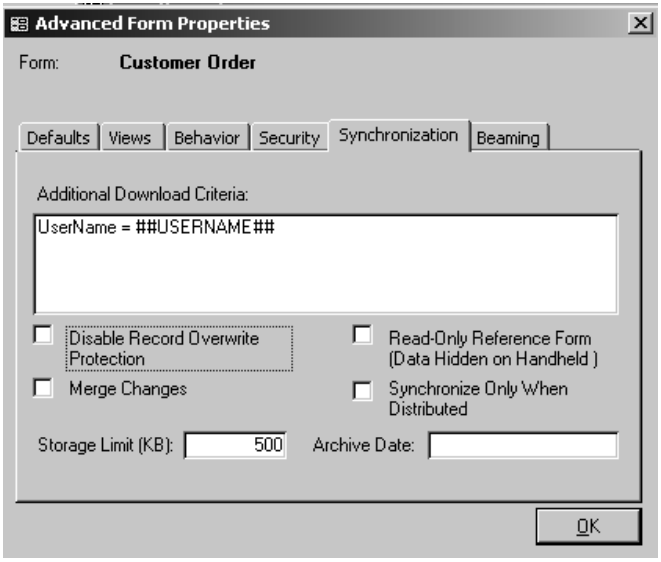
If you do not want to receive the earliest records on the handheld, you can periodically set an Archive Date. Records before the Archive Date will not be placed on the handheld. See page 189 for information on how to set an Archive Date.

Additional Download Criteria

Additional Download Criteria lets you specify criteria for selecting which records are sent to the handheld. The default of UserName = ##USERNAME## means that records must be assigned to a handheld user to be sent to that user's handheld.

If you are linking to an external database, you will need to specify Additional Download Criteria to choose which records from your database are sent to the handheld.

See page 181 for more information on Additional Download Criteria.



Switching Off Synchronizing Forms

If you don't want to synchronize Pendragon Forms every time you perform a HotSync data transfer, you can use the HotSync Manager program to switch on or off synchronizing Pendragon Forms.

To switch on or off synchronizing Forms:

1. Click the HotSync Manager icon (red & blue arrows icon in the Windows task tray), and choose Custom.
2. In the Custom window, select your handheld user name.
3. In the list of handheld applications, click on Pendragon Forms to select it.
4. Click the Change button.
    - Select the Do Nothing option to turn off synchronizing Forms on the next HotSync data transfer only.
    - Check the Set as Default box if you want to switch off synchronizing Forms indefinitely.
    - Select the Synchronize option to return to synchronizing Forms.

IMPORTANT:
In order to backup data that is on the handheld, you must set Forms to synchronize.

Switching off Synchronizing Only One Form Design

If you have a form that is for reference purposes only, that handheld users do not add to or update, you can choose to set the form to Synchronize Only When Distributed. This speeds up synchronization, as the form will be ignored during synchronization unless the form has been re-distributed. For information on setting this Advanced Form Property, see page 188.

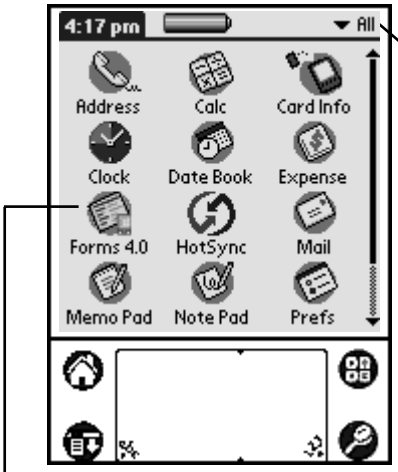
IMPORTANT:
If users are adding records or modifying records of a form, you should not switch on Synchronize Only When Distributed. Otherwise, records on the handheld will not be backed up.

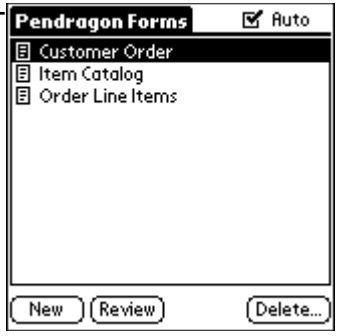
6. Using Forms on the Handheld

The Forms Icon

When you tap the Applications button (the House icon on the handheld), you should see a Forms 4.0 icon.

Tapping the Forms icon runs the Pendragon Forms program on the handheld.





Troubleshooting Tips

If you do not see the Forms icon on the handheld, first check that you are viewing All applications. Tap the arrow in the upper right corner of the Applications screen, and select All.

If you still do not see the Forms icon on the Applications screen, you will need to install the Forms program from the PC.

On the PC, click Start...Programs...
Pendragon Forms...
Install Forms 4.0 on Handheld.

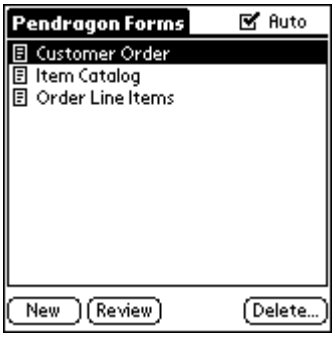
A window will be displayed for you to select which handheld to install Forms on. Select the handheld user name, then click the Done button.

Synchronize the handheld to install the Forms program on the handheld.

Once the Forms icon is on the handheld, it will take another synchronization to receive any form designs.

The Forms List (or Pendragon Forms Main Menu)

When you tap the Forms icon, a list of forms that have been sent to the handheld is displayed. This screen is called the Forms List, and is the Main Menu screen for Pendragon Forms.



Entering New Records

Each instance of filling in a form creates a record.

To create a new record on the handheld:

1. Tap the name of a form.
2. Tap the **New** button.

There are three possible ways to enter new records on a form:

1. Layout View - displays several fields per screen.
   The layout of each screen is created by the designer of the form on the PC.
2. Field View - displays one field at a time.
   The field name is in the top half of the screen, and the handheld user enters a response in the bottom half of the screen.
3. Record View - displays eleven fields at a time in a two-column format.
   The left-hand column displays the field name, and the right-hand column displays the response that the user enters.

The person who created the form design can set an Advanced Forms Property to select which view will be available to the handheld users. See pages 50 and 169 for more information.

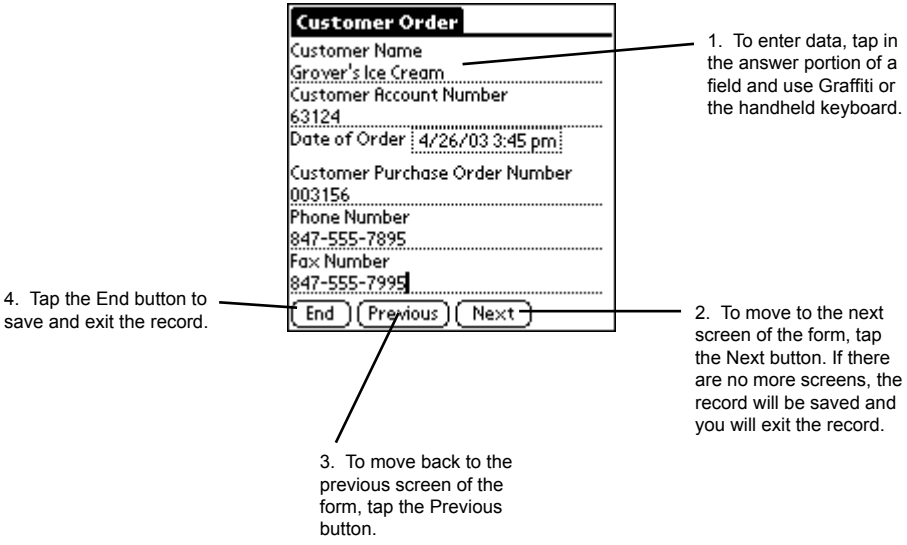
Layout View

New in Forms 4.0.
Layout View allows the designer of the form to decide how many fields are displayed per screen and how much space each field occupies on the screen.

Handheld users can tap in the answer area of a field to write the answer for that particular field.

Tap the **Next** button to move to the next screen of the form, or tap the **Previous** button to move to the previous screen of the form. The **End** button saves the record and exits the form.

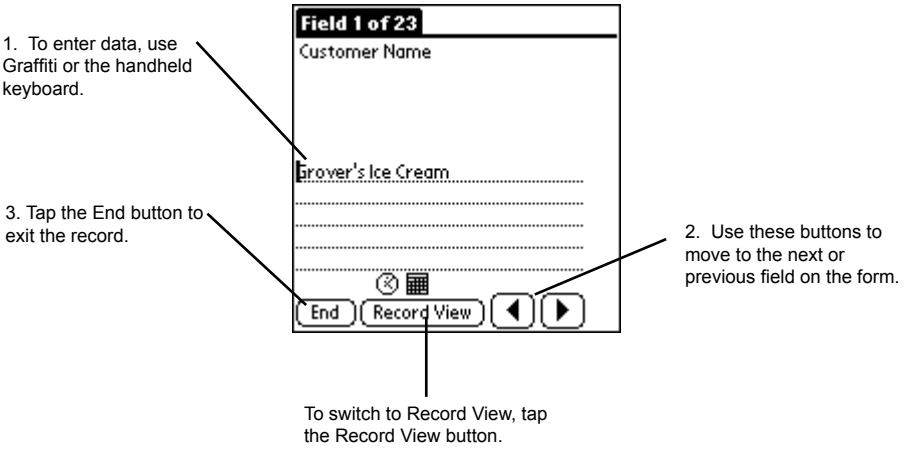
In Forms 4.0, Layout View is the default for creating new records and reviewing existing records.



After a form has been frozen and sent to the handheld, the designer of the form can modify the layout of the form if needed. Changes to the layout might include making a field start on a new screen, changing the question or answer font to bold and or large font, or providing more space for an answer in a Text field such as a Comment field. For the layout changes to take effect, re-distribute the form and synchronize the handhelds.

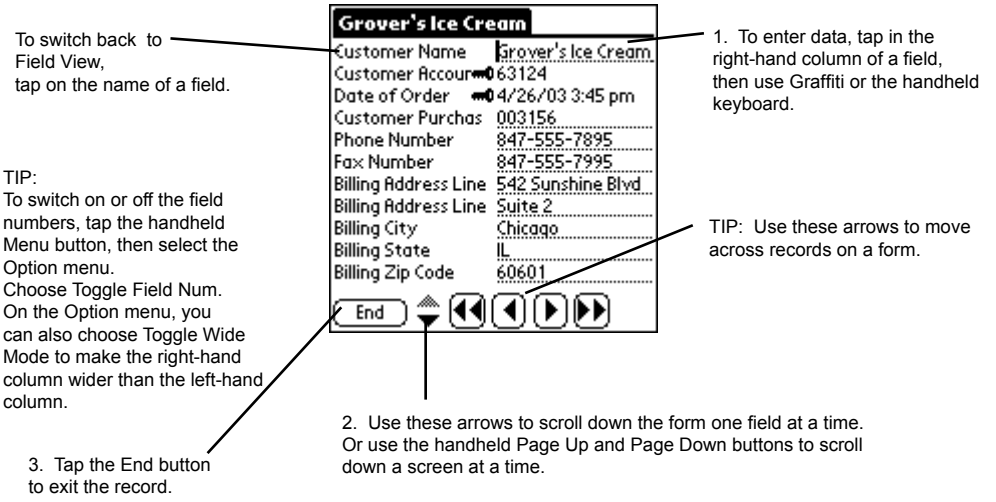
Field View

Field View displays only one field at a time on screen.
Right and Left arrow buttons allow the user to move to the next or previous field on the form.



Record View

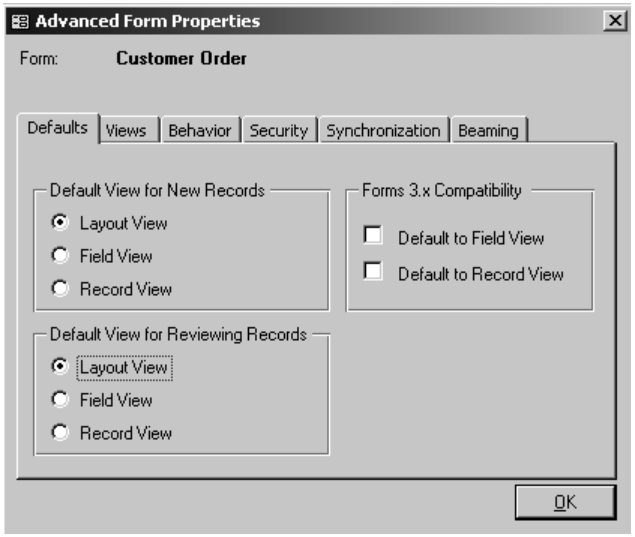
Record View is a two-column format that displays field names in the left-hand column and responses in the right-hand column. An entire field name may not be visible. The handheld user can tap in the right-hand column to enter a response for a given field.



Changing the Default View

In Forms 4.0, an Advanced Form Property sets the default view that users will see for new records and for reviewing existing records. To access the Advanced Form Properties window on the PC, click the name of the form in the Forms Manager, then click the Properties button, then click the Advanced Properties button.

On the Defaults tab of the Advanced Form Properties window, select the default view for New Records, and the default view for Reviewing Records. Close the Advanced Form Properties window and the Form Properties window. Then re-distribute the form and synchronize for the change to take effect.



Earlier version of Pendragon Forms had a 'Toggle Default View' option accessible via the handheld Menu button, that let the user choose whether he/she wanted to enter new records in Field View or Record View. This option is only available on forms that have not been distributed using Forms 4.0. In Forms 4.0, the default views are set in the Forms Manager on the PC, as described above.

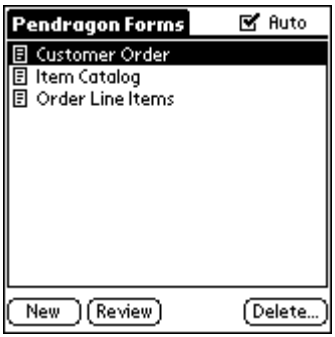
Using the AutoNavigate Feature

The AutoNavigate (Auto) checkbox appears in the upper right corner of the Forms List screen.

AutoNavigate is switched on by default. AutoNavigate affects Field View and Layout view in different ways, as described below. Record View is not affected by AutoNavigate.

To switch off AutoNavigate, un-check the Auto checkbox in the Forms List.

If you want to switch off AutoNavigate permanently for a given form, you can set the Advanced Form Property of Disable AutoNavigation. See page 175.



Effect of AutoNavigate on Field View

AutoNavigate has the most impact if you are using Field View for entering new records.

When AutoNavigate is switched on, and you are in Field View, making a selection in certain fields automatically advances you to the next field on the form.
Popup Lists, Lookup Lists, Yes/No Checkboxes, Option 1 of 5, Date, Date & Time and bar code Text fields will advance you to the next field on the form if AutoNavigate is switched on.

If the next field on the form is a Popup List, Lookup List, Date or Date & Time field, then the list or calendar is automatically displayed if the record is a new record. If you review an existing record, selection fields will not automatically be displayed. This enables the existing contents of the field to be reviewed before the handheld user decides whether to make a change.

Effect of AutoNavigate on Layout View

AutoNavigate has a limited effect in Layout View. If a selection field is the last field on a screen, making a selection will automatically advance the user to the next screen.

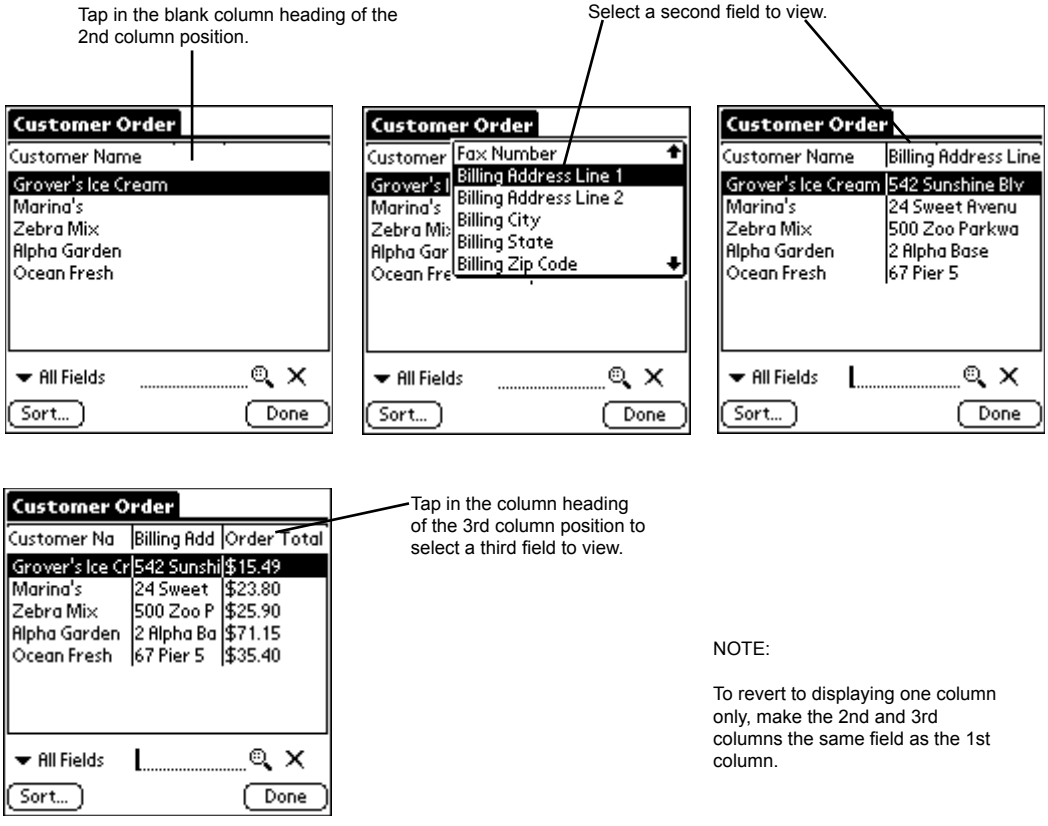
AutoNavigate does not automatically pop up any lists or calendars in Layout View.

Reviewing Records on the Handheld

To modify an existing record, you need to review the records on the handheld and select the record that you want to modify. Records created on the PC and downloaded to the handheld for completion are considered existing records.

To review records on the handheld:

1. Tap on the name of a form to highlight it.
2. Tap the Review button. A list of existing records for that form will be displayed. The Display Key field (typically the first field) of each record is shown on screen.
3. To determine which record to select, you can display up to two additional fields by tapping in the second and third column heading positions and selecting a field name.
4. Tap on a record to select the record and make changes.

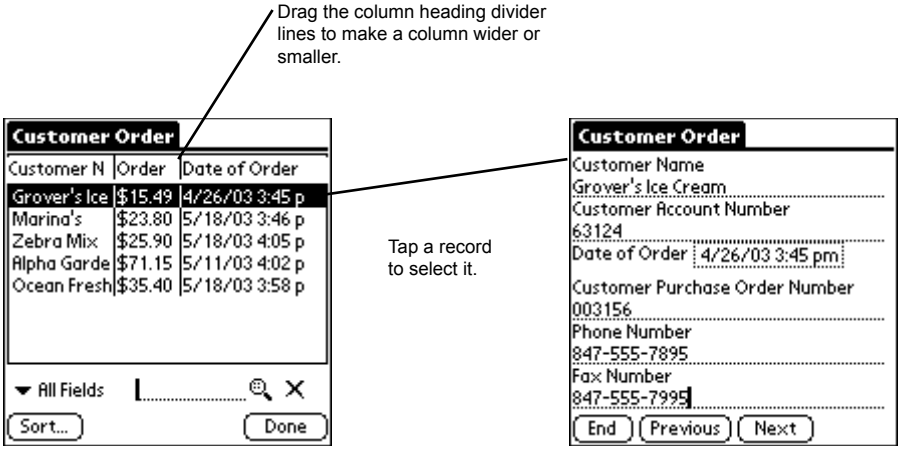


NOTE:

To revert to displaying one column only, make the 2nd and 3rd columns the same field as the 1st column.

On the review screen, you can drag the column heading divider lines to make a column wider or smaller.

Tap a record to select it and view the record in detail.

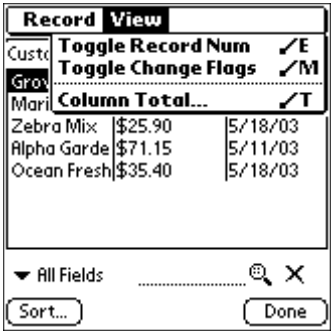


If there are more records than you can see on the Review screen, you can use the arrow button in the lower right corner of the list of records to scroll down. Or use the Page Up and Page Down buttons on the handheld to move up or down a page at a time.

Quick Sum and Average

From the list of records, there is a quick way to view the sum of all the records for one column of data.

1. Display the column to be added as the the second column in the records list.
2. Tap the handheld Menu button (the drop-down menu icon below the House icon), and select View...Column Total. The selected field is added up across all records. The total number of records in the form (Count) is also displayed, as well as the average of the values in the selected field.
   NOTE: the sum, average and count are across all currently filtered records.



Password-Protecting a Form Design

You can password-protect a form design so that the handheld user has to enter a password to access the form on the handheld. Once the password is entered, the handheld user can access the form for as long as Pendragon Forms is the active application and the handheld device remains powered up. If the user switches applications or if the handheld device is powered off, the user will need to enter the password the next time the form is accessed again.

Setting a password on a form design is an Advanced Form Property. See page 180 for details.

Warning: Password-protecting a form design does not encrypt the data within the form. This means that a person with advanced knowledge of the PalmOS may be able to access the data.

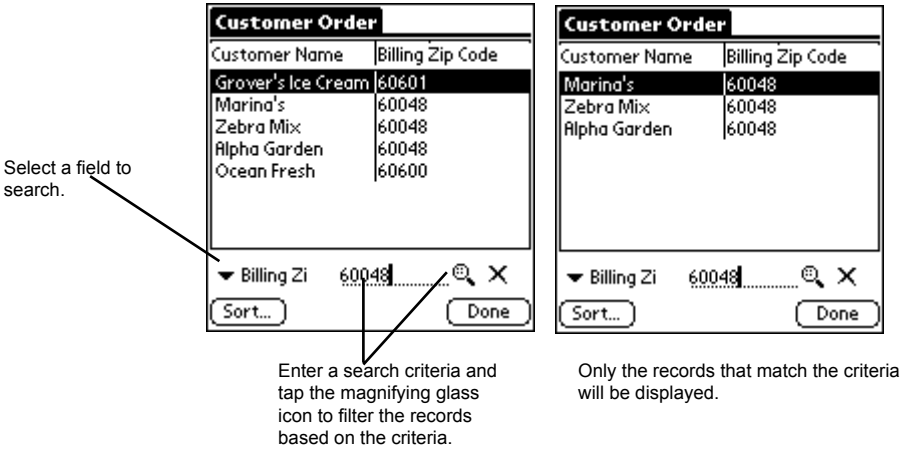
Filtering Records

The Filter feature allows you to display only those records that match the search criteria that you specify.

You can search in just one field, or across all fields on a form.

To apply a filter:

1. Tap on the name of a form to display the records in that form, then tap the Review button.
2. Tap on the arrow underneath the list of records, and select the field that you want to use to filter the records.
3. On the dotted line, type the search criteria for which you are looking.
4. Tap the Search icon (magnifying glass icon) to perform the search and filter the records. Only the records which match the search criteria will be displayed.
5. To switch off the filter and display all the records, tap the X icon.



Filtering records using an SPT 1550 / SPT 1800

If you have an SPT 1550/SPT 1800 series handheld, and there is a bar code Text field on your form, you can scan the bar code into the search criteria field. If only one record matches the bar code, the record will be displayed. If several records have the same bar code, then a filtered list of records will be displayed and you can tap on a record to select it.

Sorting Records

The Sort feature allows you to select a field to sort by. You can then choose to sort the records in this field in ascending order (A..Z) or descending order (Z..A).

The default sort order is to display the records in the order in which they were entered (most recent record at the top of the list). This default sorts on the TimeStamp field (the creation date and time of the record.)

To sort records:

1. Tap the name of a form, then tap the Review button.
2. Tap the Sort button to select a field to sort.
3. On the Sort Records screen, tap the A->Z icon to sort the records in ascending order (A..Z) or tap the Z->A button to sort the records in descending order (Z..A)
4. In the Sort On field, select the field that you want to use to sort the records. Tap the OK button to sort the records.

Tap the Sort button to select a field to sort by.

Select a Sort Order (A...Z or Z...A), and select a field to Sort On. Then tap OK.

In this example, records have been sorted from A to Z in a field called Customer Name.

NOTE:
To revert to sorting records in the order in which they were created, choose to sort on the Time-Stamp field.

WARNING:
If there are a lot of records on the handheld, sorting can take a long time, even minutes, on a slow handheld device. Instead of sorting records on the handheld, you may want to sort records as they are sent from the PC - see Additional Download Criteria, page 181.

Deleting Records and Forms from the Handheld

Pendragon Forms is designed to be centrally managed from the PC.

- To delete a form and all its records from the handheld, remove the form from the User Group to which the handheld belongs, and then synchronize the handheld. See page 42.
- To delete records, but not the form design from the handheld, you need a criteria on the PC that determines which records to remove from the handheld. (See *Limiting the number of records on the Handheld*, page 43.) Without such criteria, records that are manually deleted from the handheld will re-appear after a HotSync data transfer.

When should you delete records and forms manually from the handheld?

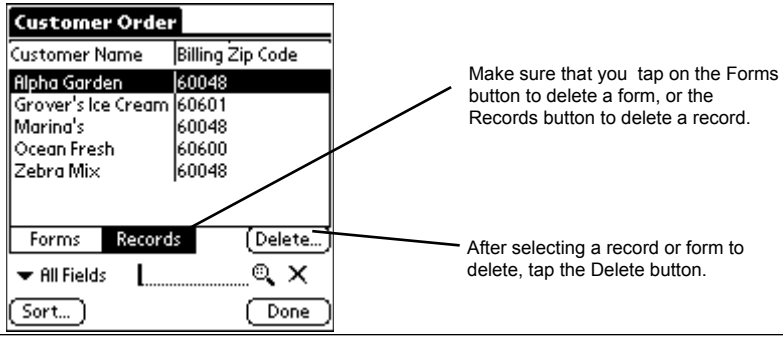
NOTE: Manually deleting a record from the handheld will not delete the record from the desktop.

You may want to manually delete a record if:

- The record was sent from the PC and then incorrect information was entered on the handheld. If you manually delete the record and then synchronize, you will receive a fresh copy of the record from the PC.
- The form was deleted from the desktop before it was removed from your handheld. If you do not need the data in the form, you can delete the form from the handheld.

To delete a record or form from the handheld:

1. Tap on a form to select it.
2. Tap the Delete button. A list of records for the form is displayed.
3. Do one of the following:
   - To delete a record, tap on a record in the list, and tap the Records button.
   - To delete a form, tap the Forms button to display a list of forms, and then tap on a form in the list.
4. After selecting the record or form to delete, tap the Delete button. You will need to confirm the deletion. Deleting a form also deletes any records associated with that form.



Setting Forms Preferences

New in Forms 4.0 is a Forms Preferences screen that sets global options that apply to all forms.

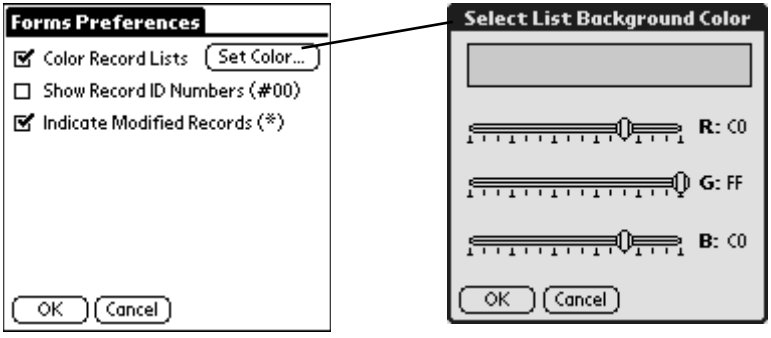
To access the Forms Preferences screen, tap the Forms icon, and then tap the handheld Menu button (the drop-down menu icon below the House icon on the handheld). Tap the Options menu and then select the Preferences option.

The Forms Preferences are:

- **Color Record Lists**

  The default is that this checkbox is checked. If you are using a monochrome device, this option does not apply, even when checked. On Color handheld devices, if Color Record Lists is switched on, then when the user reviews records for a form, the records will appear on lines of alternating green and white colors. This helps the user differentiate between records.

  If you tap the Set Colors button, you can change the default color used on the review screen. The default setting is Red (R) = C0 (or CC), Green (G) = FF and Blue (B)= C0 (or CC). If you change the default, do not make the color too dark, or it will be difficult to read the text of the records that appear on that color.



- **Show Record ID Numbers**

  The default is that this option is switched off. If this option is on, users will see a Record ID number next to each record when they review records. This is not very useful to end-users because the Record ID numbers count records across all forms, not within a given form. However, Record ID numbers are used by Pendragon Software technical support.

- **Indicate Modified Records (*)**

  This option is switched on by default. When the user reviews records, any new or modified records will have an asterisk (*) next to the record. This option helps to identify to the user which records will be uploaded to the PC on the next synchronization.

Switching on Field Numbers (for Debugging Purposes)

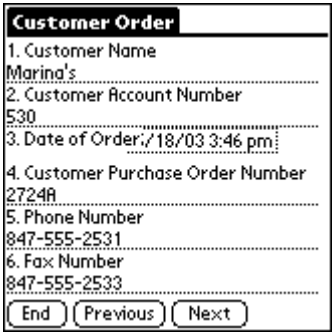
If you are in a record on the handheld, you can choose to switch on field numbers to help you debug a problem, particularly a scripting problem, on the handheld.

To switch on field numbers:

1. Either create a new record or review an existing record.
2. Tap the handheld Menu button (the drop-down menu button below the House icon on the handheld).
3. On the Option menu, tap the Toggle Field Num option.
   Note: If you select this option a second time, the field numbers will be switched off.

Field numbers will appear at the start of each field name. Note that in some fields, such as a field on which the question and answer are on the same line, adding the field numbers may cause a part of the field name to be out of view. This is why it is generally recommended that you switch on field numbers only when debugging a form. If you want field numbers permanently in your form, put numbers in the field names as you design the form. (Note, however, that database columns in Microsoft Access cannot begin with a number, so the database table that is created when you freeze the form will contain the letter A in front of any field that starts with a number. The handheld user will not see the added letter A.)

Field numbers can help you troubleshoot a scripting problem.You can look at the script in the Form Designer window on the PC, and then look on the handheld to see whether the script is referencing the correct field numbers.



7. Field Types

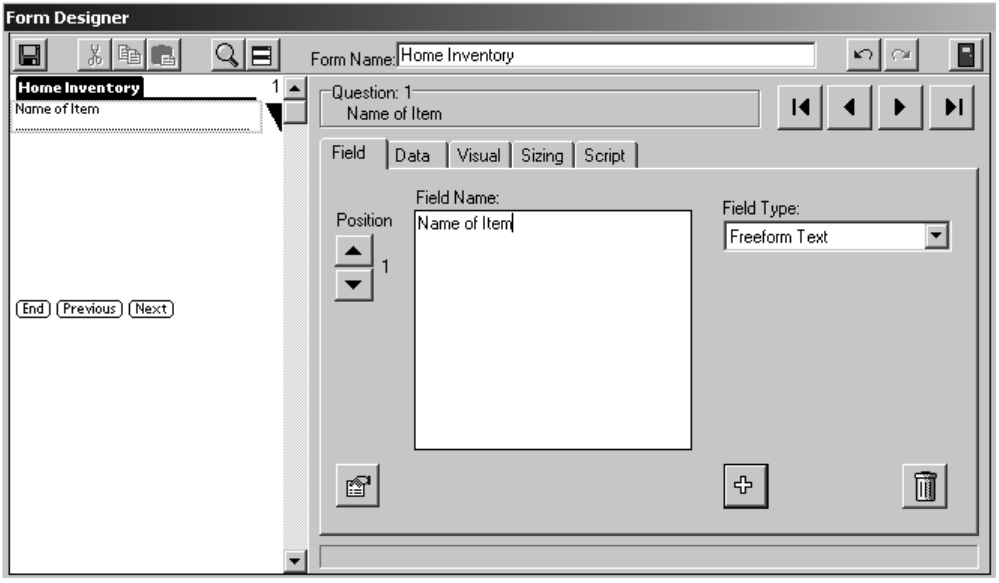
In the Pendragon Forms Manager, the Form Designer window is where you create your form design. To access the Form Designer window, either click the **New** button in the Forms Manager window to create a new form design, or select a form and click on the **Edit** button to edit an existing form design.

Every field on your form must have a field name and a field type.

- A field name can be approximately 255 characters in length. When viewing a form on the handheld in Record View, only the information from the first line or up to the first colon (:) on the first line will be displayed.
- A field type determines the kind of data that you want to allow the handheld user to input when entering records on a form.

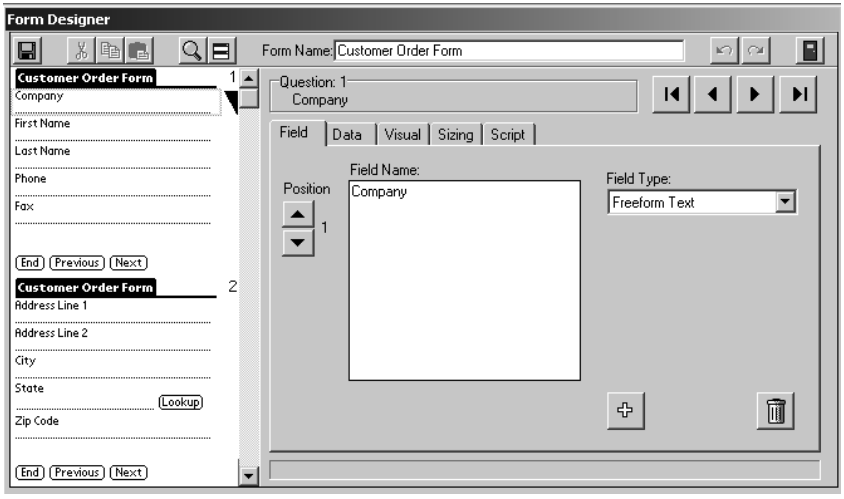
This chapter looks at the 23 different field types that are available in Pendragon Forms.

For a quick overview of using the Form Designer, see Chapter 2, page 6.
A detailed look at the Form Designer starts on page 132.

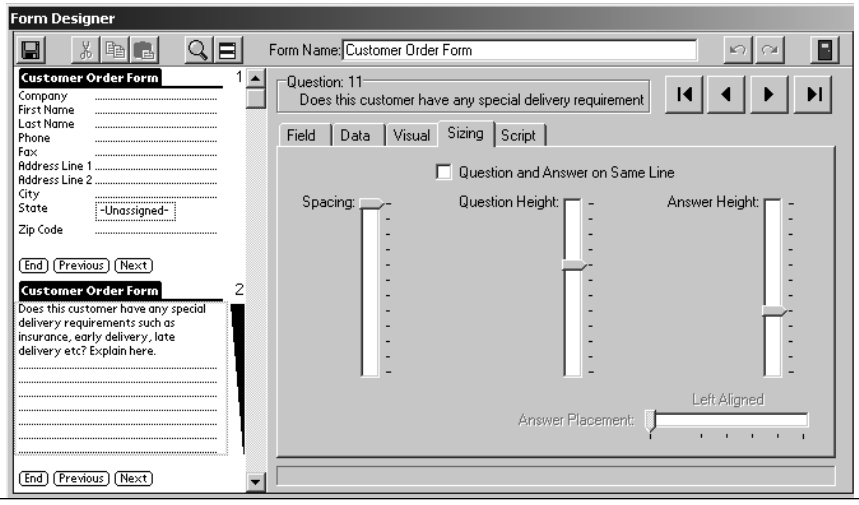


Freeform Text Field

A Freeform Text field, also called a Text field, allows the handheld user to enter any alpha, numeric or other character.



For each field on your form, use the Sizing tab in the Form Designer to size the question or answer portion of the field to match the amount of data that is needed.
For example, a field such as a name can fit the question and answer on the same line, but a field for a comment may need the question or answer to be several lines long.

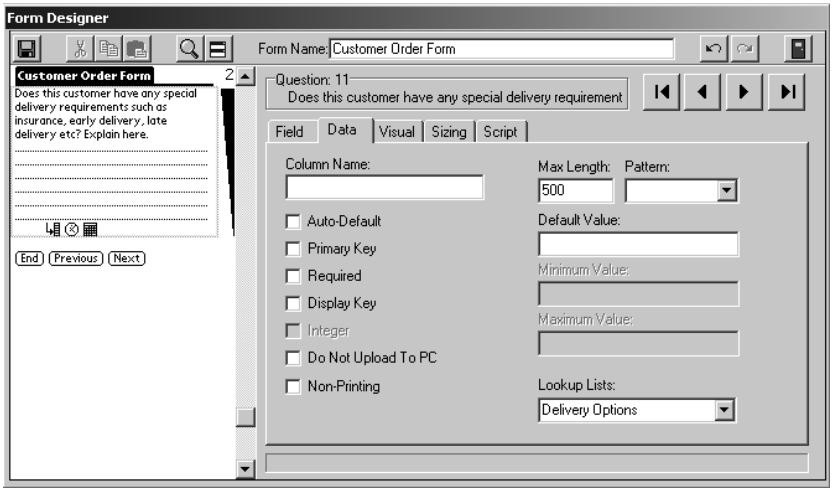


Advanced Field Properties of Text Fields

The Data tab in the Form Designer window shows the Advanced Field Properties that are available for a Text field.

The default maximum length of a Text field is 255 characters, which is enough for most Text fields. If you need to allow more characters or limit users to fewer characters, you can click on the Data tab for the field and type a number from 1 to 2000 in the Max Length field.

NOTE: The Max Length field cannot be changed after a form is frozen.



You can select a Lookup List to be associated with a Text field. If users frequently need to type specific phrases, you can put these phrases in a Lookup List, and the users can select a phrase to insert into the Text field to avoid hand-writing. See page 84 for information on creating a Lookup List.

To associate a Lookup List with a Text field, click the Data tab for that Text field, and select a list in the Lookup List field. Click the Sizing tab and make the answer height bigger, so that you can see the Lookup List icon that appears below the Text field. If the cursor is blinking in the Text field, the handheld user can tap the Lookup List icon to add items from the list to the Text field.

For information on other Advanced Field Properties, see Chapter 9, *Advanced Field Properties*, page 152.

Features of Text Fields

On the handheld, use Graffiti or the built-in keyboard to enter data in a Text field.

If answer icons are available, you can:

a) Tap the clock icon at the bottom of a Text field to add the current time to the field.

b) Tap the calendar icon at the bottom of a Text field to add a date and time to the field.

c) Tap the Lookup List icon to select an item from a Lookup List and paste it into the Text field.

To copy a name and phone number from the built-in Address Book to a Text field, tap the handheld Menu button and select the Lookup option. Select a name from the Address Book and tap the Add button.

If there is a numeric keypad on the same screen as a Text field, the numeric keypad can be used to enter data in Text, Numeric or Currency fields. If the cursor is not blinking in a field, tap in the field first before using the numeric keyboard.

Text fields are the only fields that can accept bar code input without using a script.
See Chapter 15, *Using Bar Codes*, page 308.

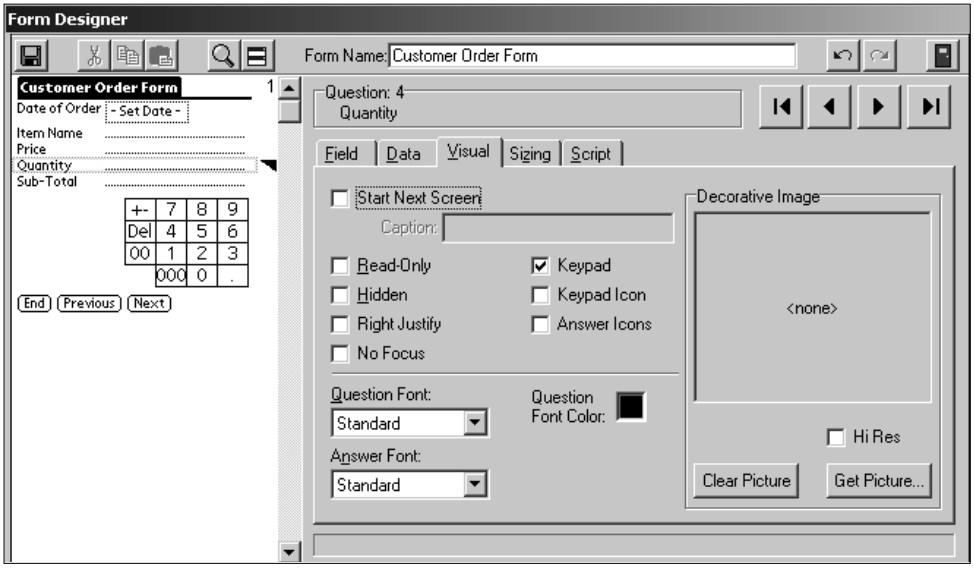
Numeric Field

A Numeric field allows the handheld user to enter a numeric character using an onscreen numeric keypad, Graffiti, or the built-in keyboard.

The maximum length of a Numeric field is 15 digits. A decimal point and a minus sign can be added in addition to the 15 digits.

Exponents can be used to represent very large or very small numbers.
For example:
1,500,000 can be entered as 1.5e6,
0.0025 can be entered as 2.5e-3
The maximum positive exponent (for a large number) is e308,
and minimum negative exponent (for a small number) is e-324.

To display an on-screen keypad for a Numeric field, click the Visual tab for that field, and check the Keypad checkbox.



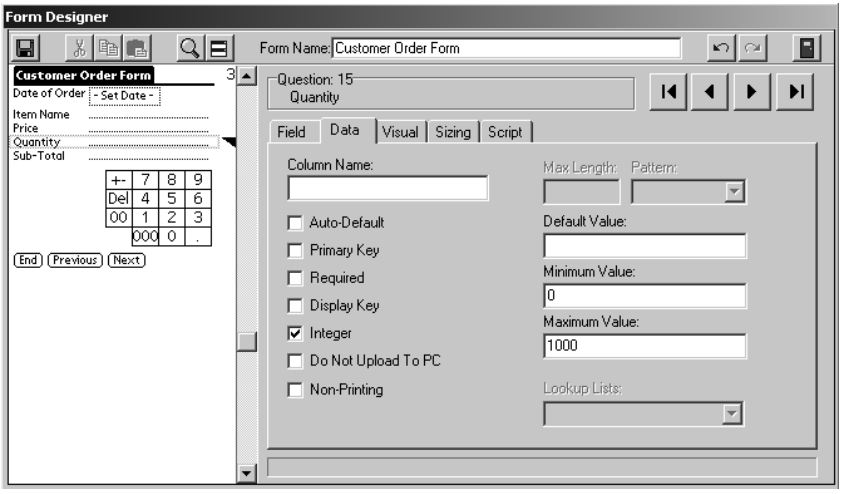
Only one numeric keypad will be displayed per screen, and all the Text, Numeric and Currency fields on that screen can use the same keypad. On the handheld, if the cursor is not blinking in a field, the user should tap in the field to move the cursor to that field before using the numeric keypad.

Advanced Field Properties of Numeric Fields

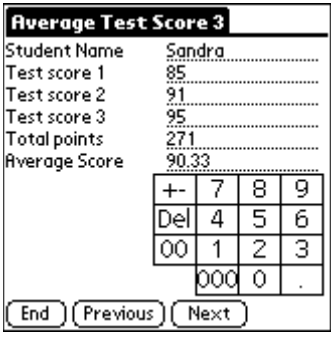
On the Data tab of a Numeric field, you can check the Integer checkbox if you want the handheld user to enter integers (whole numbers) only. Note that if you choose integers, you are limited to numbers between + or - 2,147,483,647 (effectively 9 digits).

If you want to restrict the handheld user to entering numbers within a numeric range, you can set the maximum (Max) and minimum (Min) values of the allowable range.
You must fill in both the Max and the Min values to specify the range.

For information on other Advanced Field Properties of Numeric fields, see page 152.



Features of Numeric Fields



On the handheld, enter numeric characters using the onscreen numeric keypad. You can also use Graffiti or the built-in handheld keypad.

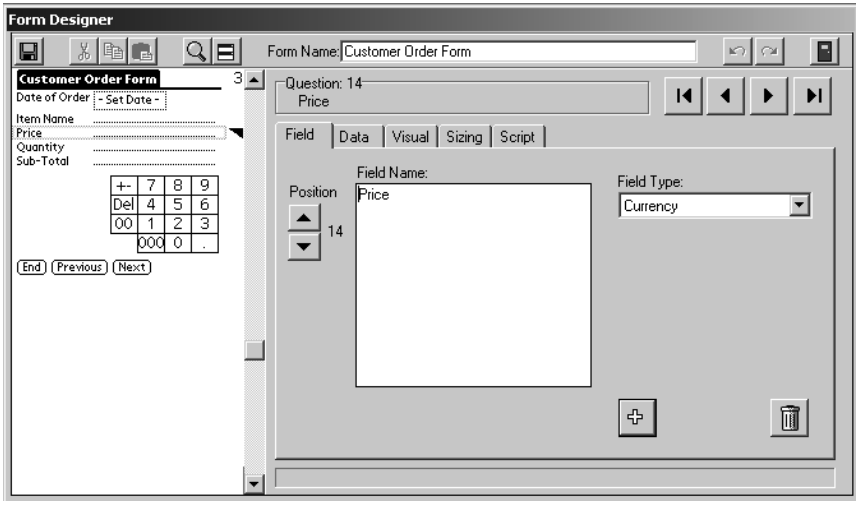
Numeric fields can contain calculations.
See Chapter 14, *Scripting Examples*, page 284.

Currency Field

A Currency field allows the handheld user to enter a number with 2 decimal places, using an onscreen keypad or using Graffiti.

Commas are automatically added after every thousand.
The maximum length of a currency field is 9 digits, or + / - $9,999,999.99
If a larger number is necessary, use a Numeric field.

Only the onscreen keypad can be used to enter data in a Currency field. The handheld's built-in keyboard cannot be used. Click the Visual tab for the Currency field and check the Keypad checkbox to display the onscreen keypad.



Features of Currency Fields

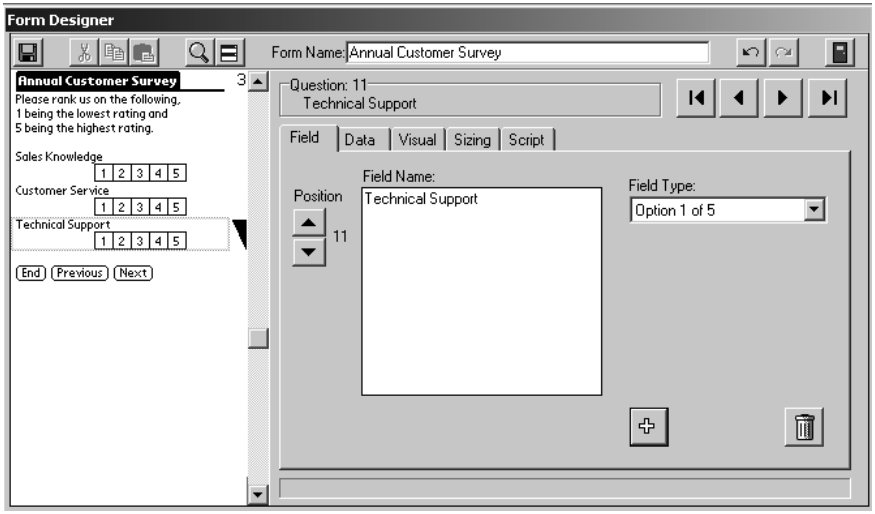
Internally on the handheld, Currency fields are stored as a whole number of cents, and the Currency field displays the number with the appropriate decimal places.

Calculations can be performed in Currency fields. If the result of a Currency calculation is also placed in a Currency field, the result will be displayed correctly. See Chapter 14, *Scripting Examples*, page 284.

Option 1 of 5 Field

The Option 1 of 5 field displays five checkboxes labeled 1 2 3 4 5, and the handheld user can check one box to make a selection.

Option 1 of 5 fields look attractive together on the same screen, if you are rating various items.



Features of Option 1 of 5 Fields

On the handheld, tap a box in the Option 1 of 5 field to select that number.

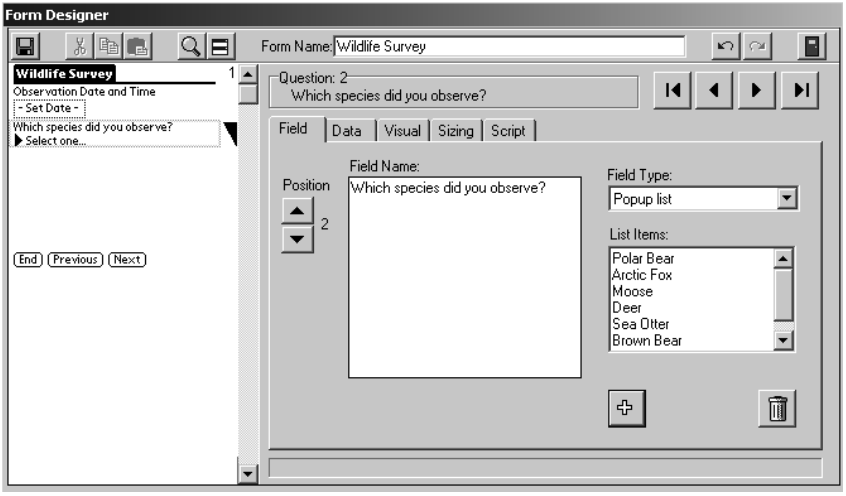
Option 1 of 5 can be configured to have fewer than five checkboxes, or to have the boxes labeled with a different character. To do this, add a character sequence in square brackets at the end of the field name in the Form Designer. Example: Overall Grade [ABCD]
Note that after a HotSync data transfer, options on the PC will still appear as the numbers 1-5. If you prefer to record the alpha characters, use a Popup List field instead of an Option 1 of 5 field.

Popup List Field

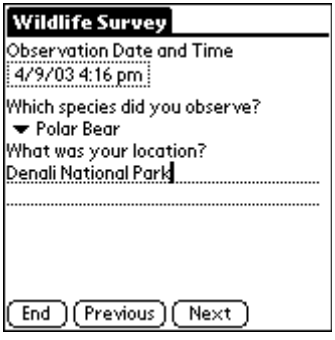
A Popup List field allows the handheld user to select only one item from a list of items.

In the Form Designer window, type each item in the list on a separate line in the List Items section of the screen. Each item in the list cannot exceed 30 characters. The maximum length of a Popup List is 512 characters. A carriage return (pressing Enter) counts as 2 characters.

When you freeze a form, Popup List entries are also frozen and cannot be changed. If you need a list which can be modified after the form is frozen, use a Lookup List field instead of a Popup List.



Features of Popup Lists



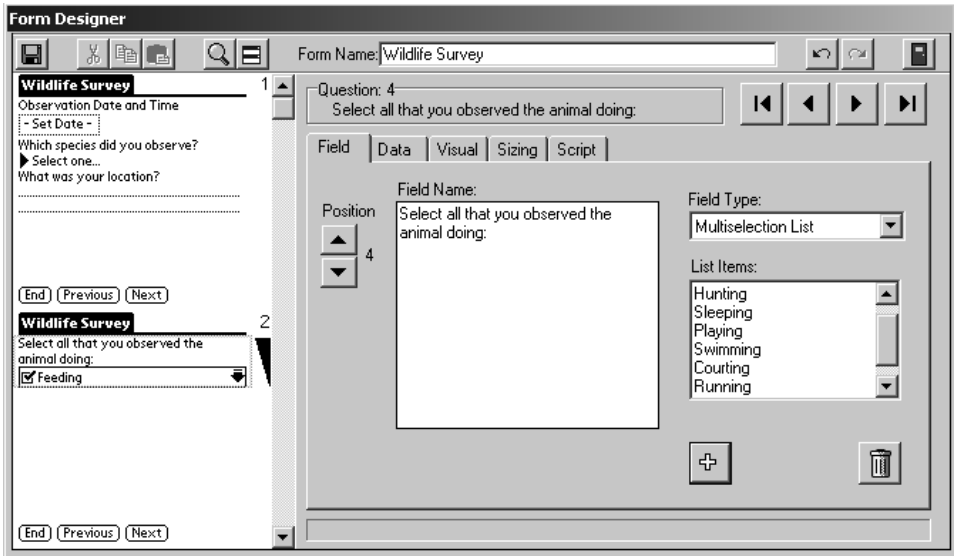
Tap in a Popup List field and make a selection from the list.

You can create a cascading Popup/Lookup relationship, whereby a selection made in a Popup List determines which Lookup List is displayed in the next field. See Cascading Lookup, page 90.

MultiSelection List Field

A MultiSelection List allows the handheld user to select one or more items from a list. A checkbox appears next to each item in the list, and the user can choose which boxes to check.

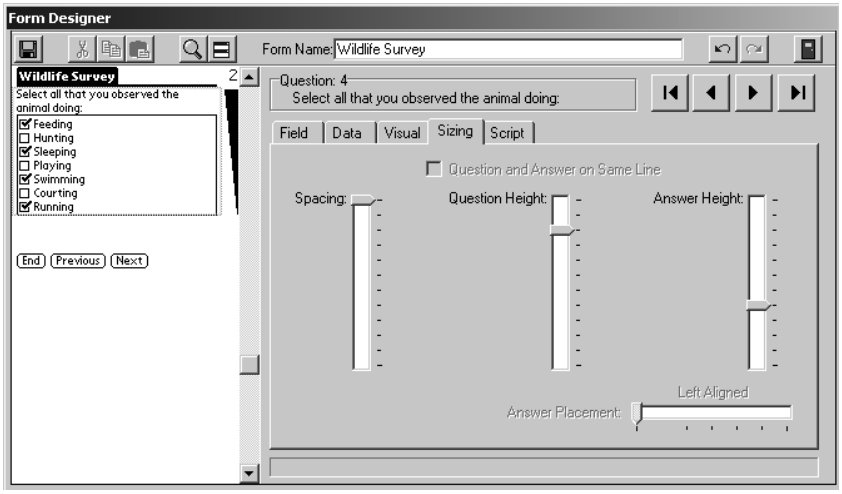
In the Form Designer window, type each item in the list on a separate line in the List Items field. Each item in the list can be up to 30 characters.
The maximum number of items that can be entered in a MultiSelection List is 32 items.



When you freeze a form design, the MultiSelection List entries are frozen and cannot be changed. If you need to change a list on a regular basis, you may want to consider using a Text field with a Lookup List instead of a MultiSelection List. (See page 62.)

When you create a MultiSelection List field, click the Sizing tab in the Form Designer to re-size the answer height of the field so that the user can see as many options as can fit on the handheld screen.

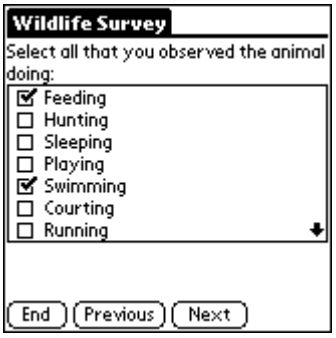
If the list has more entries than can be seen, a scroll arrow in the lower right corner of the list, or the handheld Page Up and Page Down buttons can be used to scroll down.



When data comes back to the PC, all selected items will be listed in the field, separated by semicolons.

ObservationDa	WhichSpecies	WhatWasYourl	SelectAllThatYouObserv
4/9/2003 4:16:00 PM	Polar Bear	Denali National Park	Feeding;Swimming
6:01:00 PM	Sea Otter	Oceanfront	Feeding;Sleeping;Playing;Swimming

Features of MultiSelection Lists



To make a selection in a MultiSelection List field, check one or more checkboxes in the field.

If the list contains more items than can be seen, there will be a scroll arrow in the lower right corner of the MultiSelection box. You can tap on the scroll arrow to scroll down the list, or use the handheld PageUp and PageDown buttons to scroll.

A MultiSelection List can only be modified in Layout View or Field View.

If you are in Record View, you will be switched to Field View to see the list. Tap the Record View button to return to Record View.

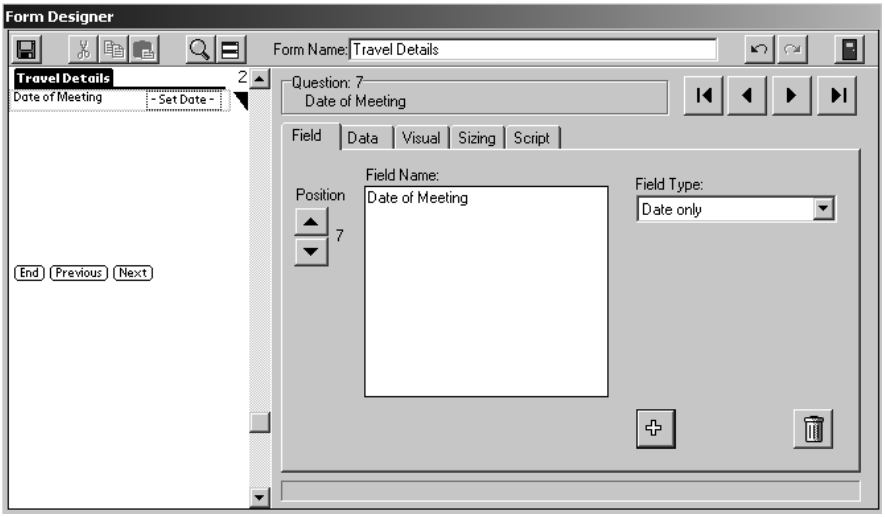
On the Review screen of the handheld, when you are reviewing a list of records, the contents of a MultiSelection List will not be visible unless you select the record to view in detail.

Internally, a MultiSelection List is stored as a binary number, with each bit position in the number representing one of the options in the list. To use a MultiSelection field in a script, see page 304.

Date Field

A Date Only field, also called a Date field, allows the handheld user to select a date from a popup calendar.

The default date that is displayed in the popup calendar is the current date on the handheld.



Features of a Date Field

On the handheld, tap the Set date button to display a calendar and choose a date.

If you do not want to select a date, tap the Clear button to display the message "No date selected".

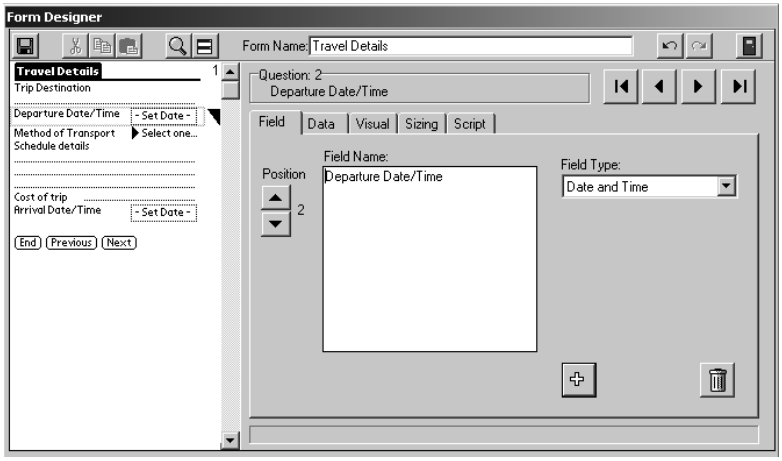
It is possible to perform calculations on dates. See Chapter 14 *Scripting Examples*, page 291.

A script can also be used to place a default date, such as the current date, into a Date field. See page 291.

Date & Time Field

A Date & Time field allows the handheld user to select a date and a time from a popup calendar and clock.

The default date and time that are displayed in the popup calendar and clock are the current date and time on the handheld.



Features of Date & Time Fields

On the handheld, tap the Set date button to display a calendar and choose a date.

Tap the Set Time button to display a clock and choose a time.

If you do not want to select a date, tapping the Clear button will display the message “No date selected”.

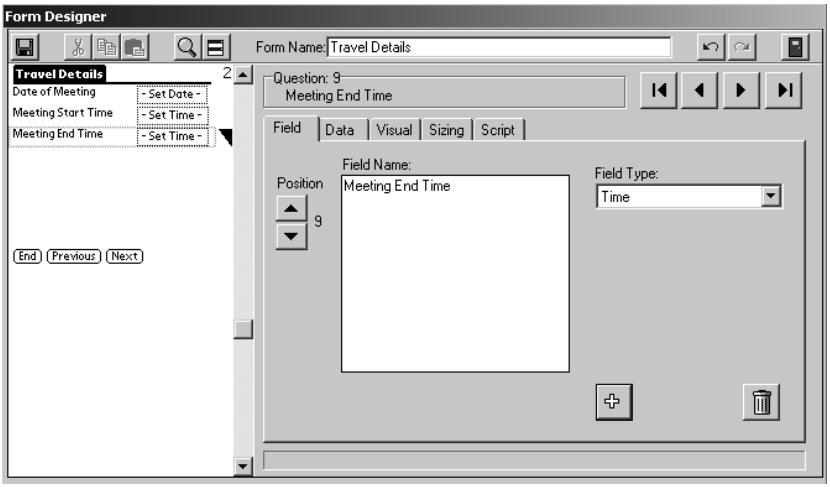
It is possible to perform calculations on dates. See Chapter 14, *Scripting Examples*, page 291.

A script can also be used to place a default date, such as the current date and time, into a Date & Time field. See page 291.

Time Field

A Time field allows the handheld user to select a time from a popup clock.

The default time that is displayed on the popup clock is the current time on the handheld.



Features of Time Fields

On the handheld, tap the Set Time button to display a clock and select a time.

Tap the Clear button to leave the field blank.

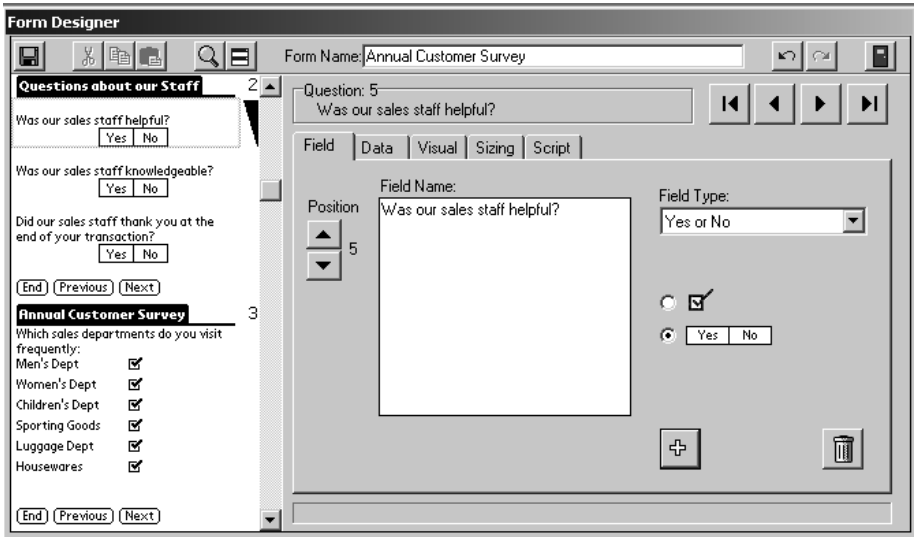
You can switch to a 24-hour clock by setting Preferences on the handheld. From the Applications screen, tap Preferences, then set Time to HH:MM. All Time fields, including those in Pendragon Forms, will be displayed in 24-hour clock mode. (Note that after a HotSync data transfer, the data on the PC will be displayed in the format selected in the Windows Control Panel.)

You can use a script to automatically insert the current time into a Time field. See page 291.

Yes or No Checkbox Field

A Yes or No checkbox allows the handheld user to select one of two options: Yes or No.

Data coming back to the PC will contain three possible values:
Y for Yes,
N for No,
or be blank if no option was selected.



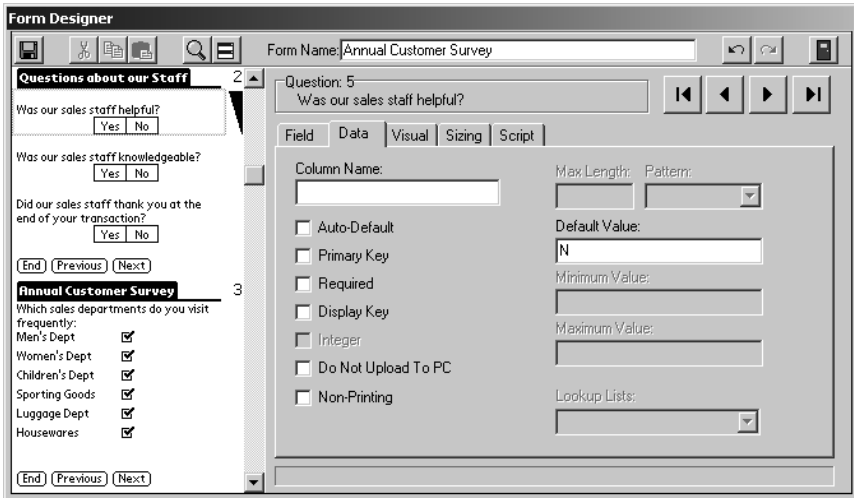
In Layout View, click the appropriate button to choose whether the Yes/No checkbox appears as a single checkbox, or whether the field is displayed as two individual boxes labeled Yes and No. If you choose a single checkbox, then to select No, the handheld user would need to check and then uncheck the checkbox, or you can default the field to N (for No) - see Advanced Field Properties on the next page.

Field View always shows the Yes and No boxes as separate. Record View shows a single checkbox.

Advanced Field Properties of Yes/ No Checkbox Fields

If the user leaves a Yes/No checkbox blank, the data value will be blank (null).
If you do not want to allow a null value, you can set a default so that if the handheld user does not touch the checkbox, the default value will be the value stored in the field.

To set a default value for a Yes/No checkbox, click the Data tab for the Yes/No field.
In the Default Value field, type N to default to No, or type Y to default to Yes.



Instead of using a default value, another way to avoid a null value is to require the handheld user to fill in the Yes/No checkbox. On the Data tab, check the Required checkbox. For more information see Chapter 9, *Advanced Field Properties*, page 152.

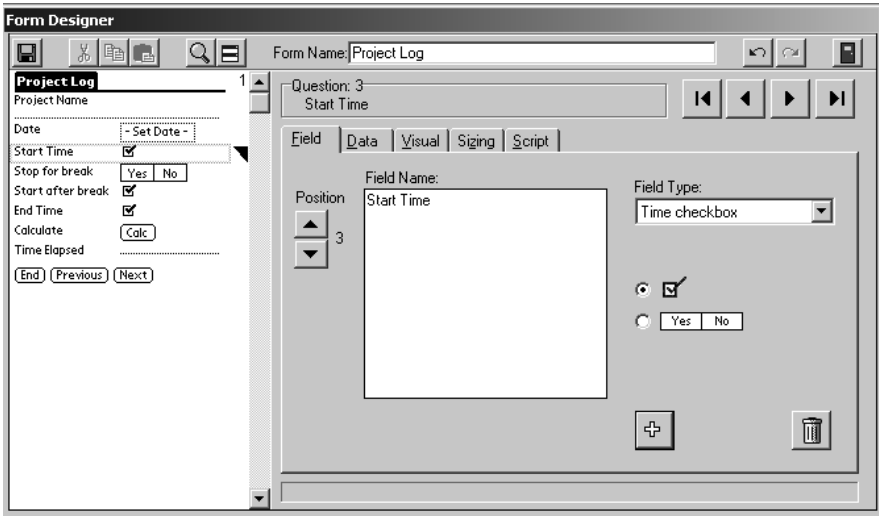
Features of Yes/No Checkboxes

On the handheld, if two separate boxes are available for Yes and No, tap one box to make your selection. If only one checkbox is visible, check the checkbox for Yes, or check and then un-check the checkbox for No.

Yes/No Checkboxes are used in branching scripts, so that depending on whether the handheld user answers Yes or No to a given question, they jump to another part of the form to fill in.
See Chapter 14, *Scripting Examples*, page 294.

Time Checkbox Field

A Time Checkbox is a special type of Yes/No checkbox in which, when the handheld user checks the box for Yes, a date and time stamp is recorded.



Features of Time Checkboxes

On the handheld, if you tap Yes or check the checkbox, a date and time stamp will be added.

If a Time Checkbox is left blank, or if the option No is checked, a null field is sent back to the PC - no date or time stamp.

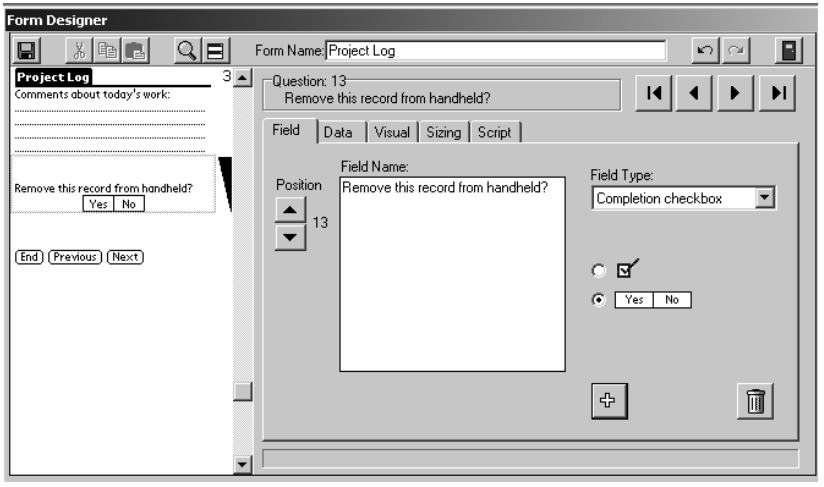
The date and time stamp is only visible when you view data on the PC.

To require the handheld user to check the Time Checkbox field, go to the Data tab and check the Required checkbox.

Completion Checkbox Field

A Completion Checkbox is a special type of Yes/No checkbox. When the handheld user checks Yes, it flags the record for removal from the handheld on the next HotSync data transfer.

For a Completion Checkbox to work, click on the name of the form in the Forms Manager and then click the Properties button. In the Data Persistence section of the **Form Properties** window, you must select to **Keep Incomplete records on the Handheld**. (See page 165.)



Features of Completion Checkboxes

To select a record to be removed on the next synchronization, check the Yes checkbox of a Completion Checkbox field.

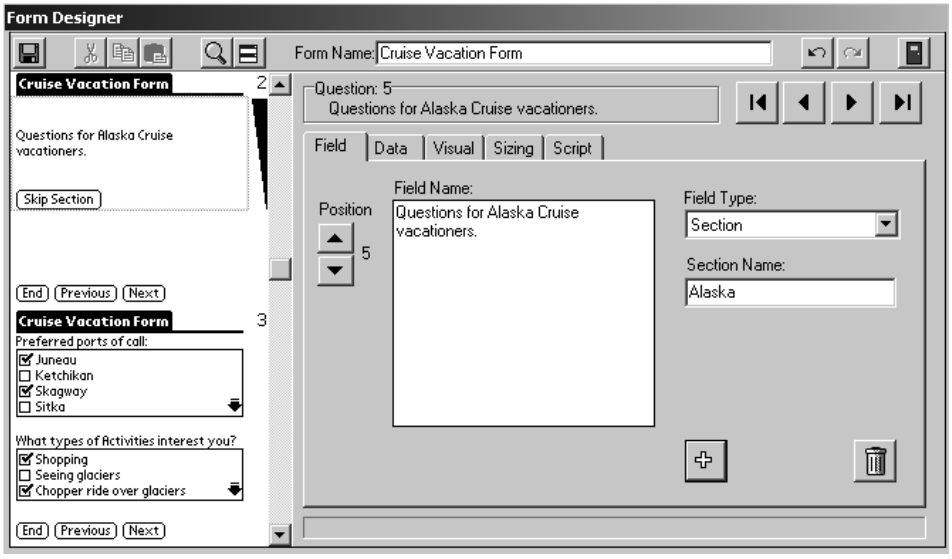
A Completion Checkbox field can cascade from a parent form to a subform. The Completion Checkbox field should be within the first 10 fields on the parent form and on the subform. (The Completion Checkbox field can be hidden on the subform.) You can only cascade one level deep from parent to subform, that is, you cannot nest subforms.

Section Field

A Section field is a read-only topic heading.

The handheld user cannot enter data in a Section field. Instead, the name of the Section field provides the user with information for filling in the fields that follow the Section field.

In the Form Designer window, when you select Section field as your field type, you will need to type a name for the section in the Section Name field. The Section Name can be up to 30 characters.

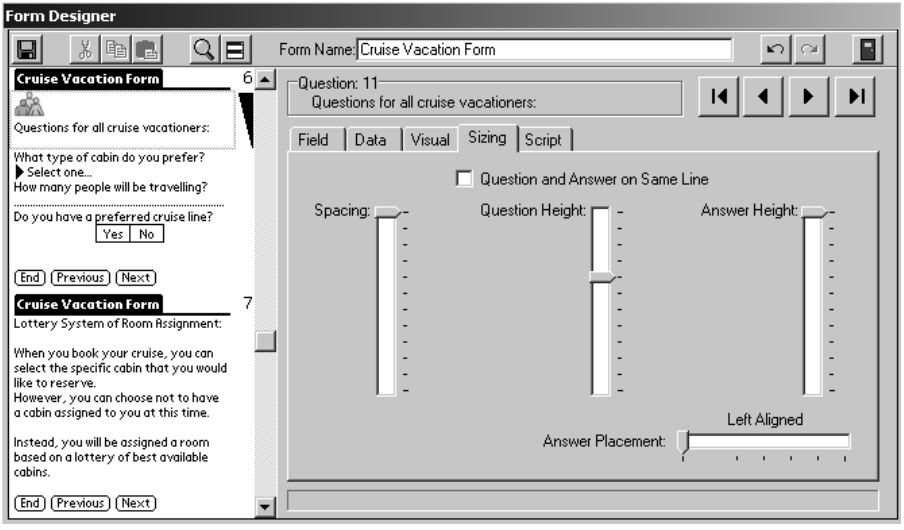


A Section field has three uses:

1. Section headings can form a visual divider between different categories of information.
2. Sections can be used in connection with Jump to Section fields to make it possible to jump to a section. Note however that Scripting may be a more powerful feature to use than Sections and Jump to Sections.
3. A Section field can be used if you need more space for a long question. By putting a Section field ahead of another field, you can double the onscreen space of your question.

Section fields include a Skip Section button. Tapping this button advances the user to the next Section field on the form. If there are no more Section fields, the user will jump to the end of the record.

If you do not want the handheld user to be able to skip over sections of a form, you can click the Sizing tab of a Section field and make the Answer Height zero. This will hide the Skip Section button.



You can choose to add a graphic to a Section field name, to help to illustrate the purpose of the section. If you click the Visual tab of a Section field, you can click the Get Picture button to select a graphic to use with the Section field. See Chapter 8, Advanced Form Designer, page 138, for more information on adding pictures to fields.

You can also use Section fields containing pictures to act as a 'main menu' screen, from which the user can jump to other forms to fill in. See Chapter 21, *Custom Main Menu*, page 381.

Features of Sections

A Section field provides information about the questions in this section of the form. To start answering the questions, tap the Next button.

To skip a Section and jump to the next Section field on the form, tap the Skip Section button. If there are no more Section fields on the form, you will end the record.

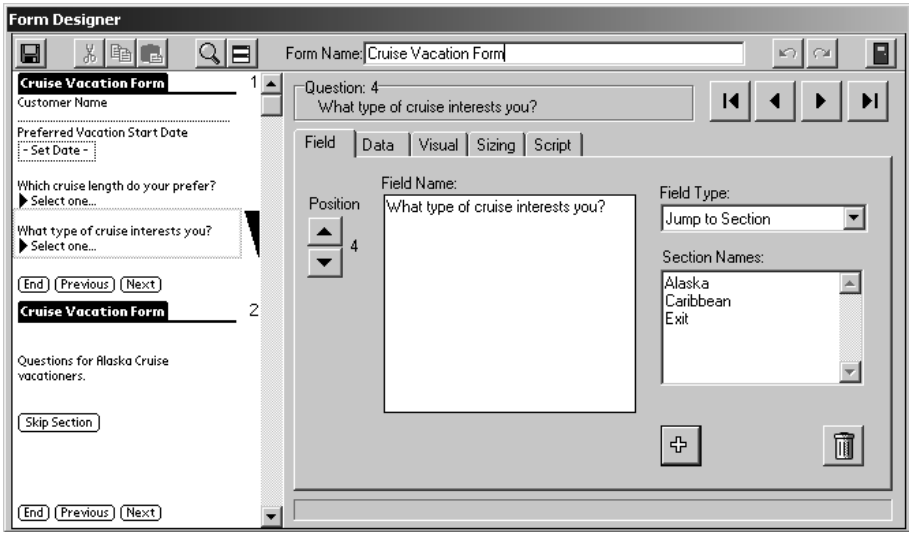
Here a Section field includes a graphic, and has the Section Skip button hidden.

Jump to Section Field

A Jump to Section field is a special type of Popup List that allows the handheld user to jump to a Section field on a form.

When you select the Jump to Section field type in the Form Designer window, a Section Names field appears. Each item in the list must correspond to the Section Name of a Section field. See page 79.

The maximum length of a Jump to Section list is 512 characters.
A carriage return (pressing Enter) counts as 2 characters.



Features of Jump to Sections

On the handheld, selecting an item from the Jump to Section list jumps the user to that Section field on the form. The user can jump forward or backward in the form, depending on where the Section fields are located on the form.

After filling out the questions in a given section of the form, you may need a branching script to return the handheld user to the Jump to Section field so that they can select another section to fill in. See Chapter 14, *Scripting Examples*, page 299.

If you keep returning the user to the Jump to Section field to select another section, remember to have a way for the user to end the form. In the Jump to Section field shown in the top picture, there is an Exit section that does not return the user to the Jump to Section field.

Lookup List Field

Lookup Lists allow the handheld user to select an item from a list.

With a Lookup List, the handheld user can type extra information or edit the field after a selection has been made. An Exclusive Lookup option does not let the user edit the selection.

A Lookup List can be modified even after a form has been frozen. This makes the Lookup List field more flexible than a Popup List or a MultiSelection List field. The modified Lookup List is sent to the handheld during synchronization.

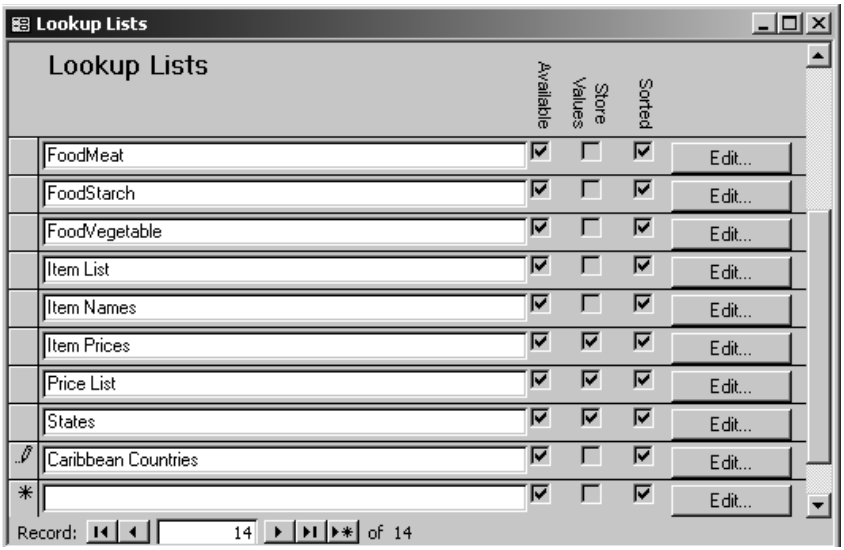
Lookup Lists are created separately from the form design.

Step 1: Creating a Lookup List

In the Pendragon Forms Manager, click the Lookups button to display the Lookup Editor.

To create a new Lookup List, type a name for the list in the blank row. Click the Edit button next to that Lookup List name.

To edit an existing Lookup List, click the Edit button next to the name of the list.



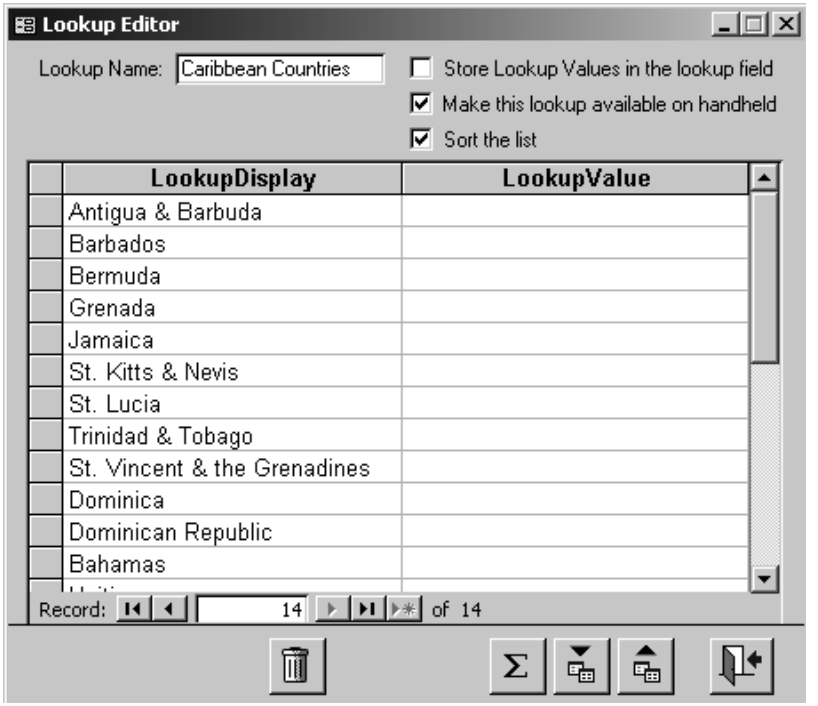
In the LookupDisplay column, type each item that you want in the Lookup List. To save an entry, click in the next row, or press TAB until the cursor moves to the next row.

The maximum length for a single item is 50 characters. However on the handheld screen you can only view a width of 36 characters.

The maximum length for the entire Lookup List is 1000 items or 32KB.

To store the item name that the user selects, leave the LookupValue column blank.

Check the checkboxes:
Make this lookup available on handheld
Sort the list (Optional: sorts the list A..Z.)



To save and close the Lookup Editor, click the Close button (Exit Door icon) or click the X button in the upper right of the Lookup Editor screen. Also close the Lookup List window.

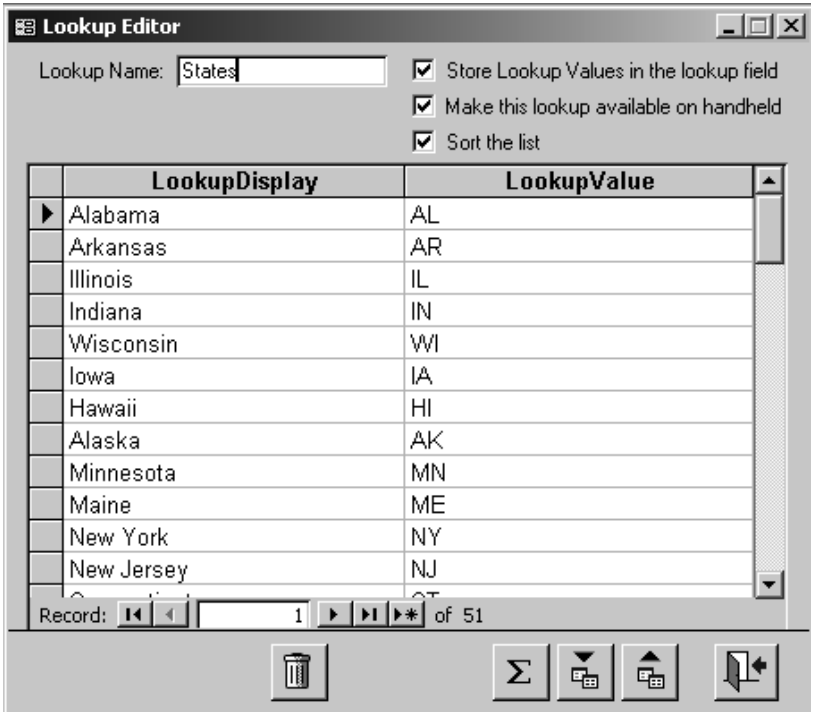
The LookupValue column can be used if you want the handheld user to see the item names in the list, but when they make a selection, store an abbreviation or alternate value in the field.

For example, you may want the user to see the names of US states in the list, but store the two-letter postal abbreviation for each state.

In this case, type the full names of the items in the LookupDisplay column, and type the corresponding abbreviations in the LookupValue column. Do not leave any blanks in the LookupValue column.

Check the checkboxes:
Store LookupValues in Lookup List
Make this lookup available on handheld
Sort the list (Optional: sorts the list A..Z.)

NOTE: On the PC, if you click the Edit/View button to view the records for the form, you will still see the LookupDisplay items, not the Lookup Value items. The actual database table, which can be viewed by clicking ALT + Edit/View, contains the Lookup Value items.



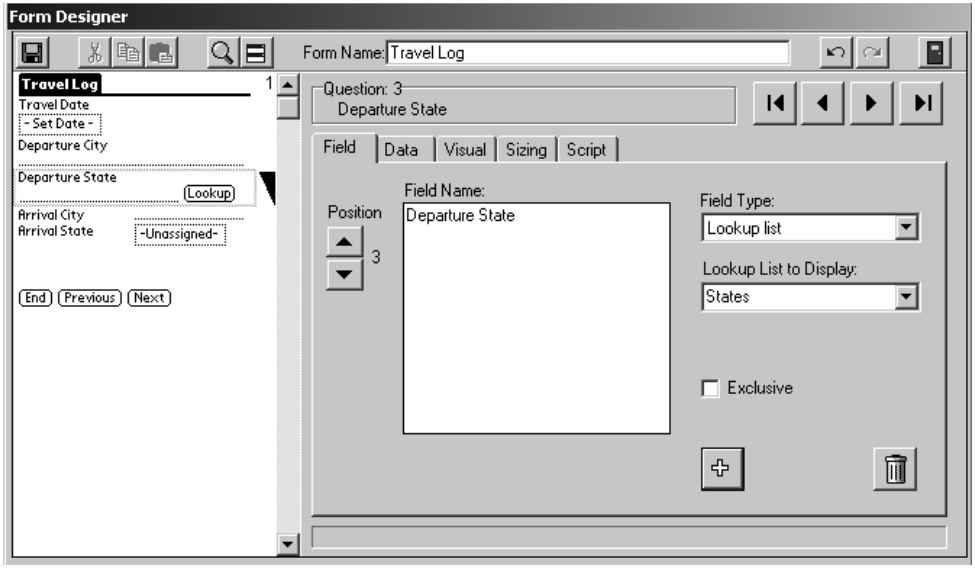
Step 2: Creating a Lookup List Field

Once you have created your Lookup List, you can create a Lookup List field on your form.

In the Form Designer window, select Lookup List as the field type.

In the Lookup List to Display section of the screen, click the arrow and select the name of a Lookup List.

If you do not want handheld users to have the ability to edit a selection to create an item that is not in the list, check the Exclusive checkbox.



Lookup List fields appear in two different ways depending on whether the question and answer components of the field are on the same line or not.

In the picture shown above, the Departure State field takes up two lines on the handheld: the question on one line and the answer on the next line. In this case the Lookup List field appears as a line for storing text, with a Lookup button next to the line. The handheld user can tap the button to make a selection form the list.

In the Arrival State field in the picture, the Sizing tab of the Form Designer has been used to fit the question and answer components of the field on the same line. In this case the Lookup List appears as a box marked Unassigned. The handheld user can tap the box to display the Lookup List and make a selection.

Features of Lookup Lists

On the handheld, tap the Lookup button or box to display the list. Tap an item to select it.

If the list is too long to fit on one screen, there will be arrows to allow you to scroll up and down the list. You can also use the handheld PageUp and PageDown buttons to scroll through the list.

If the list is sorted in alphabetic order, you can also jump to the first item beginning with the letter that you write in the Graffiti area.

Troubleshooting Lookup Lists

On the handheld, if you get an error message *Lookup Failed. List not found.* it means that the Lookup List that is mentioned in the error message is not on the handheld.

On the PC, click the Lookups button in the Forms Manager on the PC. If the *Available* checkbox is not checked, edit the Lookup List and check the *Make this lookup available on handheld* checkbox. Synchronize the handheld and see if the Lookup List appears.

If the problem persists, click on the form in the Forms Manager, then click the Edit button to open the Form Designer. Display the Lookup List field and re-select the Lookup List that you want to use. Re-distribute the form design, synchronize, and check the handheld again.

Deleting Lookup Lists

Deleting a Lookup List requires care to ensure that the list is removed from the handheld.

1. In the Forms Manager, click the Lookups button. Click the Edit button next to the Lookup List that you want to delete.
2. Un-check the checkbox *Make this lookup available on handheld*, so that this checkbox is blank. Close the Lookup Editor window.
3. Synchronize all the handheld devices to remove the Lookup List from each handheld.
4. To delete the Lookup List from the PC, edit the Lookup List and click the Trash can button.

Importing/Exporting Lookup Lists

If you want to create a Lookup List based on data in an ASCII file, you can create the Lookup List and then import the data into the list. See page 205 for more information on importing Lookup Lists.

If you are giving someone a form design that you have created, and the form contains Lookup Lists, you will need to export the Lookup Lists separately from the form design. See page 205 for more information on exporting Lookup Lists.

Other Uses for Lookup Lists

It is possible to allow the handheld user to perform a lookup from a Text field, and paste the selected item into the Text field. This allows the user to select more than one item from the Lookup List. See page 89.

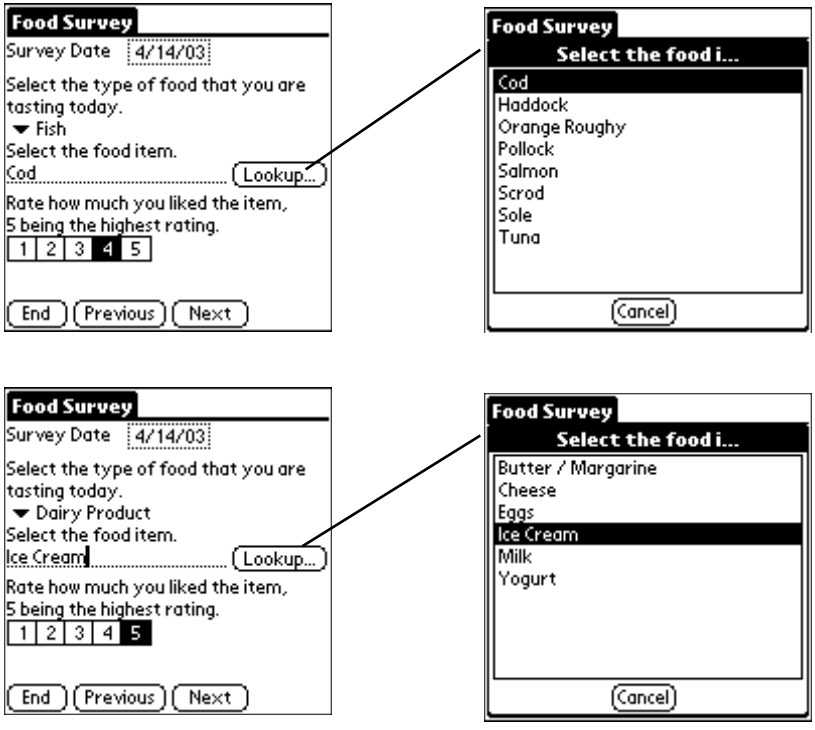
It is also possible to use two fields to create a Cascading Popup/Lookup relationship, in which a selection in a Popup List field (or a Lookup List) determines which Lookup List the user sees in the next field. See *Cascading Lookup*, page 90.

A Lookup List field can also be used to perform a lookup to another form. See page 94.

Cascading Lookup

You can use two fields - either a Popup List and a Lookup List, or two Lookup Lists - to create what is called a cascading lookup. This means that making a selection in one field determines which Lookup List the handheld user sees in the next field on the form.

In the example shown below, selecting a food type in field 2 will display a list of foods within that category in field 3.

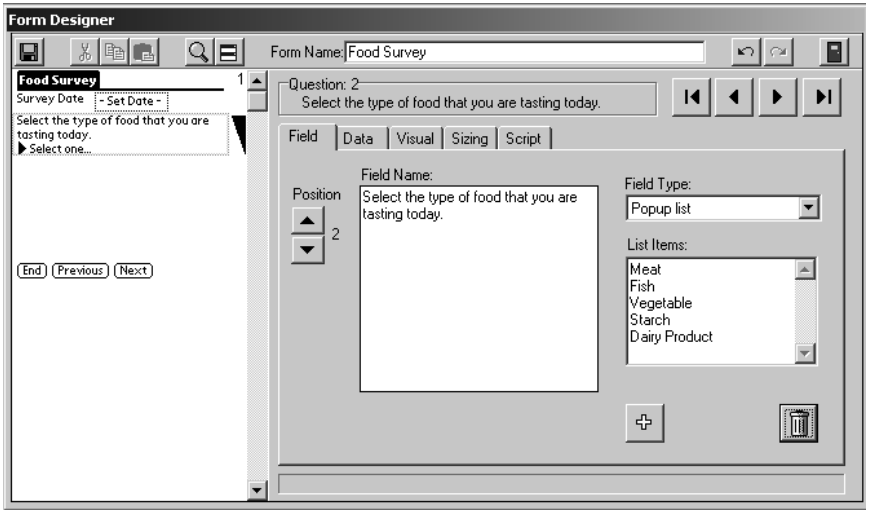


Three steps are involved in creating a cascading relationship between two fields.

Cascading Lookup Step 1: Create the first Popup or Lookup List field

To create a cascading relationship between two fields, make the first field either a Popup List or a Lookup List. (A Lookup List is preferred if you think you will need to add or delete items from the list in the future.)

The list of items in the Popup List or Lookup List are the categories from which the user will initially select.



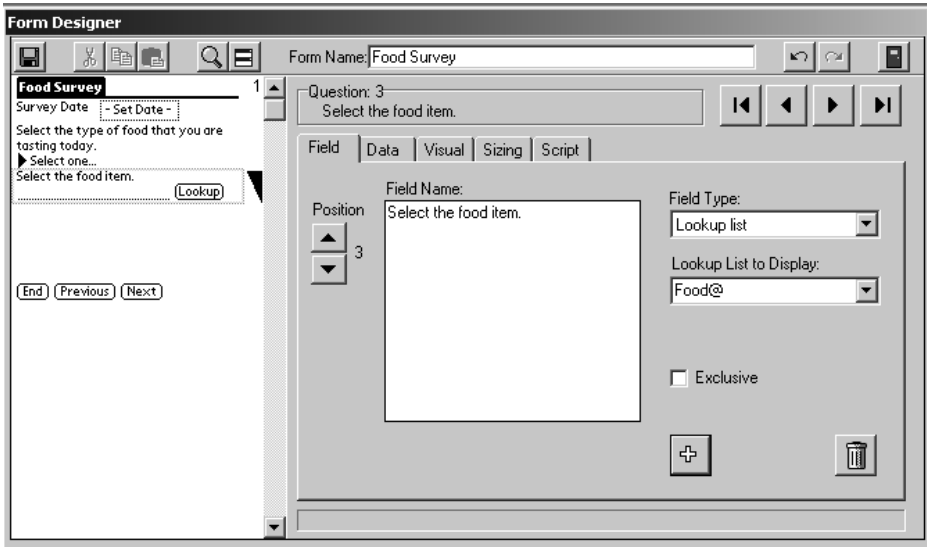
In the example shown in the picture above, the categories are food types: Meat, Fish, Vegetable, Starch, and Dairy Product.

Cascading Lookup Step 2: Create the second Lookup List field

Create a second field that immediately follows the first Popup or Lookup field. Make this second field a Lookup List field.

Do not select a Lookup List to display. Instead, in the Lookup List to Display section of the field, type a keyword followed by the @ symbol. The keyword can be a short word.

In the example shown below, the keyword is Food, so the Lookup List to Display is written as Food@



When the handheld user selects an item in the first Popup or Lookup List field, their selection will determine which Lookup List will be displayed in the next field. To figure out which Lookup List to display, the program on the handheld will look for a Lookup List that starts with the keyword and instead of the @ symbol, will insert the name of the item selected in the previous field.

For example, if the items in the previous field are Meat, Fish, Vegetable, Starch, and Dairy Product, and the keyword is Food, then the possible Lookup Lists will be FoodMeat, FoodFish, FoodVegetable, FoodStarch and FoodDairy Product.

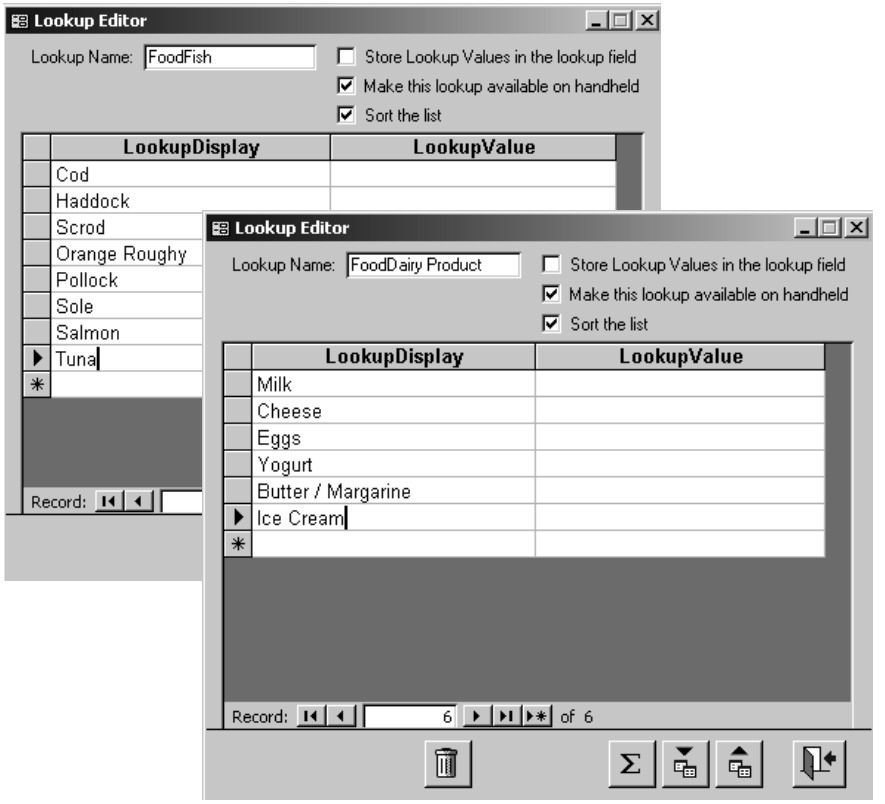
The third step in making a Cascading Lookup is to make the specially named Lookup Lists, as shown on the next page.

Cascading Lookup Step 3: Create a Lookup List for each category

You will need to create a separate Lookup List for each item in the Popup/Lookup List of the first field. For example, if you have four choices in the first field, you have to make four separate Lookup Lists.

The names of the Lookup Lists are very important in making the cascading relationship work. On the handheld, when the user makes a selection in the first field, the second field is going to display a Lookup List whose name begins with the keyword followed by the item name selected in the first field.

If the keyword is Food and the item selected is Fish, the name of the corresponding Lookup List is FoodFish.
The Lookup List name must match the same spelling and case sensitivity as the keyword and the item name. Do not put a space between the keyword and the item name.

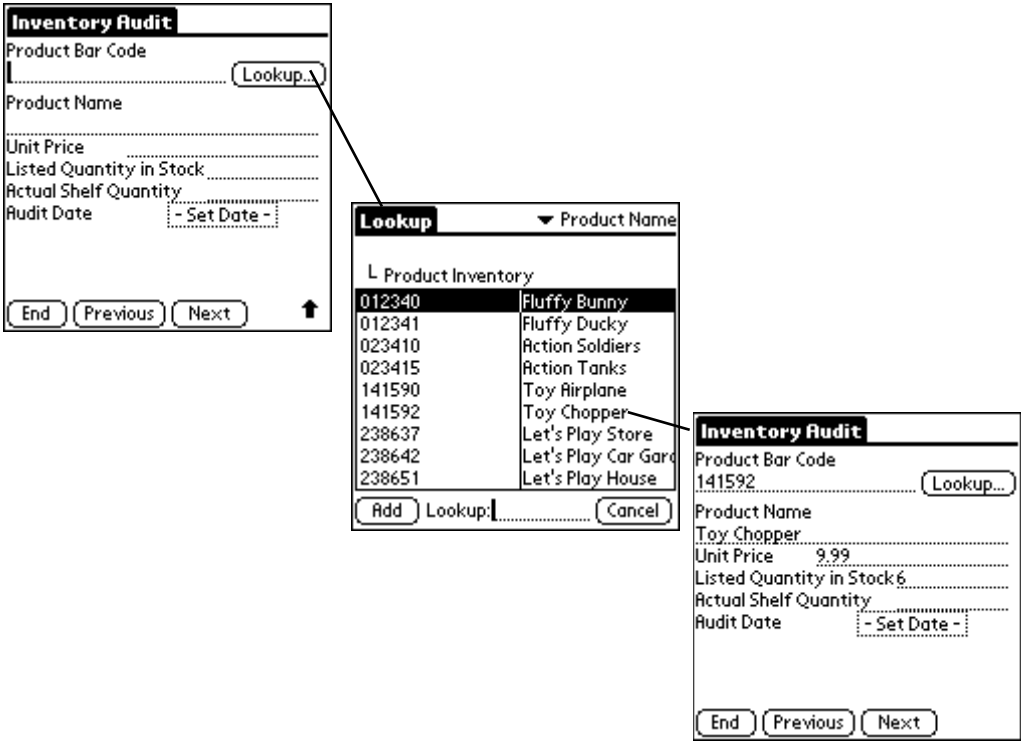


Lookup to Another Form

A Lookup to Another Form allows you to jump from one form to a second form, select a record, and copy fields from the second form into the first form.

You might want to use a Lookup to Another Form if you have reference information that you want to maintain in one form, that you want to access from another form.

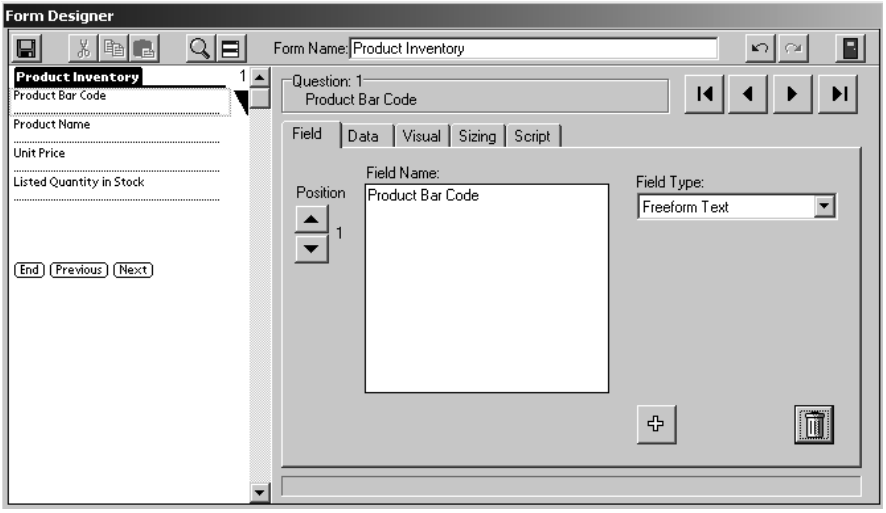
In the example below, the handheld user starts out in one form. Tapping the Lookup button jumps the user to a second form, where a record is selected. The user is returned to the first form, and several fields on the first form are automatically filled in from the second form.



Lookup to Another Form Step 1: Create the reference form

To create a Lookup to Another Form, first create the form that will contain the reference information.

When typing field names, be mindful about the case sensitivity (that is, the use of upper and lower case letters), and the use of spaces and punctuation. Whatever field names and field types you use on the reference form, you will have to use the exact same field names and field types in the form that is doing the lookup.



Freeze the reference form, and populate it with data, either by typing the data into the Edit/View screen (see page 193), or by importing the data from another source (see page 206).

Viewer for FORM_ID_235602664 : Form

	UserName	TimeStamp	ProductBarCo	ProductName	UnitPrice	ListedQuantity
	No one	03 9:48:12 PM	012340	Fluffy Bunny	$14.99	25
	No one	03 9:48:32 PM	012341	Fluffy Ducky	$14.99	18
	No one	03 9:49:31 PM	023410	Action Soldiers	$4.49	6
	No one	03 9:50:11 PM	023415	Action Tanks	$4.49	9
	No one	03 9:51:38 PM	141590	Toy Airplane	$9.99	12
	No one	03 9:52:33 PM	141592	Toy Chopper	$9.99	6
	No one	03 9:53:07 PM	238637	Let's Play Store	$19.95	5
	No one	03 9:53:41 PM	238642	Let's Play Car C	$19.95	2
▶	No one	03 9:54:53 PM	238651	Let's Play Hous	$19.95	4
*	No one	03 9:56:36 PM				

Lookup to Another Form Step 2: Create the form that does the lookup

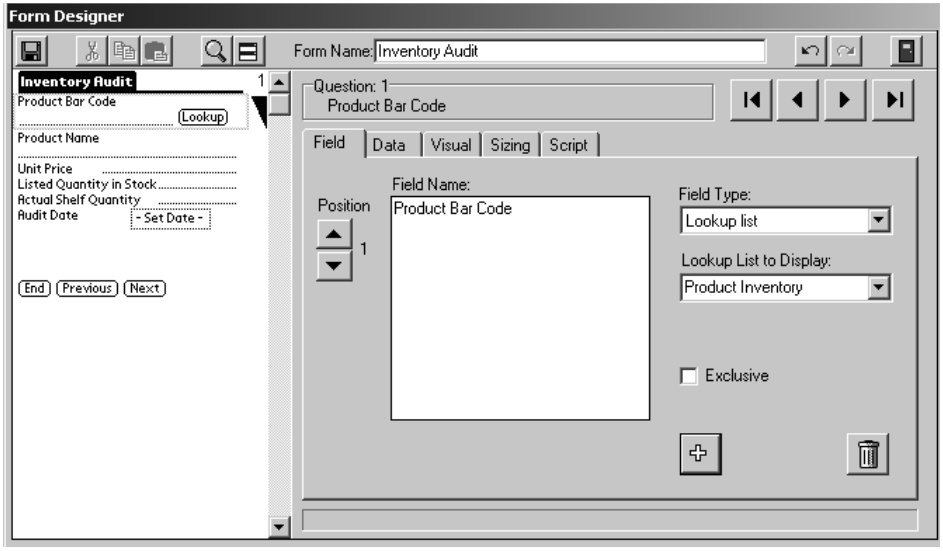
Next, create the form that will be doing the lookup.

In order to do the lookup, one field on this form must be a Lookup List field type.
In the Lookup List to Display field, instead of selecting a Lookup List, type the exact name of the reference form, using the same upper and lower case letters and spaces.

For each field that you want to copy from the reference form into this form, create a field on this form that has the exact same field name and field type as the reference form.
For instance, if a field is Numeric on the reference form, it will only copy into an identically named Numeric field on this form.

If you make the Lookup List field match the field name of a Text field on the reference form, up to 50 characters of the Text field will be copied into the Lookup List field, even though the field types are different. This is the only case where field types do not have to match between the reference form and the form doing the lookup.

In the picture below, the fields that match the reference form on the previous page are: Product Bar Code, Product Name, Unit Price and Listed Quantity in Stock. When the user performs the lookup, data from the reference form will copy into these four fields.



Special Features

One feature of a Lookup to Another Form is that if you do a lookup and you do not find the record for which you are looking, you can add a new record to the reference form.

This is useful, for example, if you are taking inventory, and you find an item on the shelf that is not listed in the reference form. In this scenario you may want to add the item to the reference form.

To add an item to the form, you can tap the Add button on the lookup screen. This jumps you to the reference form so that you can add the new record. When you end the new record you will return to the lookup screen and the new record will be in the list.

Note: If each record in the reference form is supposed to be unique, you may want to use a primary key on that form to prevent users from entering the same record twice.
For information on primary keys see page 155.

For examples of doing a Lookup to Another Form, see page 366.

Lookup to a Read-Only Reference Form

Pendragon Forms has a mechanism for efficiently storing reference forms with large numbers of records (e.g.: more than 1000 records). This is a read-only reference form.

Advantages:

- A read-only reference form provides for a fast lookup on the handheld by maintaining fixed-width columns for each field.

Limitations:

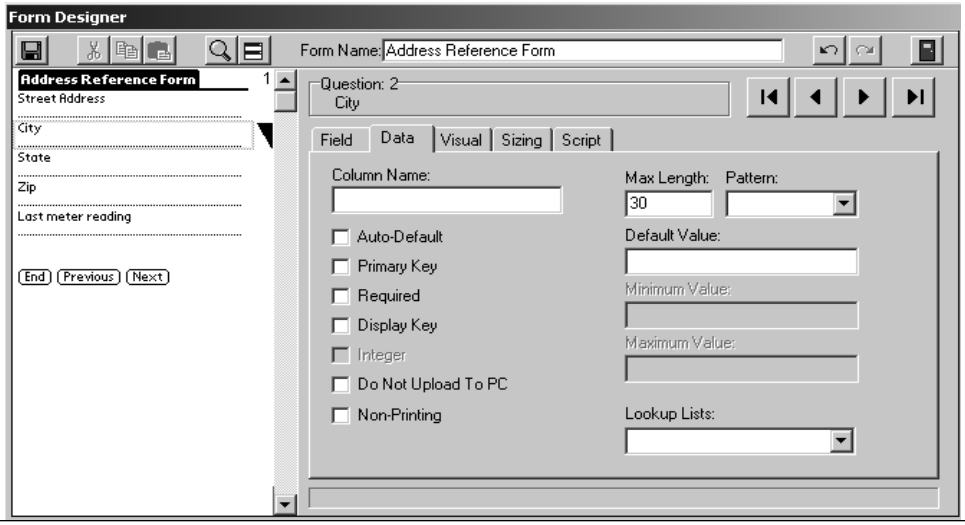
- Only Text and Numeric fields can be stored in a read-only reference form.
- The individual records of the read-only reference form cannot be viewed or modified on the handheld. The read-only reference form can only be accessed by doing a lookup from another form.

Step 1: Creating the Read-Only Reference Form

To create a read-only reference form, create a form with only Text and Numeric fields.

For each Text field, click the Data tab and set the Maximum Length to the smallest maximum that you need. For instance, if a field called Last Name never contains more than 50 characters, set the Max Length to 50.

If you do not set the Maximum Length of each Text field yourself, the default length of 255 characters will be reserved for each Text field. In a fixed-width format, this means that 255 bytes of space will be reserved even if the field only contains one character.



The Display Key field of the reference form will be used to view the records in the reference form when the handheld user performs the lookup from another form.

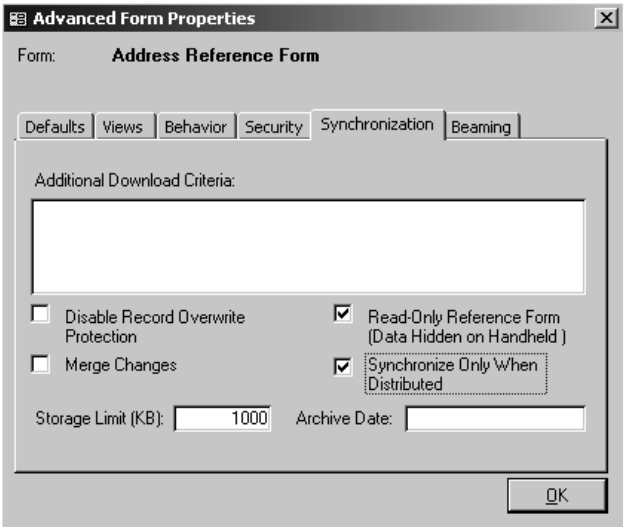
By default, the Display Key field is the first field on the form.
To select a different field on the form to be the Display Key field, click on the field in the Preview Area of the Form Designer window, to select that field. Then click the Data tab and check the Display Key checkbox to make the field the Display Key field.

Step 2: Setting the Advanced Form Properties of the Read-Only Reference form

After you have designed the form and closed the Form Designer window, click the name of the form in the Forms Manager and then click the Properties button. In the Properties window, check the Data Persistence checkbox of Keep a Copy of Records on Handheld.

Click the Advanced Form Properties button. In the Advanced Form Properties window, click the Synchronization tab and do the following:

1. Check the Read-Only Reference Form checkbox to turn this form into a read-only reference form.
2. Optional: If the records in the read-only reference do not change frequently, you can speed up synchronization time by checking the Synchronize Only When Distributed checkbox. That way the form will only be synchronized when you re-distribute the form, for example after adding new records on the PC.



3. If several handheld users are going to share the same read-only reference form, delete the default Additional Download Criteria of `UserName = ##USERNAME##` so that the Additional Download Criteria field is blank. The default criteria causes records to be sent to a handheld device only if the record is specifically assigned to that device.
4. If you have a lot of records, you may want to increase the Storage Limit field to more than 500KB. (Try 1000 or 2000.)

Freeze the reference form and then either click the Edit/View button in the Forms Manager and type in the records for that form, or you can import your data into the database table from an ASCII file - see page 206.

863 : Form

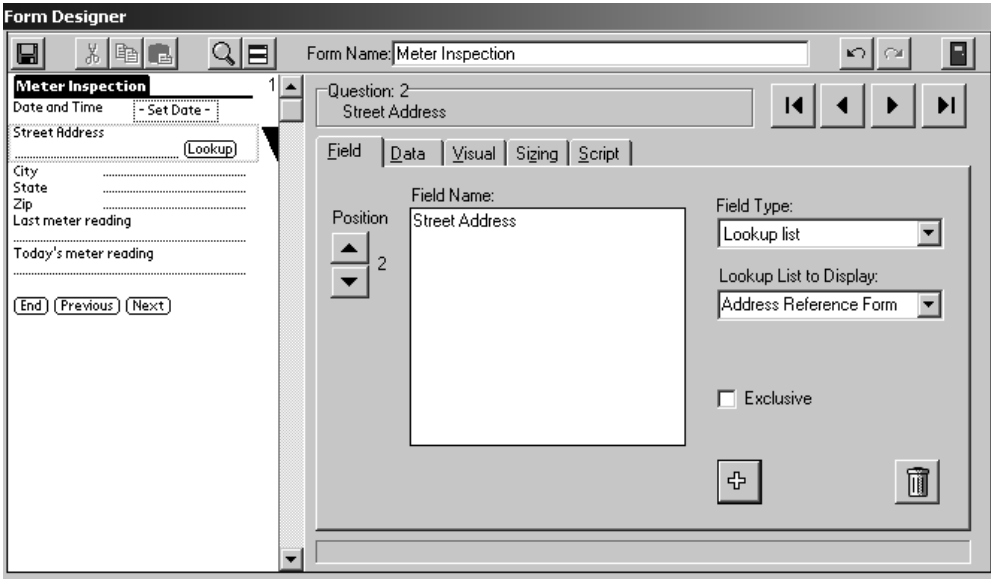
UserName	TimeStamp	StreetAddress	City	State	Zip	LastMeterR
No one	003 1:42:06 PM	Cherry Lane, #1	Chicago	IL	60606	159264
No one	003 1:42:12 PM	Cherry Lane, #2	Chicago	IL	60606	162971
No one	003 1:42:49 PM	Cherry Lane, #3	Chicago	IL	60606	471523
No one	003 1:43:22 PM	Cherry Lane, #4	Chicago	IL	60606	369888
No one	003 1:43:38 PM	Cherry Lane, #5	Chicago	IL	60606	233521
No one	003 1:43:58 PM	Cherry Lane, #6	Chicago	IL	60606	187532
No one	003 1:44:28 PM	Apple Blossom Trail, #2	Chicago	IL	60607	244122
No one	003 1:44:59 PM	Apple Blossom Trail, #4	Chicago	IL	60607	215093
No one	003 1:47:01 PM	Apple Blossom Trail, #6	Chicago	IL	60607	208974
No one	003 1:47:34 PM	Apple Blossom Trail, #8	Chicago	IL	60607	245687
No one	003 1:48:01 PM	Charles Street, Apt 1A	Chicago	IL	60606	2134
No one	003 1:48:56 PM	Charles Street, Apt 1B	Chicago	IL	60606	2155
No one	003 1:49:41 PM	Charles Street. Apt 1C	Chicago	IL	60606	2987
No one	003 1:50:10 PM	Charles Street, Apt 2A	Chicago	IL	60606	1955
No one	003 1:50:36 PM	Charles Street, Apt 2B	Chicago	IL	60606	2051
No one	003 1:51:05 PM	Charles Street, Apt 2C	Chicago	IL	60606	2113
No one	003 1:51:25 PM	Arthur Ave, Suite A	Chicago	IL	60700	631522

Step 3: Create the form that does the lookup to the Read-Only Reference form

The next step is to create the form that will do the lookup to the read-only reference form.

On this form, create a Lookup List field. This field will be used to perform the lookup to the read-only reference form. For the Lookup List to Display, instead of selecting a Lookup List, type the exact name of the read-only reference form, using the same upper and lower case letters and spaces as in the name of the read-only reference form.

For all other fields that you want to copy from the read-only reference form, create fields on the current form with the exact same field names and field types (Text or Numeric) as the fields on the read-only reference form.

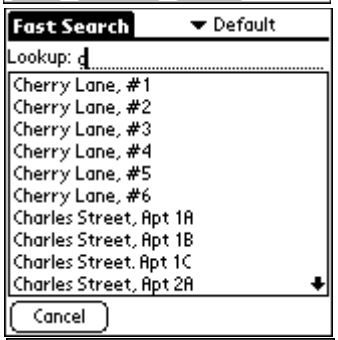


The Lookup List field can copy up to 50 characters from a Text field in the read-only reference form. In the picture above, data from a Text field called Street Address in the read-only reference form will copy into the Lookup List field of the form doing the lookup.

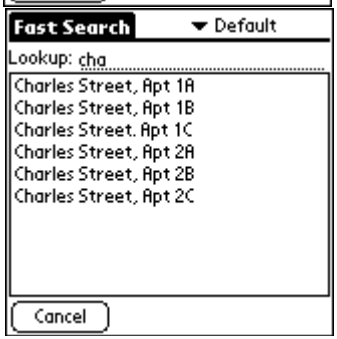
Freeze the form. Distribute both this form and the read-only reference form to the handheld, and synchronize.

Features of a Lookup to a Read-Only Reference Form

On the handheld, tapping the Lookup button in the Lookup List field displays a blank lookup screen.



Entering the first character in the lookup field displays a maximum of 100 records that match the character.
The Display Key field of the reference form is being shown here. By tapping the arrow in the upper right corner of the screen, you can select to view a second field.



To refine the search, enter the next character of the record for which you are searching. If there are still too many matches, enter a third or fourth character in the search string.

Selecting a record in the list copies all the fields from the reference form that have the exact field names as fields on the form that is doing the lookup.

If you have a handheld device with a built-in bar code scanner, you can use a script to perform the lookup to the read-only reference form when you scan a bar code in the Lookup List field. See Chapter 15, *Using Bar Codes*, page 308.

Subform Field

If you need to collect information that is related, for example: customer contact information and individual customer visits, you may want to create two forms: a 'parent' form and a 'child' form. The 'child' form is also called a subform.

Parent and subforms are used when you have a one-to-many relationship: for every one record in the parent form, there will be many records in the subform.

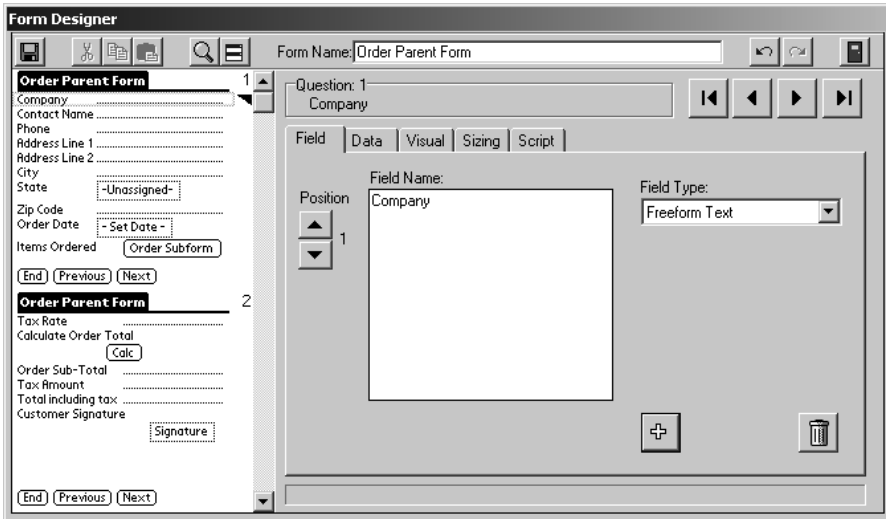
Pendragon Forms is not a relational database on the handheld, but a Subform field on a parent form makes it appear to the user that the parent form and subform are linked, by allowing the handheld user to jump from the parent form to the subform to fill in the subform record. Ending the subform record returns the user to the parent form. On the PC, data for the parent form and subform are stored in separate database tables.

Subform Step 1: Create a Parent Form

The parent form should be created first.

To connect the parent form to the subform, make at least one field on both the parent form and the subform identical in field name and field type. (Typically the first field.)

If you need to copy data from the parent form to the subform every time you create a new subform record, you can make up to the first 10 fields on the parent form and the subform identical in field name and field type.

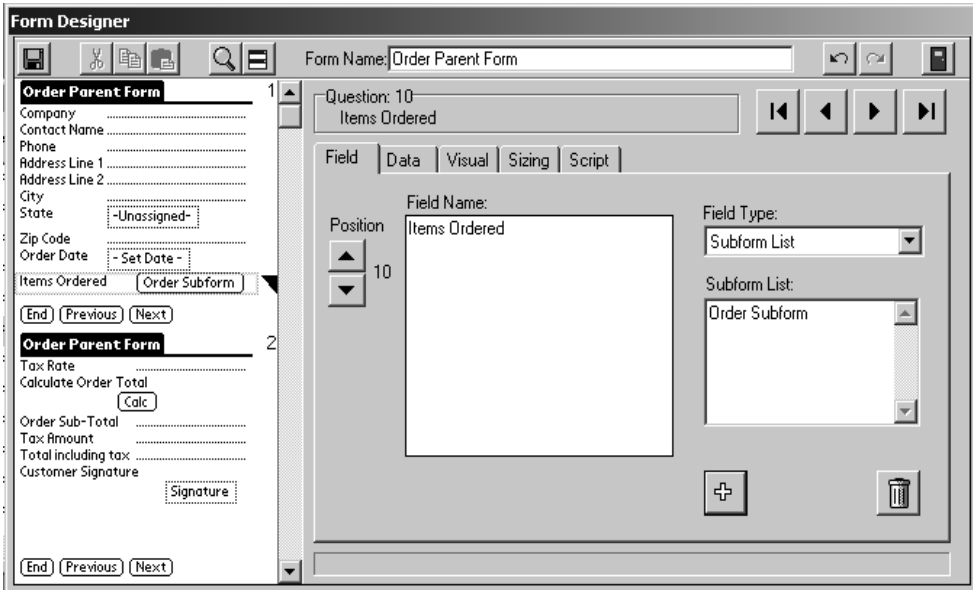


To allow the handheld user to jump from the parent form to the subform, add a Subform List field to the parent form.

The Subform field should occur after all the fields that you want to copy from the parent form to the subform record. That way the user will have a chance to fill in all the necessary fields before jumping to the subform.

In the Form Designer window, when you select Subform List as the field type, a Subform List section appears. Type the name of the form that will be used as the subform.

In the picture below, the name of the subform is going to be Order Subform.



Subform Step 2: Create a Subform

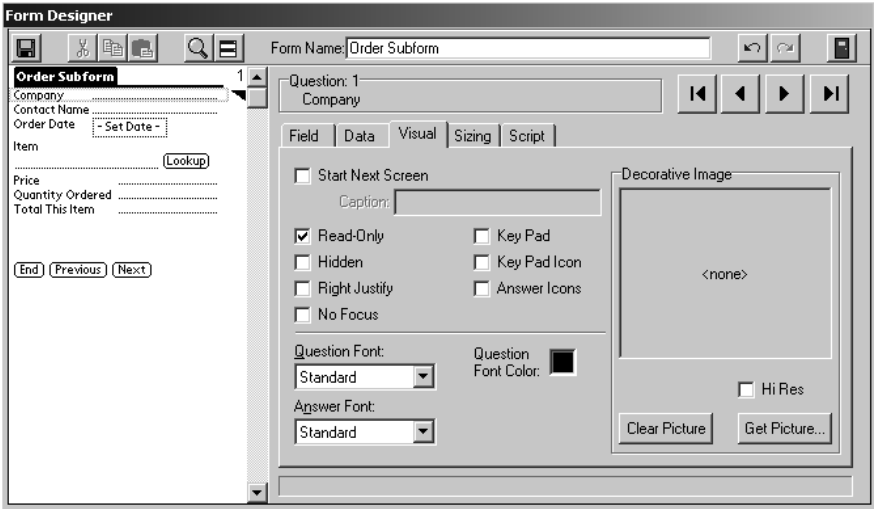
Create a new form to be the child form or subform. When you create the subform, make sure that the name of the form is identical to the name that you referenced in the Subform List field on the parent form (including upper and lower case letters and spaces).

At least one field on the subform must be identical in field name and field type to one of the first ten fields on the parent form. The matching field or fields provide the link between parent form and subform.

As a precaution, it is recommended that all the fields on the subform that match fields on the parent form should be made Read-Only on the subform. If you change one of these fields on the subform you will lose the link to the parent form, since Pendragon Forms is looking for an exact match between parent and subform in these fields. For each of the matching fields on the subform, click the Data tab in the Form Designer window and check the Read-Only checkbox.

If you want information from more than one field to copy from parent to subform, you can make up to 10 fields on the subform match the first 10 fields on the parent form. The field names and field types must be identical from parent to subform.

In the picture below, three fields match the parent form: Company, Contact Name and Order Date. The remaining fields are unique to the subform and are not on the parent form.

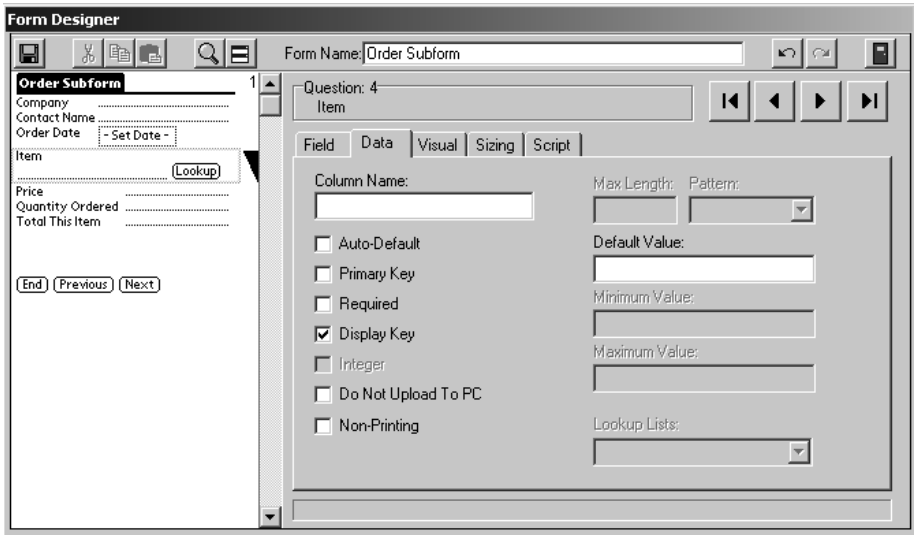


Select a field on the subform that will be the Display Key field, that is, the field that will be used to display subform records when the handheld user jumps from the parent to the subform.

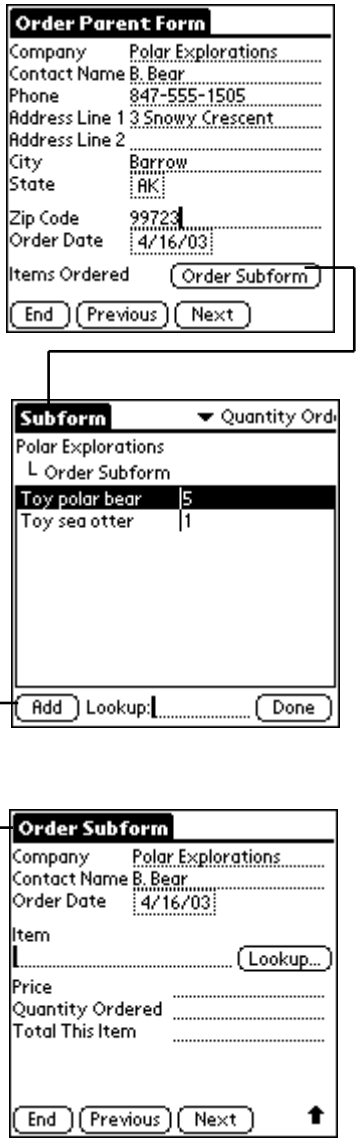
Note that when you jump from the parent form to the subform, the first matching field between parent and subform is displayed at the top of the list of subform records. Therefore, you may want to choose as the Display Key field, a field that will help you tell the difference between subform records.

In the Form Designer window, click in the Preview Area on the field that you want to use as the Display Key field. On the Data tab, check the Display Key checkbox to make that field the Display Key field.

In the picture below, the Item field on the subform is used as the Display Key field, because each subform record will contain a different item.



Features of Subforms



When using a parent form and a subform on the handheld, the user must always enter data starting from the parent form.

This means that if the parent record already exists, the user will need to review the parent record in order to add a new subform record.

To access the subform, tap the subform field on the parent form.

Existing subform records will be displayed according to the Display Key field on the subform. Tap an existing record to display it, or tap the Add button to add a new subform record.

When you create a new subform record, fields that match from the parent record are copied into the subform record.

After filling in the remaining subform fields, tap the End button to return to the list of subform records. Tap the Done button to return to the parent form.

If you have any problems with getting subforms to work, see Appendix B, *Troubleshooting*, page 443.

Special Features

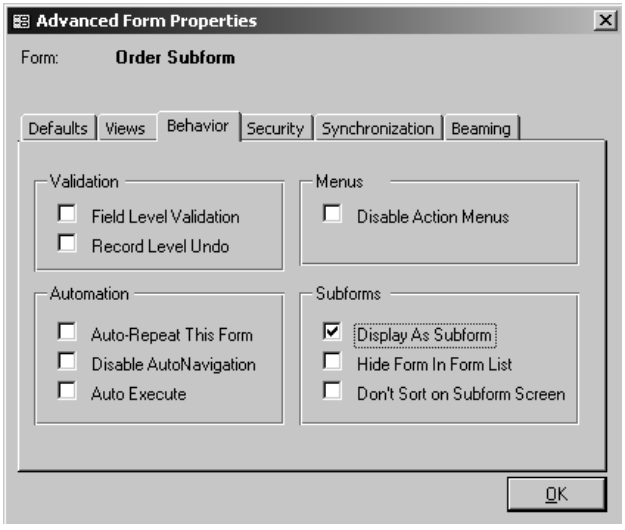
On the handheld, it is necessary to enter all data starting from the parent form. By default, however, both the names of the parent form and the subform will be visible on the handheld.

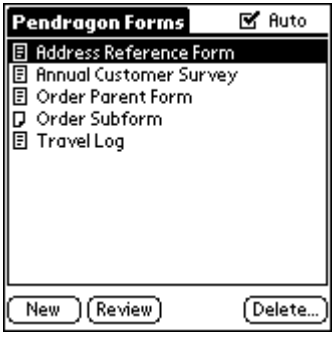
To make it easier for the handheld user to use only the parent form, you can choose to a mark a subform so that the user cannot enter new records starting directly from the subform. Or you can hide the subform name from the list of forms entirely.

In the Pendragon Forms Manager, click the name of the subform, then click the Properties button. In the Properties window, click the Advanced Form Properties button.

In the Advanced Form Properties window, click the Behavior tab.

- Either: Check the Display as Subform checkbox to mark the form as being a subform.
- Or: Check the Hide Form in Forms List checkbox so that the subform does not appear in the list of forms on the handheld.





Here a form called Order Subform is marked as a subform on the handheld. Users cannot create new records by tapping on this form. Instead, the users have to tap on the parent form.

TIP: If you have any problems getting subforms to work, see Appendix B, *Troubleshooting*, page 443.

Single Subform Field

A Single Subform field is a variation on the regular subform. Whereas you can enter many records in a subform, with a Single Subform you can only enter one record.

A Single Subform offers a way to lengthen a form. The maximum number of fields that you can have on a form is 250 fields. If you need to more than 250 fields, you can split the form into a parent form and one or more single subforms.

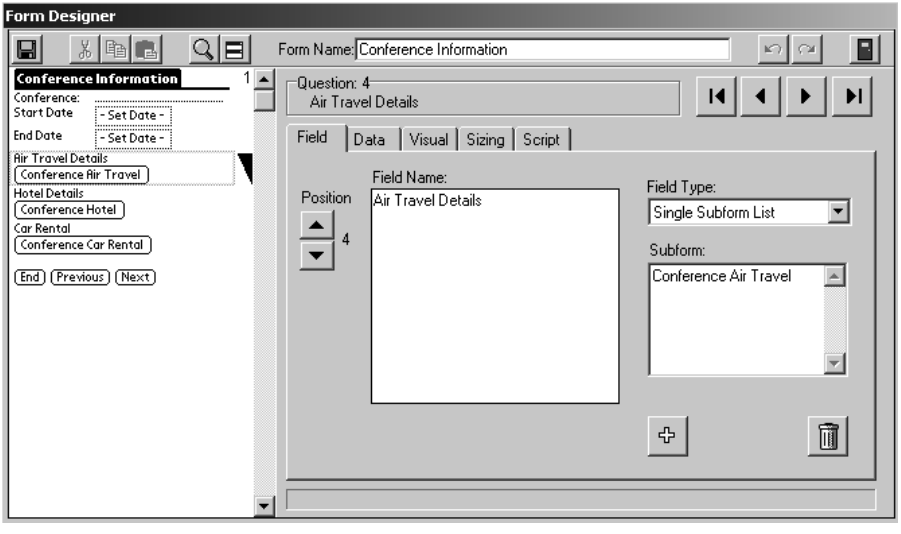
All data entry is done from the parent form. A Single Subform field on the parent form allows you to jump to a subform to enter data once, and then return to the parent form.

Step 1: Create a Parent Form

The same rules that apply to subforms apply to single subforms:

- At least one field in the first ten fields on the parent form must be identical in field name and field type on the parent form and on each subform.
- To copy data from the parent form to the single subform, you can make up to the first 10 fields match on both parent and subform.
- A separate database table is created for the parent and each subform.

On the parent form, create a Single Subform field. In the Subform List section, type the name of the form that will be used as the single subform.



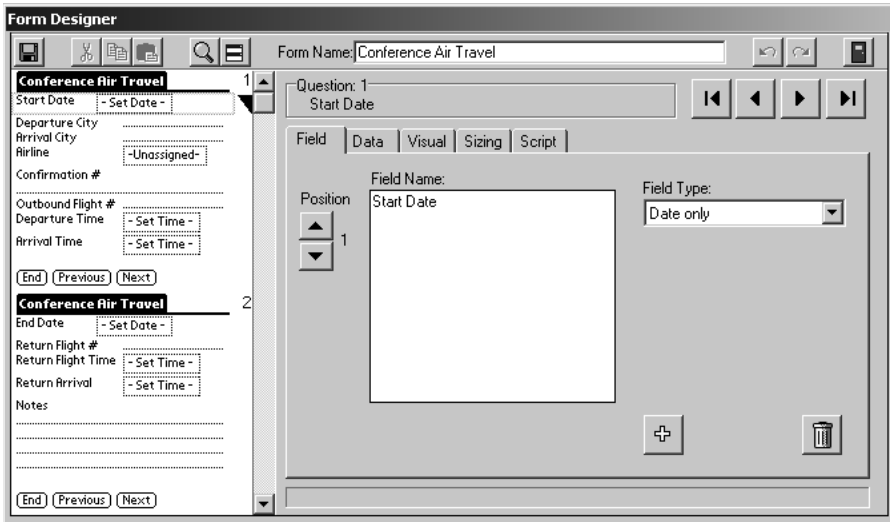
Step 2: Create a Single Subform

Create the form that will be used as the single subform. Take care so that the name of the form exactly matches the name that you typed in the Single Subform field of the parent form. Use the same upper and lower case letters and spaces.

At least one field on the single subform must exactly match the field name and field type of one of the first 10 fields of the parent form. If you need to copy data from the parent to the single subform, you can make up to the first ten fields match in both parent form and single subform.

Freeze the parent form and each single subform, then distribute to the handheld.

In the picture below, the Start Date and End Date fields are copied from the parent form into the single subform.

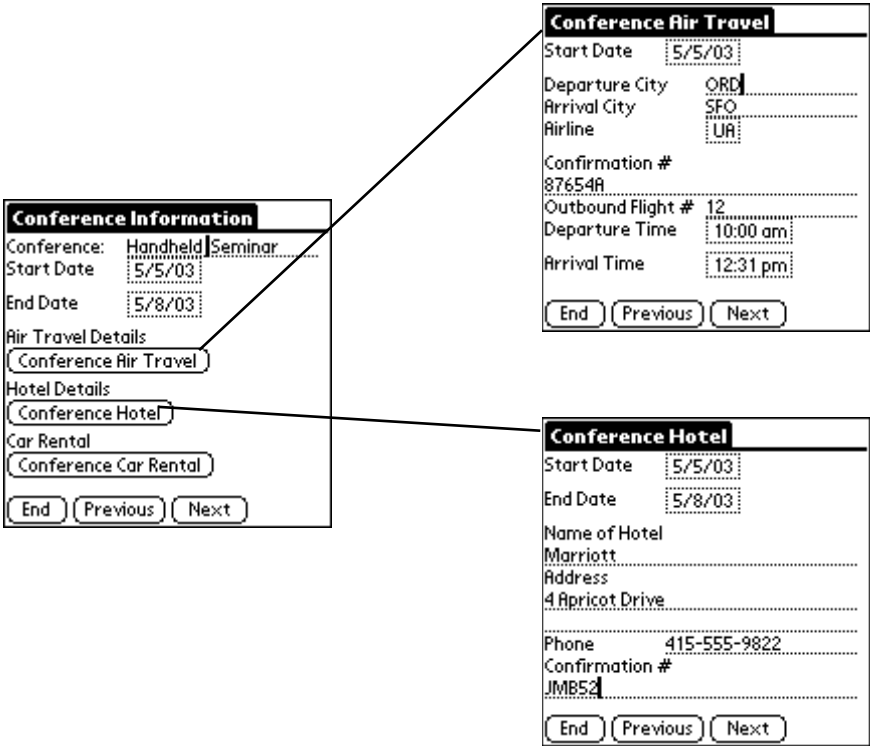


Features of Single Subforms

On the parent form on the handheld, when you tap in a Single Subform field, you will jump to the single subform.

Any of the first ten fields that match in both parent and single subform will be copied from the parent form into the single subform.

The handheld user can finish filling in the single subform, and then press the End button to jump back to the parent form.



The special features that apply to subforms also apply to single subforms. See page 108.

TIP: If you have any problems with single subforms, refer to Appendix B, *Troubleshooting*, page 443.

Signature Field

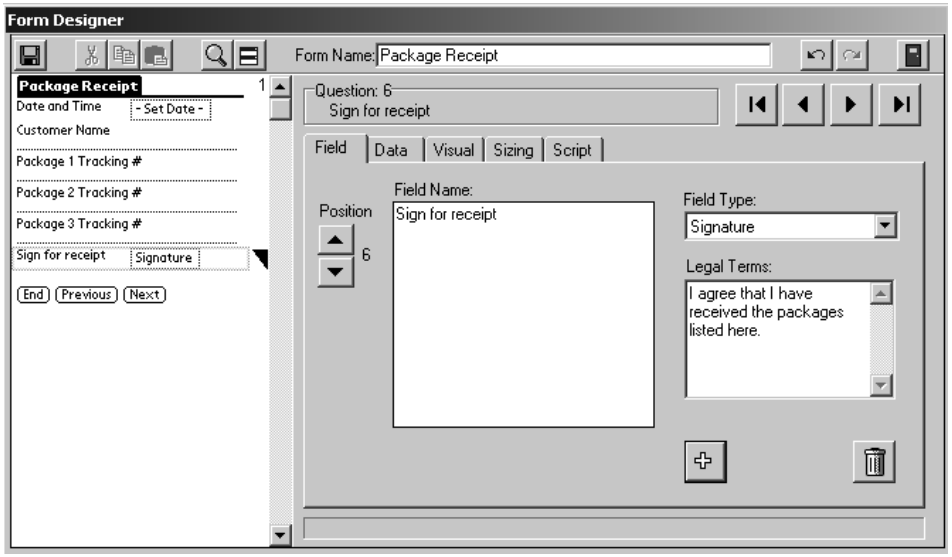
A Signature field allows the handheld user to capture a person's signature.

In the Form Designer window, when you select Signature as the field type, a Legal Terms field appears.

- If you want to indicate to the customer that signing implies agreement to certain terms, type the terms in the Legal Terms field.
- If there are no terms to agree to, leave the Legal Terms field blank.

You may need to consult with a legal professional to determine if it is sufficient for you to display legal terms on the handheld.

IMPORTANT NOTE: Signature fields and legal terms do not print directly from the handheld.



Features of Signatures

On the handheld, tap the Sign button or tap in the Unsigned box in a Signature field in order to sign.

If the customer has to read a statement of the terms that are being agreed to, these terms will be displayed. Tap the Agree button to advance to the screen that the customer can sign.

If the signature is satisfactory, tap the OK button. To re-capture the signature, tap the Clear button.

To leave this screen without saving any changes, tap Cancel.

A Signature field displays the message "Signed" if a signature has been entered, and "Unsigned" if the field is blank.

Viewing a Signature on the PC

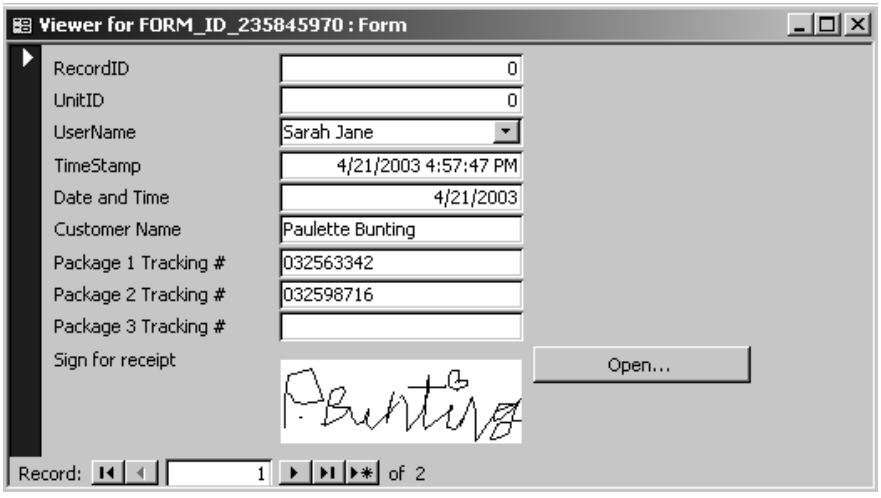
After synchronization, each signature is stored as a Long Binary Object in the Pendragon Forms Manager database.

There are two ways to view a signature in the database:

1. Click the name of the form in the Forms Manager database, and then click the Edit/View button to view the records. Signature fields will say Long Binary Object. Double-click in a Long Binary Object cell to open Windows Paint to view the image. The image can then be saved as a bitmap (.BMP) file if necessary.

OR

2. Click the name of the form in the Forms Manager database. Hold down the CTRL key and click the Edit/View button. This displays an Access form in Form View, showing one record at a time. The signature will be visible. If you click the Open button next to the signature, you can open Windows Paint to save the image as a bitmap (.BMP) file if needed.

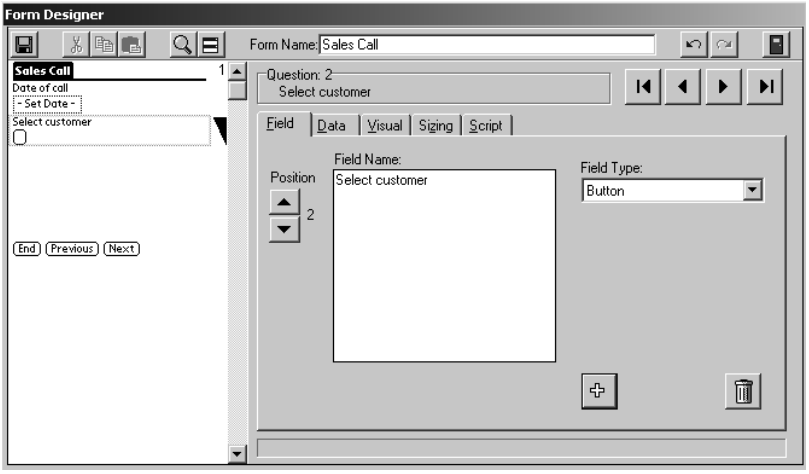


Button Field

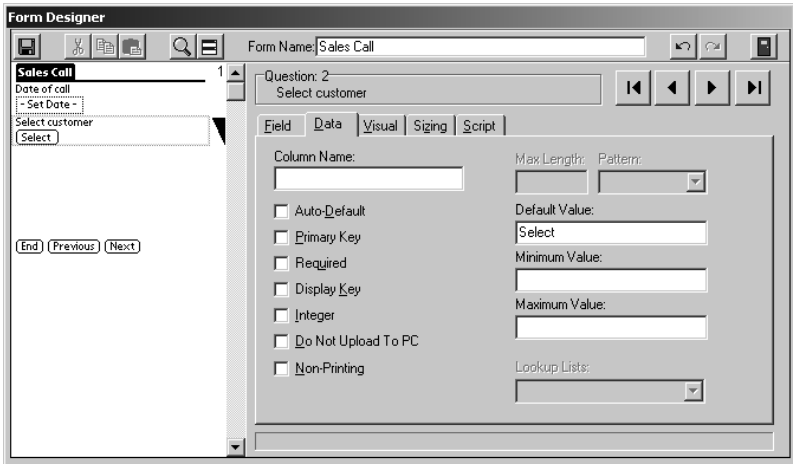
A Button field allows the handheld user to click a button in order to perform an action.

Button fields are always used in conjunction with **click:** event scripts. The **click:** event determines what happens when the handheld user taps the button. See Chapter 14, *Scripting Examples*, page 302.

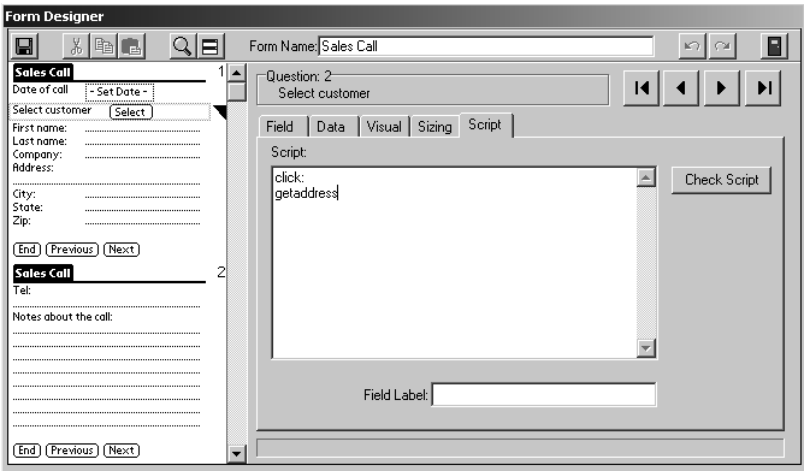
Actions that can be performed using buttons include doing a lookup to the handheld Address Book, performing calculations, printing.



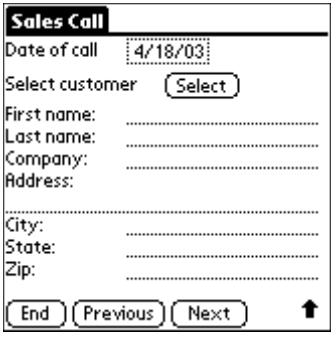
To add a label to a button, click the Data tab and type a name for the button in the Default Value field. The limit is 11 characters.



The Scripting tab of the Button field is where you write the **click:** event script that will run when the handheld user taps the button. See Chapter 13, *Scripting Reference*, page 209.



Features of Button Fields



On the handheld, tapping a button performs the action associated with the button.

In the example at left, tapping a button labeled ‘Select’ allows the handheld user to perform a lookup to the built-in Address Book, and copy information from the Address Book into specially named fields on the form.

See page 302 for details on implementing this example.

Slider Field

A Slider field allows the handheld user to select a number by tapping or sliding a marker along a horizontal line.

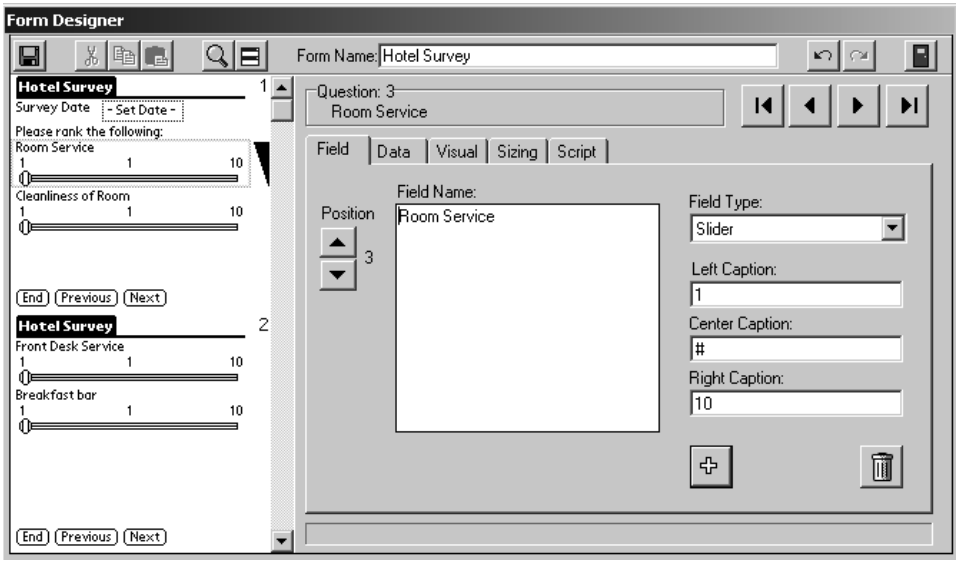
The Slider is only visible in Layout View and Field View. In Record View, the field looks like a Numeric field.

Internally, a Slider field is a Numeric field that accepts integers only, and has a Minimum and Maximum numeric range set.

In the Form Designer window, create a field with the Slider field type.

You can label the scale by entering captions for the left, center and right of the scale. A # symbol as the center caption will display the numeric value of the marker position. To display numeric values for ends of the scale, type the minimum value that you want to use in the Left Caption field, and type the maximum value that you want to use in the Right caption field.

If you enter the # symbol in each of the left, center and right caption fields, you will see labels across the top of the slider for every number in the range. This is only recommended if you have a small range, such as 0-5 or 1-10.



Click the Data tab to set the range of the Slider scale.

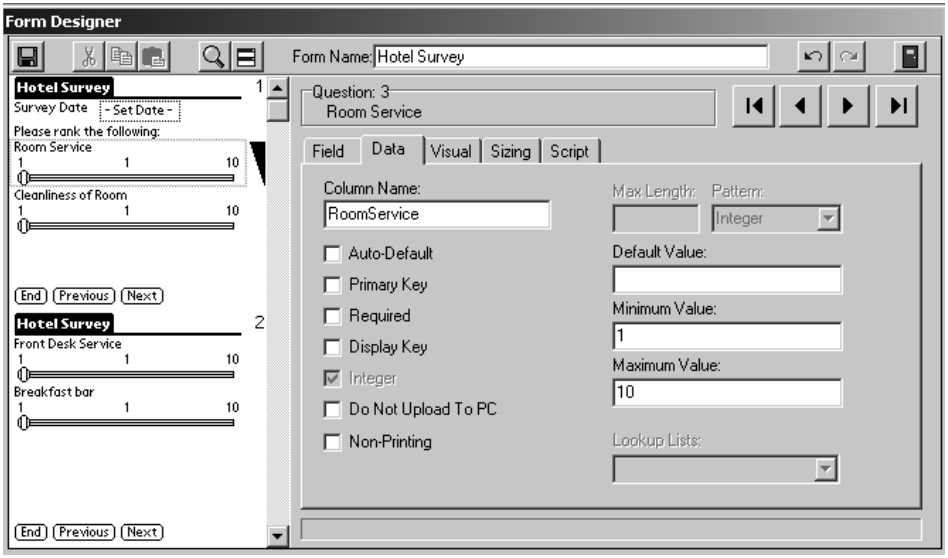
The Integer checkbox is pre-selected because a Slider field can only be an integer.

The default range is a minimum of 1 and a maximum of 10. To use a different range, enter a minimum value in the Minimum field and enter a maximum value in the Maximum field. Use the same minimum and maximum that you specified in the Left Caption and Right Caption fields on the Field tab of the Slider field.

The scale on the handheld is only 150 pixels wide. This means that if you make your slider scale from 1 to 300, the smallest movement along the scale is 2 units at a time.

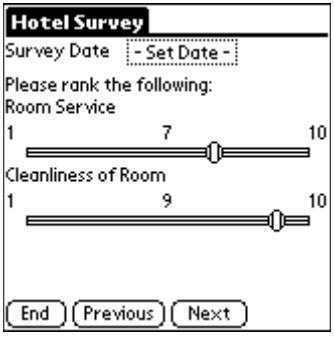
If the Default Value field is left blank, then the value of the Slider field will be null until the handheld user taps the scale. The marker for the slider scale will not be displayed until the user taps the Slider bar to select a value.

If you enter a value in the Default Value field, then the value of the Slider scale will be pre-set to that number, and the marker on the scale will be at that position along the scale.



Features of Slider Fields

On the handheld, the Slider bar initially does not have a marker when the field is null.



Tap the horizontal line to position the marker along the scale. Or you can slide the marker along the scale. The marker will only stop at integer points along the scale.

In Record View, this field is a Numeric field without a scale, but with the same numeric range.

Sketch Field

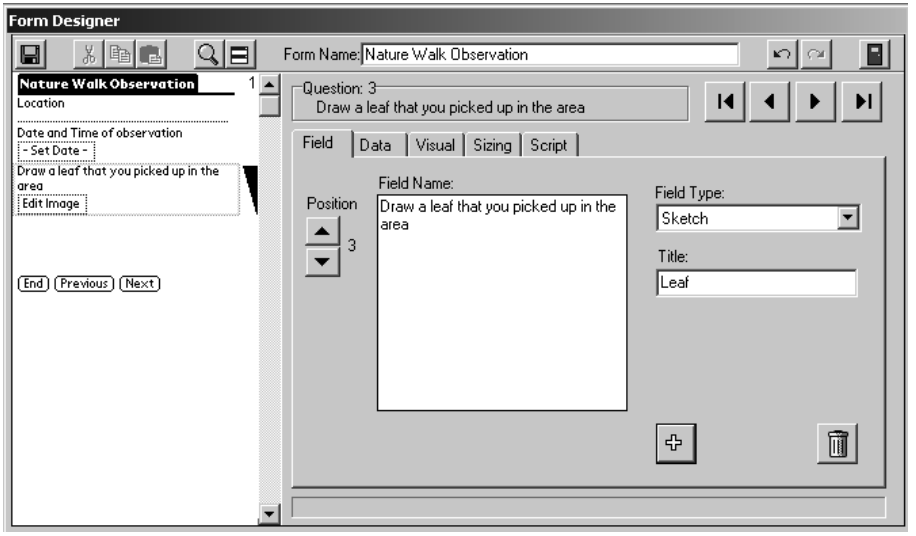
A Sketch field allows the handheld user to draw a picture.

Sketch fields are similar to Signatures, but they allow a larger area on the handheld for drawing. The area of a sketch can be 160 pixels wide x 130 pixels high.

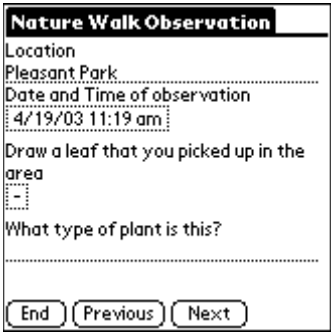
IMPORTANT NOTE: Sketch fields do not print directly from the handheld.

In the Form Designer window, create a field of field type Sketch.

In the Title field, type a name for sketch that the handheld user has to draw.



Features of Sketch Fields

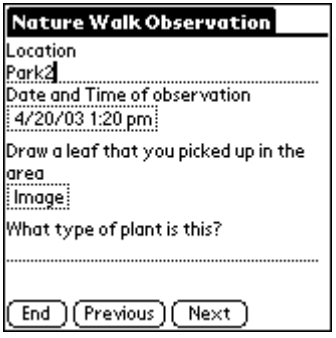


On the handheld, a dash (-) indicates that no sketch has been drawn in the field.

In Layout View or Record View, tap the dash to display the sketch area.
In Field View, tap the Edit button to display the sketch area.

In the Sketch area, the arrow button in the upper right corner of the screen allows the handheld user to select Pen (a thin line), Marker (a thick line) or Eraser to erase. The user can draw in the sketch area and then tap OK to save the image.

Tapping the Clear button erases the entire sketch area. Tapping the Cancel button cancels all changes and reverts to the original state (no image, or previously saved image.)



The Sketch field will contain the word Image if a sketch has been saved.

Viewing a Sketch on the PC

After synchronization, each sketch is stored as a Long Binary Object in the Pendragon Forms Manager database, just like Signature fields. (See page 114.)
You can double-click in a Long Binary Object cell to open Windows Paint to view the sketch. The sketch can then be saved as a bitmap (.BMP) file if necessary.

Image Field

New in Forms 4.0.

An Image field is used to attach a picture to a record.

Typically, you may have images on the PC that you want to associate with records that you send to the handheld. An example may be a form used by a school, containing pictures of students and their emergency contact information. Another example might be a real estate application containing images of properties for sale.

Only handheld devices with external storage cards can support the use of Image fields in Pendragon Forms. This is because the image files are actually stored on the external media card and not in RAM (available memory) on the handheld device. Handhelds with Palm SD cards, MMC cards or SONY Memory Stick cards can support Image fields.

For an image file to be viewable within Pendragon Forms on the handheld, the file must conform to the following limitations:

Image File Type	.BMP (Windows bitmap files)
Maximum number of colors	256 colors (8-bit color depth)
Maximum Image dimensions for Low Resolution devices	160 x 128 pixels
Maximum Image dimensions for Hi Resolution devices	320 x 192 pixels
Maximum file size	60KB

If you want to use images that are .BMP, .GIF or .JPG file types, or are larger than the maximums listed above, you can use Pendragon Forms in conjunction with a third party application called AcidImage, which is an image viewing program for the Palm OS from a company called RedMercury LLC. The images will not be visible within Pendragon Forms, but tapping on a box in the Image field will run the AcidImage program to display the image. An evaluation version of AcidImage can be downloaded from Red Mercury at http://www.red-mercury.com

To create an Image field, select Image as the field type in the Form Designer window.

The following options are available for Image fields:

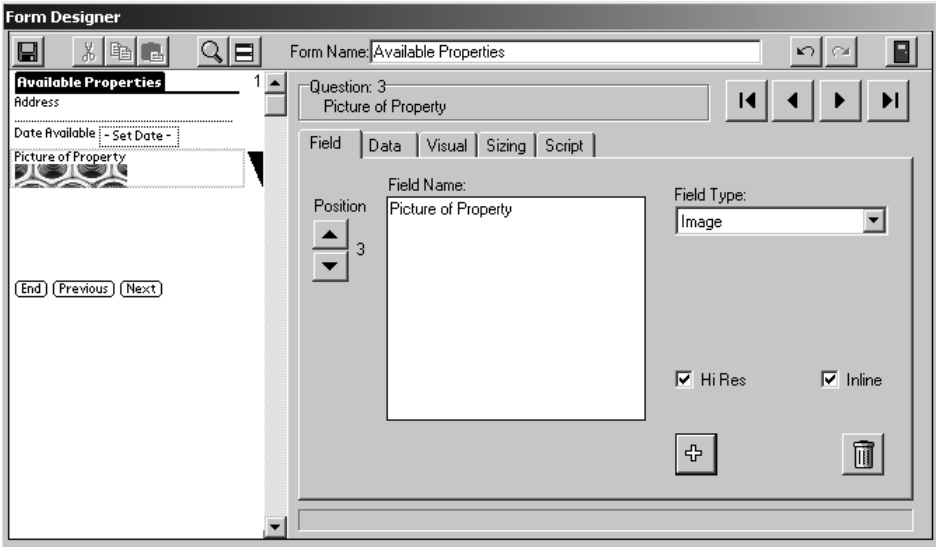
Hi Res

Check the Hi Res checkbox if you are designing an application for a high resolution device (320x320 pixel screen such as the Palm Tungsten T, Palm Zire 71 or a SONY Clie). The image will be displayed in high resolution. Hi Res images appear 1/4 the size of low resolution images, but are sharper. If you check the Hi Res option, but put your form on a low resolution device (160x160 pixel screen), the image will be displayed in low resolution.

Inline

Check the Inline checkbox if you want the image to be automatically displayed onscreen within the Pendragon Forms record. (An image must conform to the Pendragon Forms limits described on the previous page, to be visible inline.)

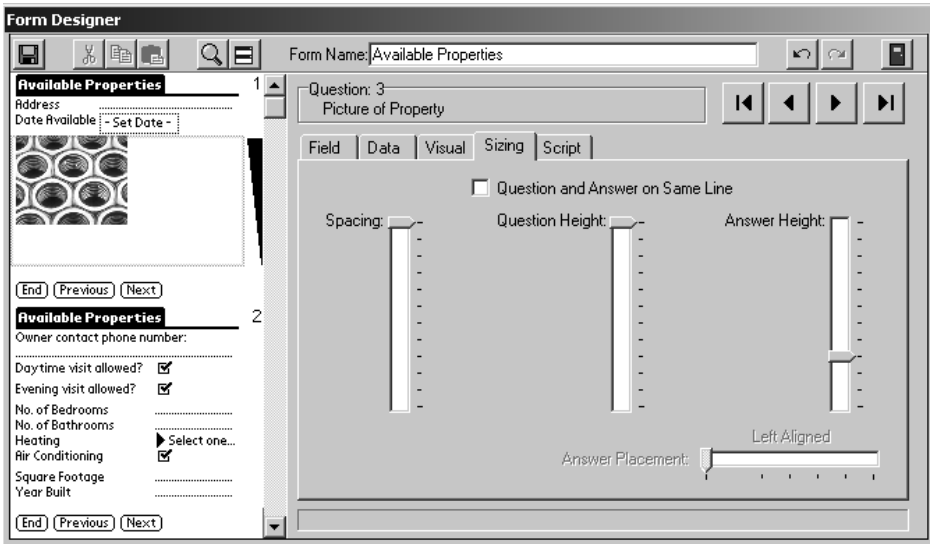
For performance reasons, if you do not want to display an image every time the user views the screen, you can choose not to check the Inline checkbox. Then the Image field will contain an icon that the user can tap when they want to see the image. If you are using the AcidImage program to display large files or .GIF or .JPG files, you should **not** check the Inline checkbox.



If you are viewing images Inline, then to reserve a space on the handheld screen that is large enough to view the image, click the Sizing tab and make the Answer Height bigger. You can also make the Question Height zero.

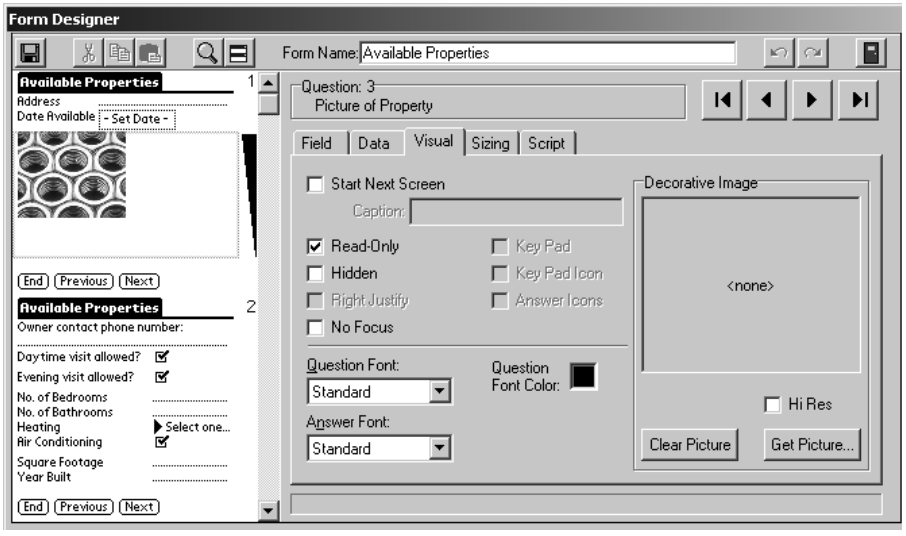
The sample graphic that displays in the Preview Area of the Form Designer is 160x128 pixels in size, so if your image file is that size, make the Answer Height big enough to see the entire sample graphic. If your image file is 320x192 pixels, you will need to have the Image field on a screen by itself, and make the Answer Height as big as the Form Designer will allow.

Note that low resolution devices (160x160 pixel screens) will only be able to display a portion of a 320x192 pixel graphic.



To prevent the handheld user from deleting the images in the records, click the Visual tab for the Image field and check the Read-Only checkbox. This is particularly important if images are not being displayed Inline, because users have the option to clear images when they are not displayed Inline.

NOTE:
Making an Image field Read-Only does not protect the image file if a script is used to attach an image file to a record.



NOTE:
If you want several handhelds to share records, you will need to select one or more fields to be the primary key field(s) before you freeze the form. See pages 23-26 for information on creating forms for users to share records.

Attaching Image Files to Records

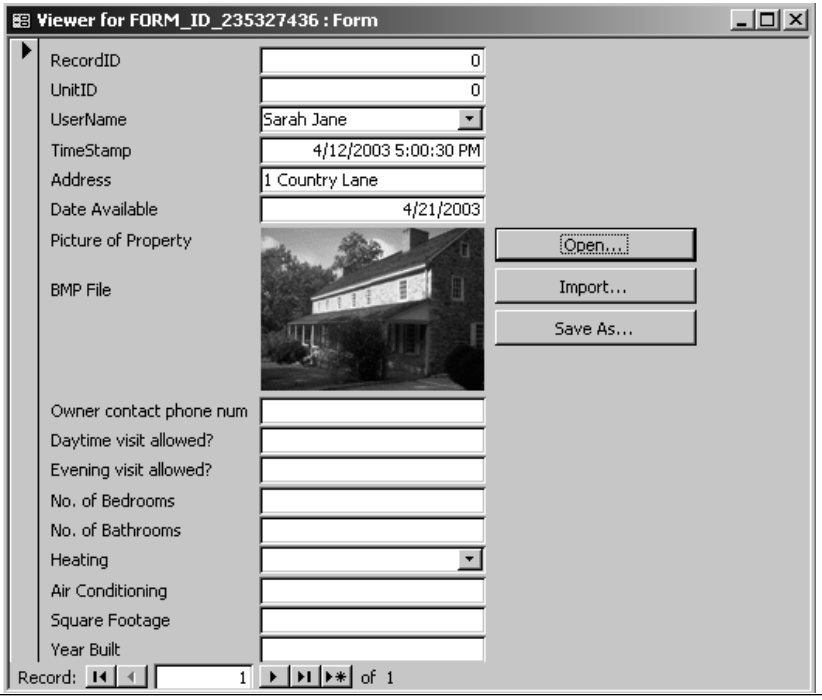
When you are satisfied with your form design, freeze the form design. Once you have frozen the form, you can create the records for the form and attach image files to the records.

To create records for the form, hold down the CTRL key and click the Edit/View button in the Forms Manager. This displays an Access form that shows one record at a time.

Before you can import a graphic into an Image field, you will need to fill in at least one other field on the form to create a new record. Then click the Import button and select the file that you want to attach to the record.

The preview only displays graphics as 160x128 pixels, even if they are 320x192 pixels. On the handheld the graphic will display appropriately. If you are using AcidImage to view .JPG or .GIF files on the handheld, you will not see a preview of the image here, but the words 'JPG File' or 'GIF File' will appear in the gray area to the left of the image so that you will know that the image has been imported successfully.

To move to the next record, click the right arrow button at the bottom of the screen, so that the record count advances by one (e.g. from 1 to 2). Remember to fill in a field before importing a graphic.

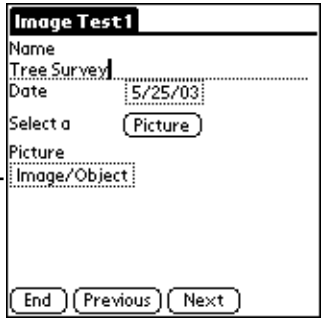


Features of Image Fields

If an Image field is set to display Inline, and the image conforms to the limits for being viewable in Pendragon Forms, it will be displayed whenever you are on the screen containing that field.

If an Image field is set to display Inline, but the image does not conform to the limits required to be viewable in Pendragon Forms, there will be an icon for the image.

If AcidImage software is installed on the handheld, tapping the icon will launch AcidImage to display the image.



If an Image field is **not** set to display Inline, a selector box will be displayed.

Tapping the selector box will display an Image Detail screen. If the image is viewable in Pendragon Forms, the image will be displayed on the Image Detail screen.

If AcidImage software is installed on the handheld, tapping the Viewer button will launch AcidImage to display the image.

Tapping the Clear button deletes the image.

Image Files

On the PC, when you import an image file, a copy of the image is stored in a binary field in the Forms Manager database.

On the handheld, image files are stored in a FORMS4 folder on the external media card (SD card, MMC card or Memory Stick) . The name of each file is composed of the FormID number (8 hex (hexadecimal) digits), the RecordID (8 hex digits) and the Question ID (4 hex digits), plus a file extension that is assigned by the conduit when the image is downloaded to the handheld. Pendragon Forms on the handheld uses the file extension to determine whether or not a file can be displayed internally.

Every time you synchronize the handheld, all records are removed from the handheld, and then the records that are to remain on the handheld are re-sent to the handheld. This is true for image files also. If you have a form with many records that contain images, synchronization may be slow as the images are removed from the handheld and then re-sent to the handheld. If the form is for reference purposes and the records are not updated by the handheld user, you can set the Advanced Form Property to Synchronize Only When Distributed. See page 188.

The information in this chapter has been about taking image files that originate on the PC and sending those images to the handheld. Through scripting, Pendragon Forms can also support attaching image or any other binary file that originates on the handheld, not the PC. For example, if you take a picture with the handheld device, you can choose to attach that image file to a Pendragon Forms record. For more information, see Chapter 17, *Working with Images*, starting on page 337.

Custom Control Field

New in Forms 4.0.

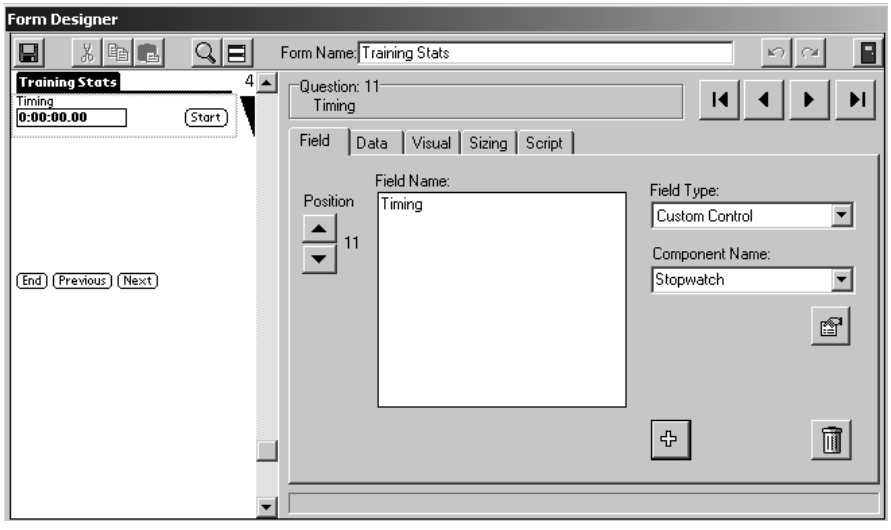
Pendragon Forms 4.0 supports Custom Controls - separate program modules that can be installed on the handheld in order to extend Pendragon Forms' capabilities.

Pendragon Forms 4.0 ships with three Custom Controls: a stopwatch control (FormsStp.prc); a GPS (Global Positioning System) control (FormsGPS.prc); and a Zire 71 Camera control (FormsZire71.prc). These three .PRC files are in the C:\Program Files\Forms3 folder and can be installed on the handheld if you are creating a form that requires them.

There is also a Software Development Kit for developers to create their own Custom Controls using the C programming language. The kit can be downloaded from www.pendragonsoftware.com.

A Custom Control field type is a placeholder for one of these external program modules. A Custom Control field is like a Text field with a customized appearance. The Custom Control field stores a value generated by the external program module. In the case of the stopwatch control, the value placed in the Custom Control field is the elapsed time with 0.1 second precision. In the case of the GPS control, the value placed in the Custom Control field is the set of GPS coordinates.

Once you install a Custom Control .PRC file onto the handheld, that program module can be accessed by several fields on the same form, or by several forms.

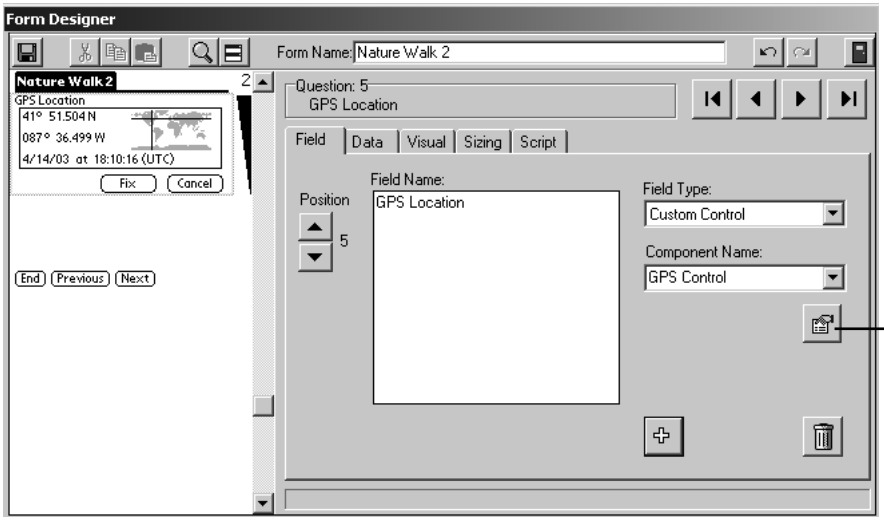


Using a Custom Control Field

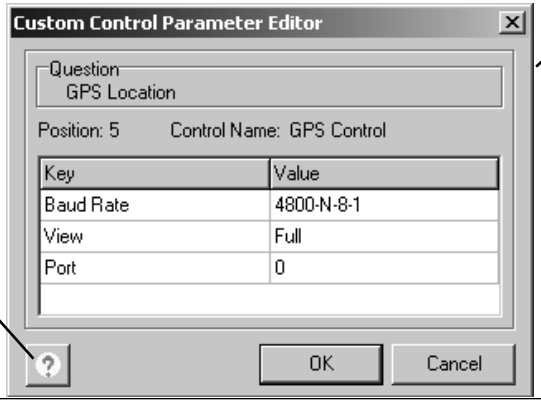
In the Form Designer window, type a name for the Custom Control field and select Custom Control as the field type.

The Component Name field will display a list of the available custom controls. Select the custom control that you want to use. The built-in custom controls are Stopwatch, GPS Control and Zire71 Camera. (Note: The 'Other' option is reserved for developers who are building their own custom control in the C programming language.)

Next, click the Parameters button to enter the parameters that are required for the custom control that you are using. For information on the required parameters, click the Help button.



Click the Help button in the Custom Control Parameter Editor window to display information on the parameters required for the Custom Control you are using. The Help is usually in .PDF file format, readable with Adobe Reader software.



Stopwatch Custom Control

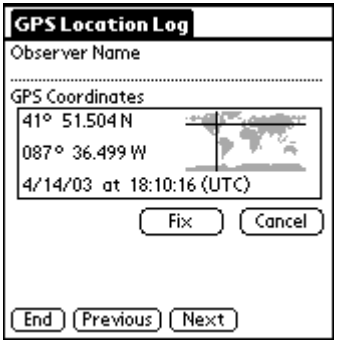
The Stopwatch custom control is called FormsStp.prc. This file is typically located in the C:\Program Files\Forms3 folder, and will need to be installed on the handheld.

In the Custom Control Parameter Editor window in the Form Designer, click the Help button to read more about using the Stopwatch control.

Tapping the Start button starts the stopwatch. Tapping Stop stops the timer. The time elapsed is recorded to 0.1 second precision and stored in the Custom Control field.

Note: the Stopwatch control is not a lap timer. If the user goes back to the Custom Control field and taps the Start button again, the Stopwatch will start counting from zero again.

GPS Custom Control



In order to use the GPS (Global Positioning System) Custom Control module, the handheld user will need an external GPS device that can attach to the hahdheld.

In the Form Designer window, if you are using the GPS custom control, click the Parameters button to enter the parameters required to make your external GPS device work with Pendragon Forms. Click the Help button in the Custom Control Parameter Editor window to read more about the required parameters.

The GPS custom control .PRC file that you will need to install on the handheld is called FormsGPS.prc. This file is typically located in the C:\Program Files\Forms3 folder.

Zire 71 Camera Custom Control

For information on the Zire 71 Camera Custom Control, see page 343 .

8. Advanced Form Designer

The Form Designer is where you design forms to send to the handheld. This chapter assumes that you have read the basics of using the Form Designer in Chapter 2 (see page 6).

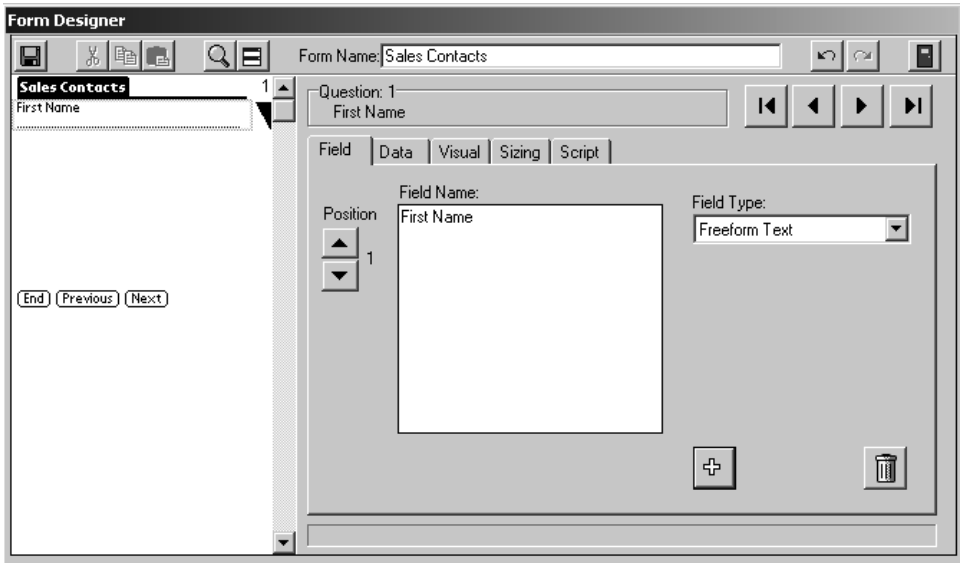
To open the Form Designer window, either click the New button in the Pendragon Forms Manager, or click on the name of an existing form and click the Edit button.

The Form Designer Window

Every form must have a Form Name, which is typed into the Form Name field at the top of the Form Designer window.

The Preview Area on the left side of the Form Designer shows which field is currently selected, by displaying a pink dotted-line box around the field. There is also a black triangle to the right of the current field, so if the pink dotted-line box is difficult to see, use the black triangle as your marker for which field is selected.

The five tabs: Field, Data, Visual, Sizing and Script all apply to the selected field.



The following table shows what the buttons in the Form Designer are used for:

Button	Function
	Click the Plus button to add a field after the selected field.
	Click the Up and Down arrow buttons to re-position the selected field, either moving the field up or down the form.
	Click the Left and Right arrow buttons to make the next or previous field the selected field. The arrow buttons with lines jump you to the first and last fields on the form. If you are on the last field on the form, and you click the right arrow button, a new field will be created at the end of the form.
	Click the Save button to save the form design. If you are working on a very long form, save often.
	Click the Exit button to close the Form Designer window. If you have not yet saved changes to the form design, you will be prompted to do so. Choose Yes to save changes.
	Click the Delete button to delete the selected field.
	Click the Field View Preview button to change the Preview Area to display what Field View looks like (one field displayed at a time on the handheld). Only use this if you are going to use Field View on the handheld.
	Click the Find button to search for a phrase in any part of a field: the field name, Popup List items, scripts. This is useful if you have a large form and you want to find a specific field.
	Hold down the Shift button and click on a field in order to use the Cut Copy and Paste buttons to cut or copy a field and paste the field into a different location on the form. You can also move a field with the Up and Down arrow buttons instead of using Cut and Paste.

Field Tab

The Field Tab of the Form Designer is where you specify the field name and field type of each field on the form.

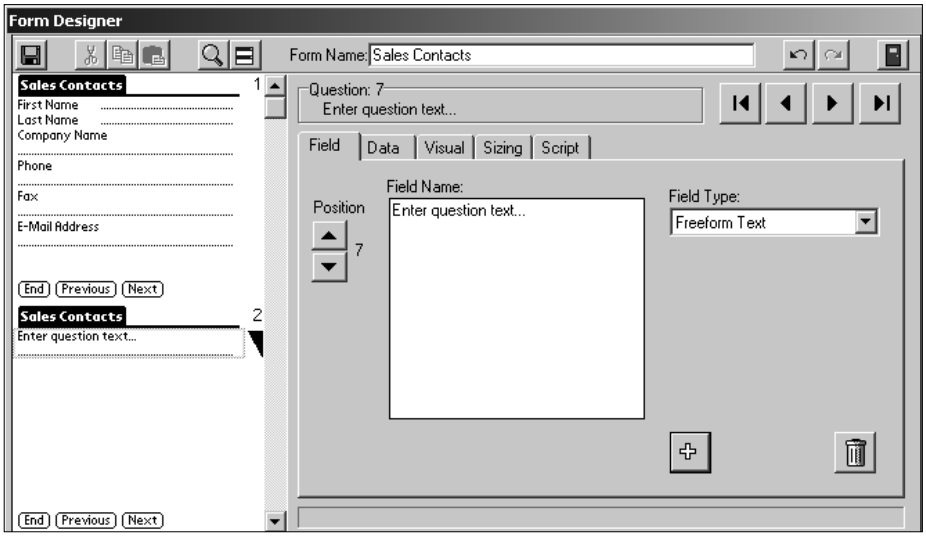
When you create a new field, the Field Name area contains the text *Enter question text...* Highlight this text if it is not already highlighted, and type the name that you want for this field.

In the Field Type field, click the arrow button to select a field type for this field. The field type determines the kind of data that the handheld user will be allowed to enter in this field. Chapter 7, *Field Types*, page 60, details the 23 different field types that are available.

The field number, that is, the position of the field on the form, is shown in two places: the Position area of the Field tab and in the Question area that is visible above the Form Designer tabs. You can use the Up and Down arrow buttons to move a field up or down from its current position.

To add another field to the form, click the + button. The new field will be added after the current position. Alternatively, if you are on the last field of the form, you can click the right arrow button to create a new field at the end of the form.

To make a different field the selected field, either click on the field in the Preview Area, or use the left and right arrow buttons until the field is displayed in the Question Area.

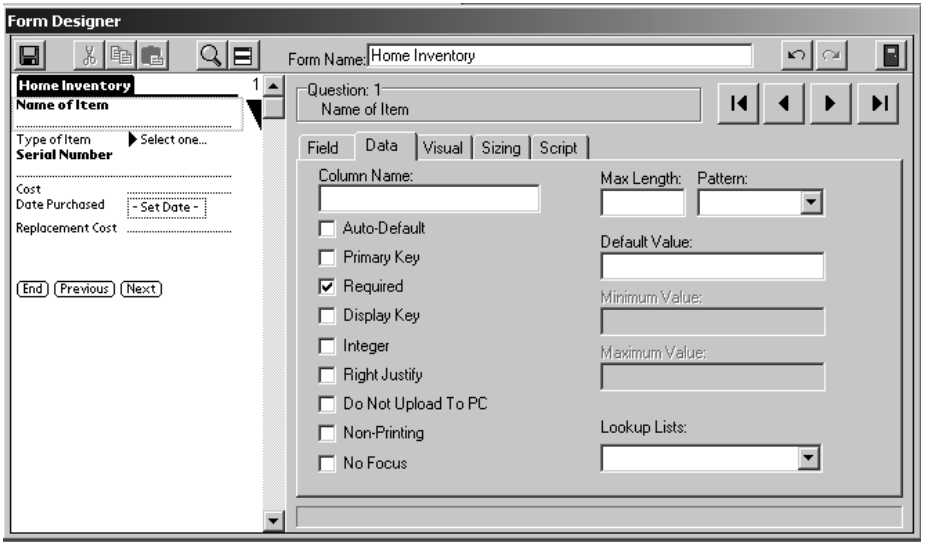


Data Tab

The Data Tab in the Form Designer window displays the Advanced Field Properties of the selected field.

The Advanced Field Properties that are available depend on the field type of the selected field.

For a complete description see Chapter 9, *Advanced Field Properties*, starting on page 152.



Visual Tab

The Visual Tab in the Form Designer window displays various attributes that affect how the field appears visually on the handheld.

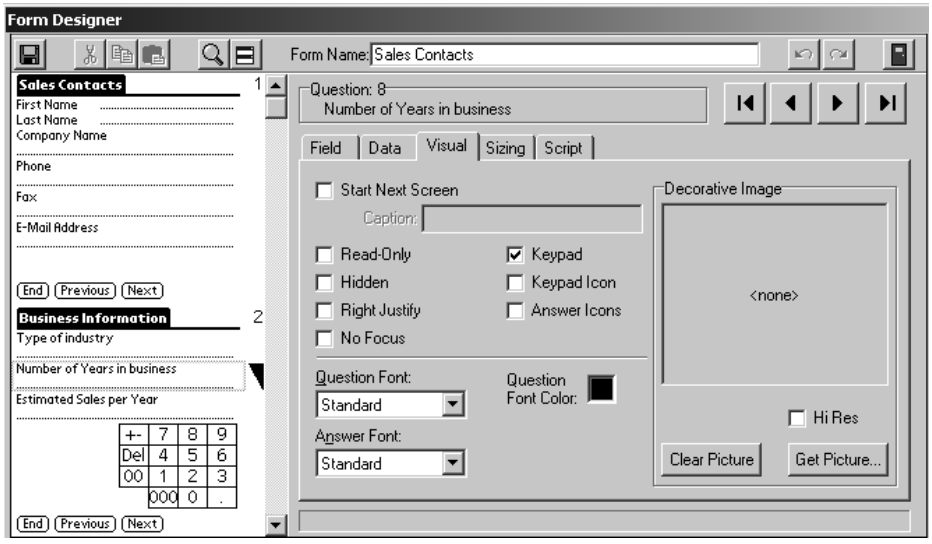
The visual attributes are described here.

Adding a Numeric Keypad

In Text, Numeric and Currency fields, you can choose to add a numeric keypad to the handheld screen, to make it easier for the user to enter data.

To add a keypad, click the Visual tab of a Text, Numeric or Currency field, and check the Keypad checkbox. Only one keypad will be displayed on the screen, so you only need to set the Keypad option for one of the fields per screen.

If you add a keypad to a screen, you will, of course, be able to fit fewer fields on that screen.



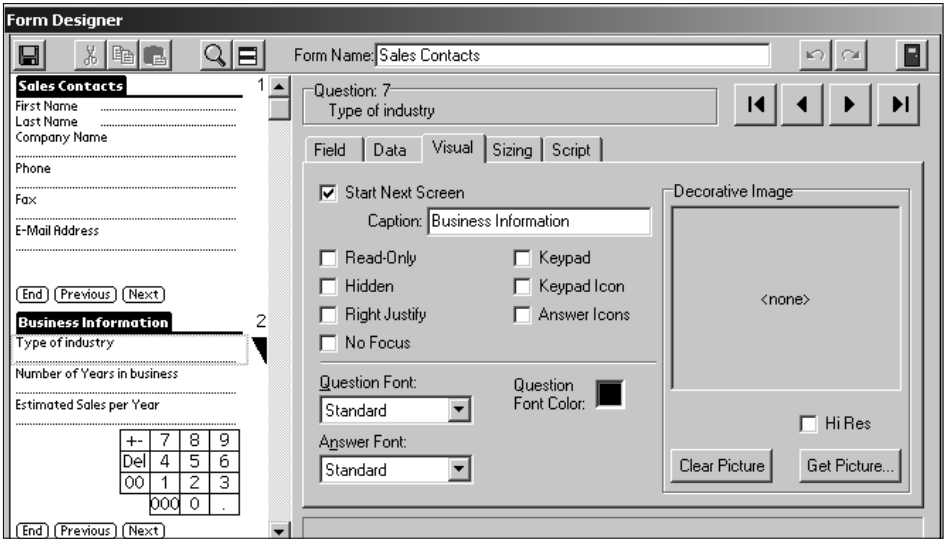
Making a field start on a new screen

When you add a field to a form, if the field can fit on the current screen, the Form Designer will just add the field to the current screen.

In some instances, it is helpful for a group of similar questions to start on a new screen.

To make a field start on a new screen, click the Visual tab for that field and check the Start Next Screen checkbox.

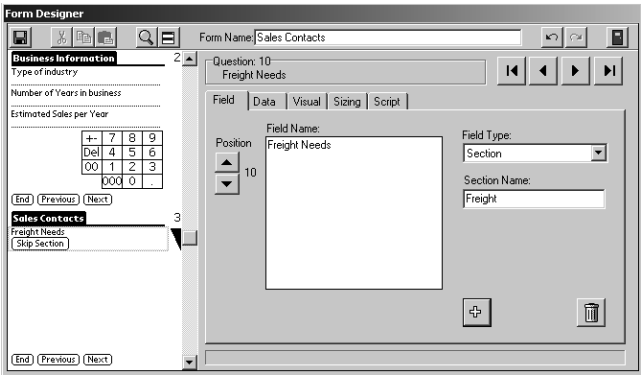
In the Caption field, you have the option of typing a new header, so that the new screen has a different header on the handheld screen. If you leave the Caption field blank, the form name will be used as the default header.



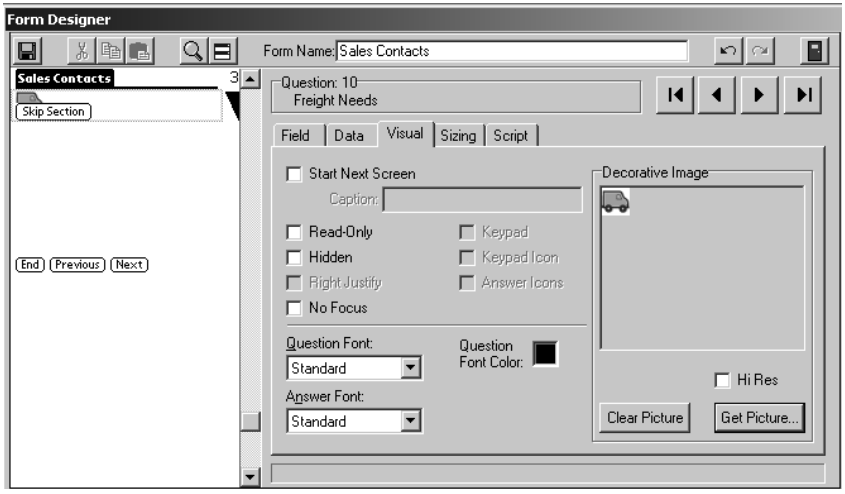
Adding an image to a screen

You can add a decorative (static) image to a question to add style, color or emphasis. Unlike images attached to Image fields, decorative images are part of the form design, not part of the data, so they do not increase the size of each record.

Section fields are frequently used to display a static image, because Section fields do not require the user to enter any data. However, you can add a static image to any type of field.



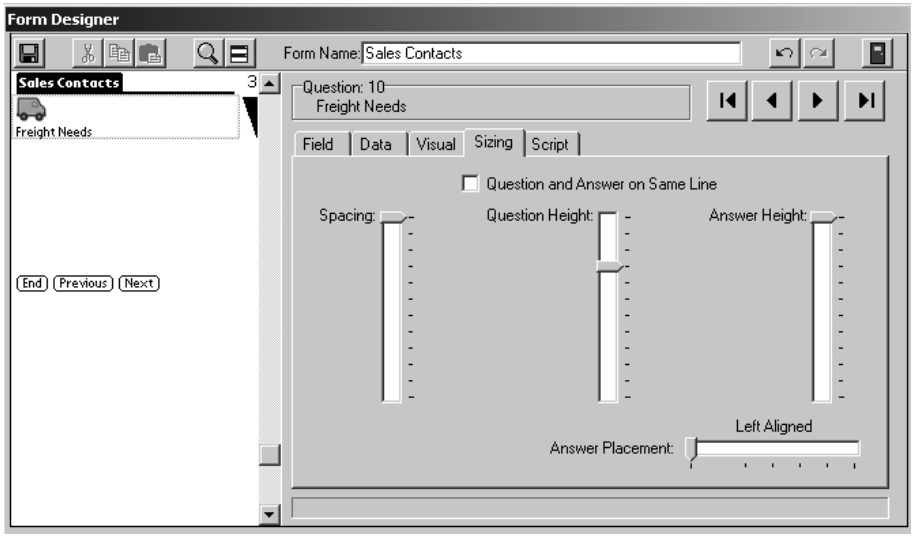
To add a decorative image, select the Visual tab and click the Get Picture button. You can select a picture from the C:\Program Files\Forms4\ClipArt folder that ships with Pendragon Forms. Or you can select a picture of your own, as long as the picture is a Windows bitmap file (.BMP file) or a JPEG file (.JPG file) not more than 320x192 pixels in size. If the selected image has more than 256 colors, it will be reduced to 256 colors before being placed on the form.



On the Sizing tab of the field, make the Question Height bigger so that you can see all of the picture. The field name of the field appears below the picture.

If you want to hide the field name, and just have the picture visible, adjust the Question Height accordingly.

For Section fields, you can adjust the Answer Height to zero to hide the Section Skip button.



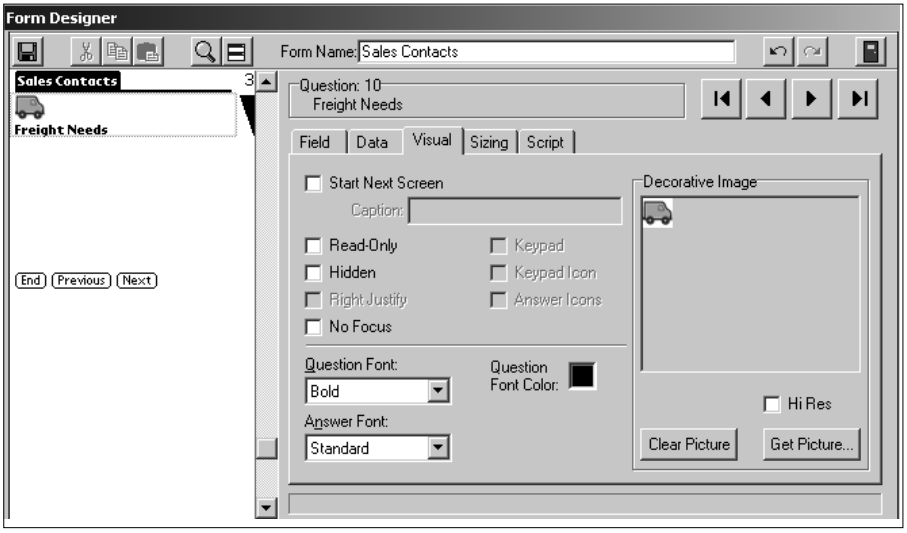
Changing font size and color

You can change the font of the question or answer component of a field on the Visual tab of the Form Designer. Your choices are: Standard font, Bold, Large or Large and Bold.

The Question Font field controls the font for the field name or question. The Answer Font field controls the font for the answer, that is, the handheld user's response.

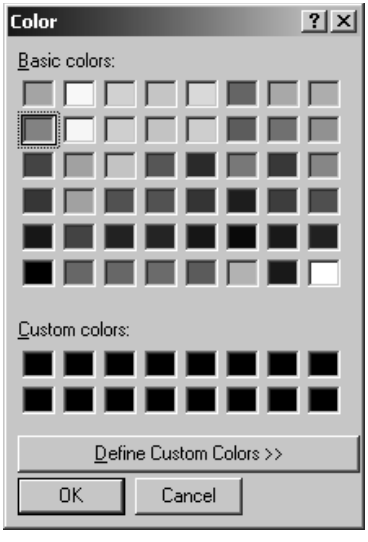
When you select font options, it is assumed that you want to continue with these options, and so new fields that are created will have to same font options set. If you only intended one field to have different fonts, change the font options back to Standard on the next field.

In the example shown below, the field name (question) is set to Bold.



On color handheld devices, question fonts can also be a color other than black. Answer fonts can only be black.

To change the question font, click in the Question Font Color field to display a color palette.



To choose a basic color, click on the color in the Basic colors section, then click OK.

The current field, plus any subsequent new fields, will have the question font in the selected color. If you only want one field to be in a different color, choose black as the question font color of the next field.

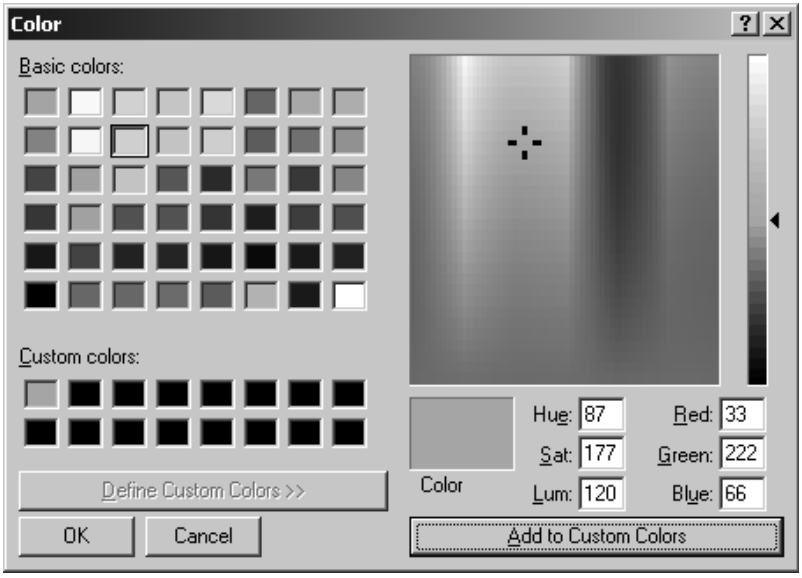
Avoid using light colors for the question font color, as they may be hard to read on the handheld.

If you do not like your font size or color, you can go back and change fonts even after a form is frozen.

It is also possible to define your own custom colors. From the Color palette, click the Define Custom Colors button to expand the Color window.

To start, first click on a basic color (anything except black or white) as your starting point, then click in the graduated palette area on the right to choose your custom color. When you are satisfied, click the Add to Custom Colors button. The new color will be added to the Custom colors palette.

To make a question font a custom color, click on the color in the Custom colors palette and click OK.

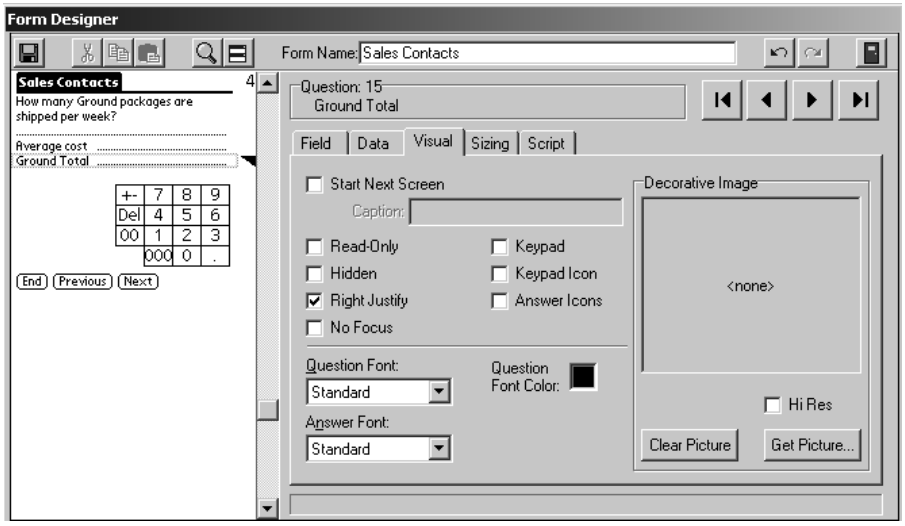


If you change font sizes for questions and answers, you will be able to fit fewer fields on a screen.

Right-Justifying Numeric and Currency fields

If you have Numeric and Currency fields on your form, you can right-justify the answer field. This is especially useful in Currency fields where the decimal points will line up vertically.

For each field that you want to right-justify, click the Visual tab and check the Right Justify checkbox.

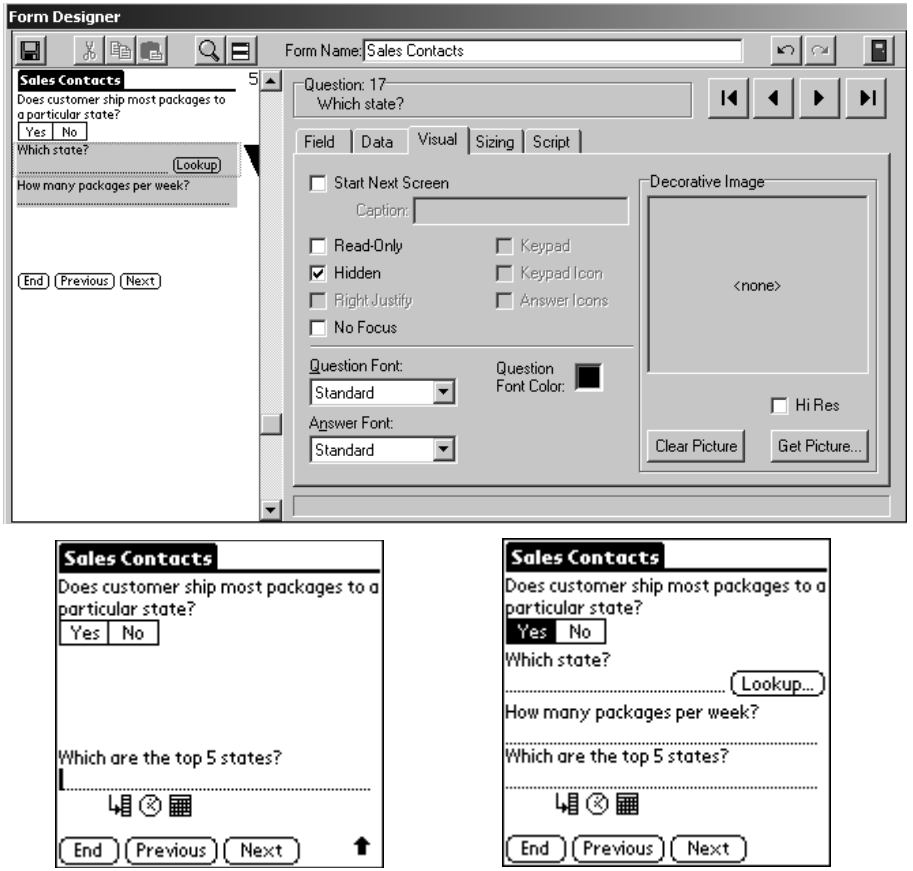


Hidden fields

If some questions on your form do not apply to everyone filling in the form, you can choose to hide these fields, and then use a script to show the fields under certain conditions.

To make a field hidden, click the Visual tab for that field and check the Hidden checkbox. Refer to Chapter 13, *Scripting Reference*, pages 249 and 272, and Chapter 14, *Scripting Examples*, page 297, for information on how to write a script to display a hidden field.

Pendragon Forms 4.0 reserves the on-screen space of a Hidden field, even though the field is not visible. The Preview Area of the Form Designer reflects this by showing the Hidden field as grayed out. If the Hidden field is made visible, it will occupy the same space as seen in the Preview Area.



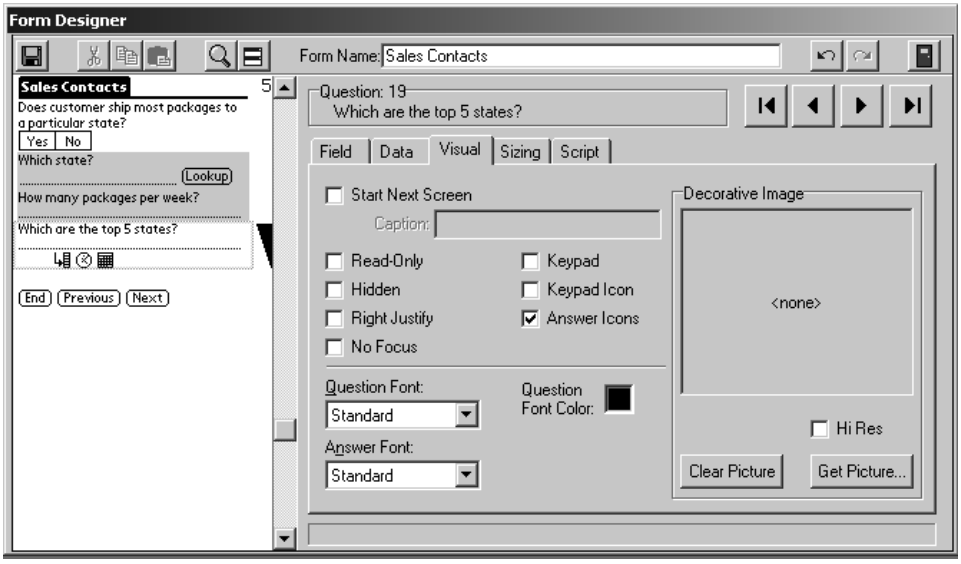
Answer Icons

It is possible to add a Clock and a Calendar icon to a Text field, to allow the handheld user to insert the current time or current date and time to the Text field. If the Text field also references a Lookup List, a Lookup List icon allows the handheld user to make selections from the Lookup List repeatedly, and copy each selection into the Text field.

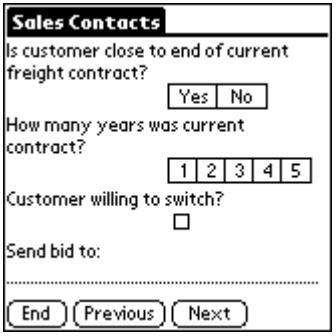
On the Visual tab, check the Answer icons checkbox. This will display icons for a Clock and a Calendar. Tapping on the Clock icon will insert the current time into the field, and tapping on the Calendar will insert the current data and time.

On the Sizing tab, make the Answer Height large enough so that you can see the icons in the Preview Area of the Form Designer.

If you want to reference a Lookup List in addition to the Clock and Calendar icons, then on the Data tab of the Text field, select a Lookup List in the Lookup List field.



No Focus (No Cursor Blinking in a Text field)



By default, a cursor blinks in the first available Text, Numeric, Currency or Lookup List field on the handheld screen. If the user were to immediately begin writing, their response would be placed in the field where the cursor is blinking.

In some instances, users may be confused at the cursor position, especially if there are other fields such as Popup Lists or Yes/No Checkboxes that the user is supposed to fill in before getting to the field where the cursor is blinking.

You can switch off the blinking cursor for a field by clicking the Visual tab in the Form Designer and checking the No Focus checkbox. The cursor will not blink in the field unless the user taps in that field.

Keypad Icon

You can choose to add a Keypad icon to a Text field, to give the handheld user another way to access the built-in keyboard.

The cursor has to be blinking in the Text field for the Keypad icon to be functional. If the cursor is not blinking in the field, the user must tap in the field before tapping the Keypad icon.

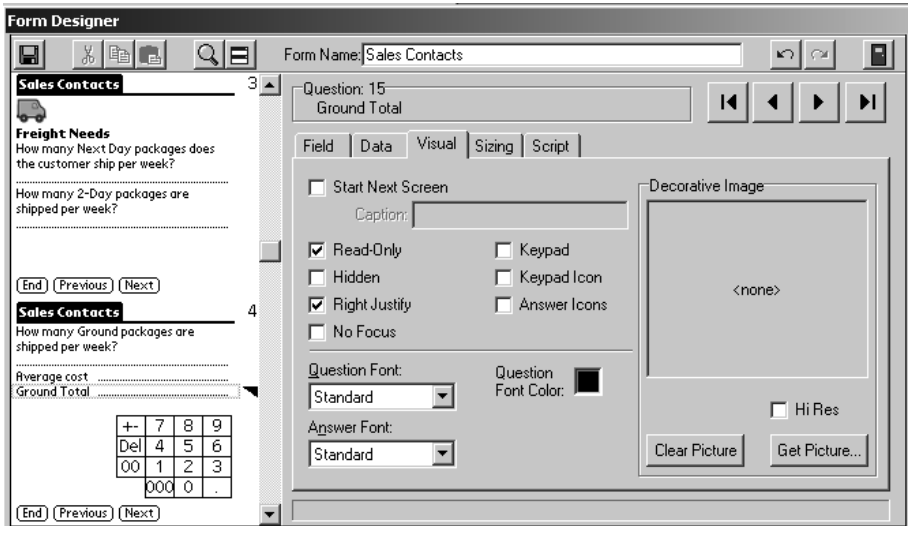
To add a Keypad icon, click the Visual tab in the Form Designer, and check the Keypad icon checkbox. Then click the Sizing tab and make the answer height large enough so that the Keypad icon is visible in the preview area.

Making a field Read-Only

In some circumstances, you may want to make a field Read-Only on the handheld.

For example, you might want the handheld user to input the variables used to perform the calculation, but not be able to change the result of the calculation directly. In this case you would make the field that is storing the calculated result read-only.

To make a field read-only, click the Visual tab and check the Read-Only checkbox.



Sizing Tab

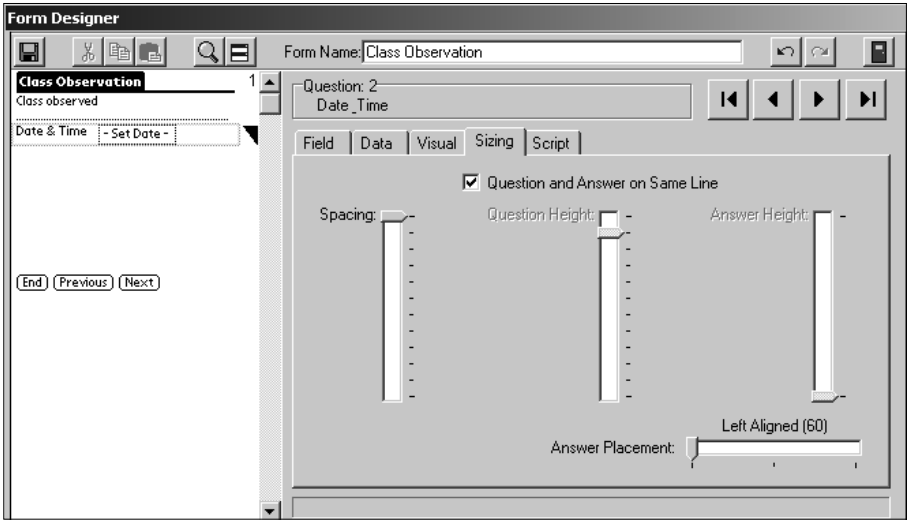
The Sizing Tab in the Form Designer window lets you adjust the amount of screen space that a field occupies on the handheld screen.

You can change sizing settings even after a form has been frozen.

Fitting a Question and Answer on one line

By default, every field takes up at least 2 lines on the handheld screen: one line for the question (the field name), and another line for the answer (the handheld user's response).

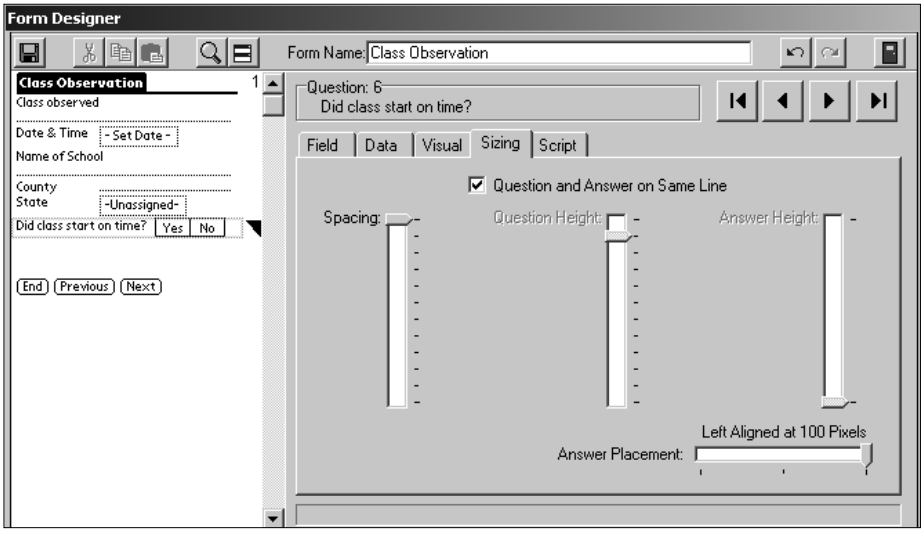
To fit more fields per screen, click on the Sizing tab for a field and check the checkbox labeled Question and Answer on Same Line. This places both the question and answer of that field on one line of the handheld screen. This option works well if the question is not too long.



Adjusting Answer Placement

If you fit a question and answer on one line, and the answer partially blocks the question, you can try adjusting the slider in the Answer Placement field on the Sizing tab.

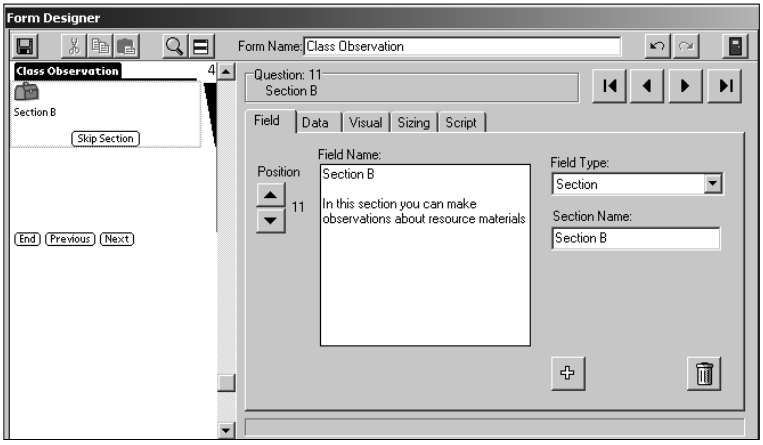
In many cases, moving the placement of the answer to the right will allow the whole field name to be seen. If this does not work, the field name may be too long to fit both question and answer on one line. Either shorten the field name or return to a 2-line format by un-checking the Question and Answer on Same Line checkbox.



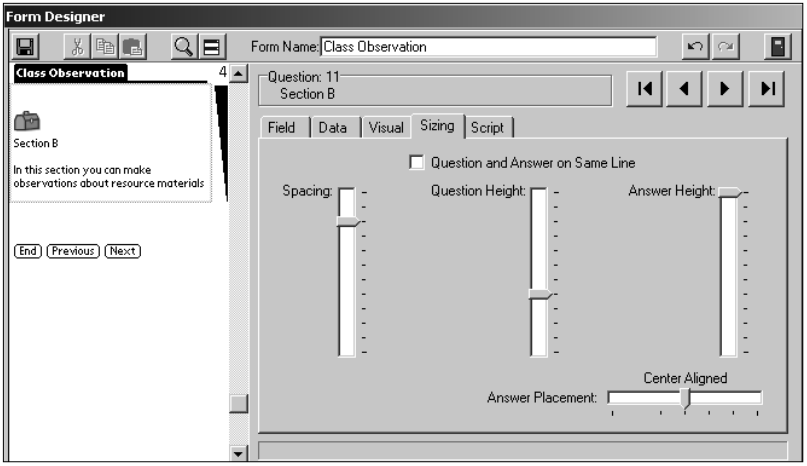
Adding Spacing before or after a Question

The Spacing, Question Height and Answer Height sliders are used to adjust the amount of space before the question, and the amount of space used by the question and the answer, respectively. The Question and Answer Height sliders are available if a field takes up more than one line.

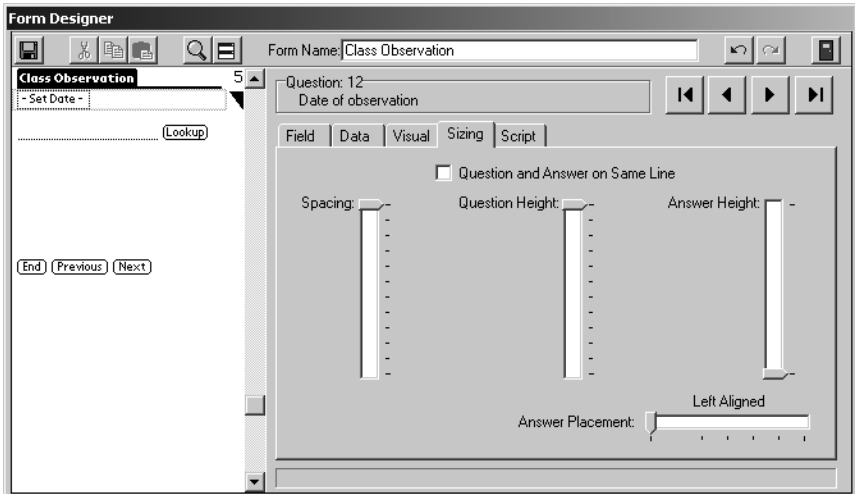
In the example shown here, a Section field contains a picture, and the question height is initially too small to display both the picture and the whole field name.



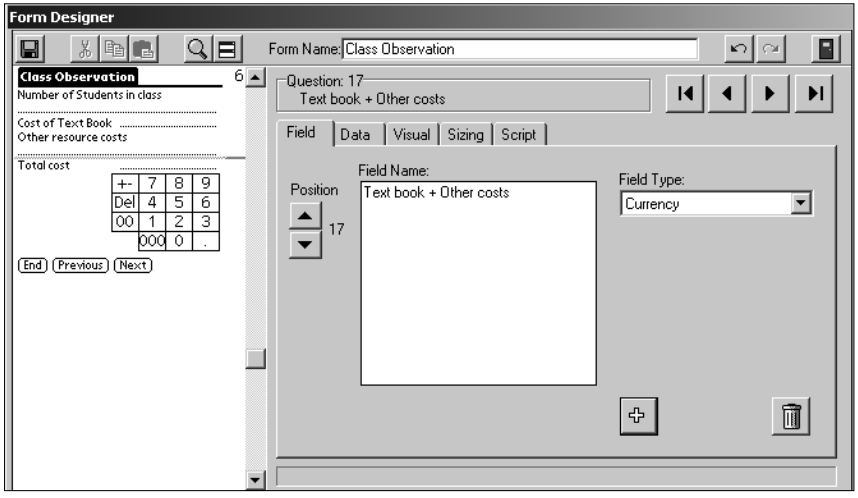
To make the field look better on screen, the Spacing slider is adjusted to add spacing before the question, and the Question Height slider is adjusted to display the picture and the whole question. Then, to prevent the user from skipping the section, the Answer Height is made zero to hide the Section Skip button.



With some fields, such as Date fields and Date & Time fields, it may not be necessary to give the handheld user instructions via the field name. In this case, you can make the Question Height zero.



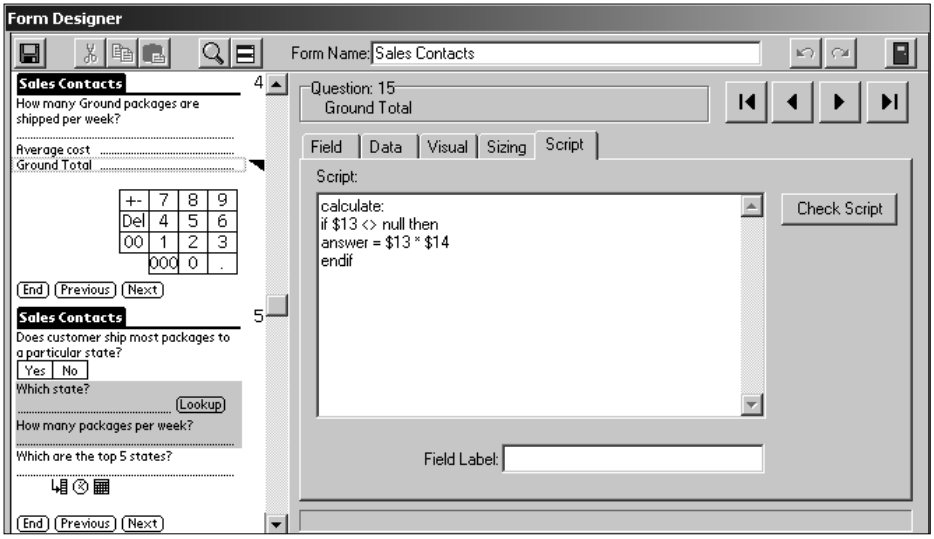
In rare cases, you may want to make both the question height and the answer height zero, so that the field does not appear on the handheld screen at all. This is different from making a field Hidden (see page 143), because hidden fields still use up space on screen. You may want to have a field with zero height to store a partial calculation, or for use in linking to another form. The Preview Area in the Form Designer shows the zero-height field as a red line. To display a zero-height field, use the Left and Right arrow buttons until the field is displayed.



Script Tab

The Script tab of the Form Designer is where you can write a script in a given field. A script performs an action, such as jumping the user to a particular field, or performs a calculation based on data the user has entered in various fields.

Chapter 13, *Scripting Reference*, page 209, provides information on the types of scripts you can write.

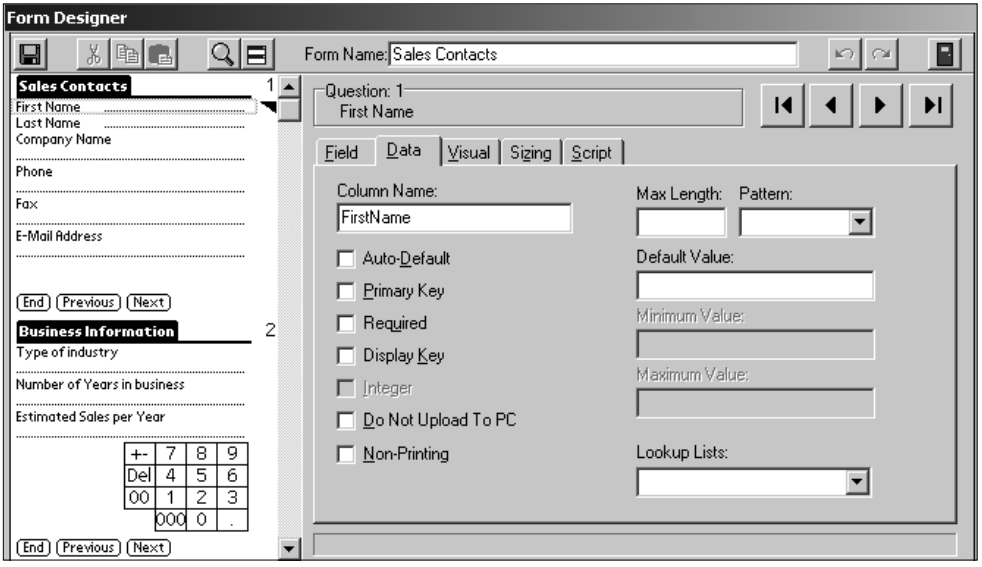


9. Advanced Field Properties

The Data tab of the Form Designer window displays the Advanced Field Properties available for the selected field. Advanced Field Properties give you extra control over the field.

If an Advanced Field Property does not apply to a particular field type, it will be grayed out.

Column Name, Primary Key and Max Length are Advanced Field Properties that must be set before a form is frozen, and cannot be changed after the form has been frozen. All other Advanced Field Properties can be set or changed whether or not the form is frozen.



Column Name

The Column Name on the Data tab of the Form Designer window is the name that the current field will be called in the database table that is created for storing the records for the form design. The database table is created when you freeze the form. You cannot change the column names after the form is frozen, or you will break the ability of the handheld to synchronize data to the PC.

- The default is that the Column Name is blank. Then, when you freeze the form design, the Column Name will be based on the name of the field, up to the first 64 characters of the field name. Only alphanumeric characters are used in the Column Name, so spaces and punctuation are ignored. If two fields are identical up to the first 64 characters of the field name, the Column Name will be modified upon freezing the form, so that each database column name is unique. (This is a Microsoft Access requirement.) To view the column names of a frozen form, click on the name of the form and then click the Edit/View button.
- If you prefer to use your own names for the database columns, type a name in the Column Name field. When you freeze the form design, you will be notified if there are any duplicate column names, and if so, you will need to edit the form so that each database column name is unique.
- If you copy a frozen form, the column names from the original form will be retained to make it easier to import data from the original form. If you re-name fields on the form, delete the old column name for each field before freezing the form, so that the new column names will be based on the new names of the fields..
- If you are linking to an external Access database (see page 392), the purpose of field-mapping is to ensure that the Column Name used in Pendragon Forms matches a column name in your external Access database. Without this match, data from the handheld cannot synchronize with your external Access database.
- Applies to: All fields.

5602664 : Form

UserName	TimeStamp	ProductBarCode	ProductName	UnitPrice	ListedQuantity
No one	03 9:48:12 PM	012340	Fluffy Bunny	$14.99	25
No one	03 9:48:32 PM	012341	Fluffy Ducky	$14.99	18
No one	03 9:49:31 PM	023410	Action Soldiers	$4.49	6
No one	03 9:50:11 PM	023415	Action Tanks	$4.49	9
No one	03 9:51:38 PM	141590	Toy Airplane	$9.99	12
No one	03 9:52:33 PM	141592	Toy Chopper	$9.99	6
No one	03 9:53:07 PM	238637	Let's Play Store	$19.95	5
No one	03 9:53:41 PM	238642	Let's Play Car G	$19.95	2
No one	03 9:54:53 PM	238651	Let's Play Hous	$19.95	4
No one	03 7:32:07 PM				

Autodefault

Turning autodefault on means that when the handheld user creates a new record, any field with autodefault on will be filled in with the same value from the previous record entered.

- The autodefault option is primarily a time-saving device. You can override the value entered in the field at any time. If you change the value for one record, that value becomes the new autodefault the next time the form is filled in.
- Autodefault values are not retained if the form is re-distributed from the PC, or if the Forms application is re-installed on the handheld. In these cases, the handheld user will have to fill in a new record in order to re-set the autodefault values.
- Autodefault does not work within the fields of a subform.
- Applies to: Text, Numeric, Currency, Yes/No Checkbox, Popup List, Multi-Selection List, Lookup List, Exclusive Lookup List, Option 1-5, Date, Date&Time, Time.

The pictures above show a simple inventory form in which the handheld user is recording inventory a room at a time. The Date, Building Location, Floor and Room Number all have Autodefault switched on, so that after the user enters the first record, all subsequent records will keep the same values for these fields. The user can keep these values until the entire room has been inventoried, and then change the values when starting on a new room.

Item Count is a Numeric field which also has the Autodefault option switched on. A script in the field increments the value by one for each new record, so that the count goes up with each new item. See page 290 for the script required to make a counter.

Primary Key

A Primary Key is a field or combination of fields that uniquely identify a record. Pendragon Forms checks that when the handheld user tries to exit out of a new record, the Primary Key field(s) are filled in and are unique. If more than one field is used to define a Primary Key, the combination of primary key fields must be unique for each record.

- If the Primary Key box is left blank, then by default Pendragon Forms will create a Primary Key consisting of the UnitID, UserName and TimeStamp fields which are automatically created when a record is created on the handheld. You can use the default primary key if users do not have to share records.
- If you want several handhelds to share the same records, you must select a different Primary Key than the default. This is because each handheld user who modifies a record will have his/her handheld user name assigned to the UserName field, and this will cause a conflict with the existing records with the original UserName. If users are sharing records, you will also need to remove the default Additional Download Criteria setting which sends to the handheld only records whose UserName matches the handheld user name. See *Additional Download Criteria*, page 181. For general information on allowing users to share records, see pages 23-26.
- If you want to select your own Primary Key, check the Primary Key checkbox for the field or fields that you want to make part of the Primary Key.
  On a form that is used for recording customer information, an example of a single field primary key might be a Customer Account Number that is different for each customer. If a form was being used to record visits to customers, you would want to allow seeing the same customer more than once, and so a multi-field Primary Key such as Customer Account Number and Date of Visit could be used.
- If you are linking to an external database, then you will need to select a Primary Key that is identical to the primary key in your database table.
- Applies to: Text, Numeric, Currency, Yes/No Checkbox, Popup List, Lookup List, Option 1-5, Date, Date&Time, Time.

Required

A Required field is a field into which the handheld user must enter data and cannot leave the field blank. You may want to make certain fields on your form required fields to ensure that the handheld user enters a response.

Note that requiring a user to fill in a field does not mean that the user will fill in correct data, it just means that the field will not be left blank.

Important: If a user does not fill in required fields, and then tries to synchronize, the records with the missing required fields will not be sent to the PC, as it is considered to be an unfinished record. If you want to allow a user to leave certain fields blank, do not make them required fields.

- On the Data tab of the Form Designer window, check the Required checkbox to make the selected field a required field.
- The default is that when the user exits a new record on the handheld, the Forms program will alert the user if any required fields have not yet been filled in. The record cannot be exited until all required fields are filled in. The problem with this default is that the user does not receive any warnings until the very end of the form.
- You can change the default so that when the handheld user moves off a screen containing a required field, the warning message is displayed immediately if the required field is empty. This may be more convenient for the user than waiting until the end of the form to perform the check. To change this default, set the Advanced Form Property of *Field Level Validation* - see page 174.
- A script can be used to make a required field optional or an optional field required. See Chapter 13, *Scripting Reference*, pages 255 and 261.
- Applies to: Text, Numeric, Yes/No Checkbox, Popup List, Lookup List, Exclusive Lookup List, Option 1-5, Date, Date&Time, Time, Signature, Time Checkbox, Slider.

Display Key

The Display Key is used to display records on the handheld. When the handheld user chooses to review records on the handheld, a list of existing records is displayed on the handheld. The contents of the Display Key field of each record on the handheld is shown on the handheld.

- If the Display Key checkbox is left blank, the default is that the first field on the form is used as the Display Key field.
- Only one field can be the Display Key field. The first field on the form with the Display Key checkbox checked will be the Display Key.
- The Display Key field should be a field which is unique for each record. For example, a Text field or a Date field are good fields to use as Display Key fields. A Popup List or a Yes/No checkbox are less appropriate as Display Key fields, because several records can have the same value.
- When using subforms, you can make the Display Key on the subform different from the Display Key on the parent form. For example, the Display Key on the parent form might be 'Customer Name', and the Display Key on the subform might be 'Date of Visit'. Selecting a given customer, and jumping to the subform, displays a list of all visits.
- Applies to: Text, Numeric, Currency, Yes/No Checkbox, Popup, Lookup List, Option 1-5, Date, Date&Time, Time, Slider.

In the first picture above, the Display Key field is the first field on the form, which happens to be a customer's First Name. This field does not provide the user with much information, and so in the second picture, the Display Key field is changed to Company Name, a field which helps the user select which record he or she needs.

Picture three above shows that no matter what the Display Key field is, it is always possible on the handheld to select two more fields to view in addiiton to the Display Key field. See page 52.

Default Value

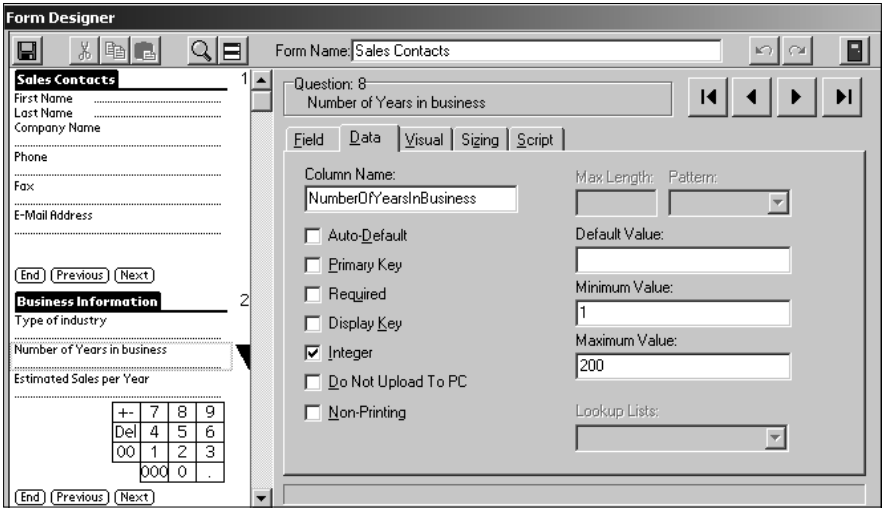
A default value is a value that will be filled in if the handheld user does not fill in a field.

For example, in a Yes/No checkbox field, if the handheld user leaves the field blank, then the data that goes back to the PC is a null value - blank. If you want to change things so that leaving a Yes/No checkbox blank is the same as responding No, you can enter a default value of N.

- Type a value in the Default Value field if you want a default to apply to the selected field.
- For a Yes/No field, type Y to default to Yes, or type N to default to No.
  In a Popup or Lookup List field, type one of the options that appears in the list.

- Date Only and Date & Time fields can only be made to default to a specific date or date and time, not the current date and time. Enter the date in the Short Date format setting that you are using in Windows. For example, to default to September 15th 1999, you can enter 09/15/1999 into the Default Value field. To default to the current date or current date&time, see Chapter 14, *Scripting Examples*, page 291.
- To make a Time field default to a specific time, you need to enter a date as well as a time. For instance, to default to 9:00AM, you will need to enter something like 7/31/1999 9:00 AM. To default to the current time, see *Scripting Examples*, page 291.
- On a Slider field, the Default Value sets the default and positions the marker of the scale at that value on the scale.
- The Default Value field has special meaning on a Button field. Typing a word into the Default Value field creates the label on the button. You can enter up to 11 characters for the name of a button.
- When you exit the Form Designer, a check will be performed to ensure that the default value that you entered is valid. For example, you cannot enter a default of Other in a Yes/No field, or a default of Purple in a popup field whose options are Red, Green, Blue.
- Applies to: Text, Numeric, Currency, Yes/No Checkbox, Popup List, Lookup List, Exclusive Lookup List, Option 1-5, Date, Date&Time, Time, Slider.

Three Advanced Field Properties apply to Numeric fields only: Integer, Minimum Value and Maximum Value.



Integer

The Integer option applies to Numeric fields and Slider fields. If the Integer checkbox is checked, the handheld user can only enter a whole number in a Numeric field.

- On the Data tab of the Form Designer window, check the Integer checkbox if you want to require the handheld user to enter a whole number (no decimal places) in a Numeric field.
- On the handheld, as the user exits the screen, the program checks whether the number entered is an integer or not. A message is displayed if the number is not an integer, and the program allows the user to edit the field to make it a whole number.
- Slider fields are a type of numeric field, and have the Integer checkbox checked by default.
- Applies to: Numeric fields and Slider fields only.

Minimum Value & Maximum Value

Minimum Value and Maximum Value apply to Numeric fields and Slider fields only.
By specifying a maximum value and a minimum value, the handheld user must enter a number with the range specified.

- Both a minimum value and a maximum value have to be entered on the Data tab of the Form Designer in order to specify the range on the handheld. You cannot enter one value and leave the other one blank.
- If the user enters a value outside of the valid range, then when the user tries to leave the screen, an error message is displayed to alert the user that the value entered is not in the allowed range. The user can then edit the value.
- On a Slider field, the Maximum Value and Minimum Value specify the ends of the slider scale. The default range on a Slider field is 1-10. You can change this default.
- Applies to: Numeric fields and Slider fields.

Three Advanced Field Properties apply to Text fields only: Max Length, Pattern and Lookup List.

Max Length

The maximum length only applies to Text fields.

- By default, the maximum length of a response in a text field is 255 characters. This is the maximum length allowable in Microsoft Access for a text field which can be sorted.
- You can change the maximum length to a number of characters from 1 to 2000, if you need to allow a shorter or longer response in the field. (Access is very efficient at storing data, so if you do not need long responses, leave the default at 255.) If you change the length of a Text field to more than 255 characters, internally Microsoft Access will store the response as a Memo field which cannot be sorted on the PC.
- When you freeze a form design, a database table is created in the Forms Manager for storing the records associated with your form. Each field on your form corresponds to a column in the database table. If you set a Max Length on a Text field, then when you freeze the form, that column will freeze with the specified maximum number of characters. This means that once a form is frozen, you cannot make the Max Length any larger. If you make the Max Length smaller, the database column will not get any smaller, but the handheld will allow only the smaller number of characters to be entered.
- If a form is going to be used as a Read-Only Reference form (see pages 98 and 188), the Max Length of all Text fields on the form should be set to the smallest value possible. This is because Read-Only Reference forms are stored as fixed-width columns on the handheld, and the default size of 255 characters in a Text field will waste space on the handheld.
- Applies to: Text fields and Lookup List fields (since the handheld user can enter text in a Lookup List field).

Pattern

Pattern applies to Text fields. You can specify that the handheld user must enter characters of a certain type.

- Possible character patterns include Alpha characters only, Alphanumeric, Digits only, Printable characters (i.e.: no Tabs or carriage returns), Uppercase or Lowercase.
- If you choose a pattern of Alpha, Alphanumeric or Digits, and the handheld user enters characters which do not conform to the pattern, a dialog box will warn the user that the text pattern is not valid. Ideally, in your field name you should inform the user of the text pattern that you expect to be entered.

- If you choose Uppercase or Lowercase as the pattern, data entered into the Text field will be converted to upper or lower case as necessary, after the user leaves the field..
- Note that if you specify a character pattern, no characters outside that pattern will be allowed. For example, if you specify Digits only, the handheld user can enter 1234567 but not 123-4567 and not 123 4567.
- Applies to: Text fields only.

Lookup List

With a Lookup List field, it is only possible to select one item from the list. The Lookup List item on the Advanced Field Properties window allows you to use a Lookup List with a Text field, enabling the handheld user to select more than one item from the list and to paste each selection in turn into the Text field.

- On the Text field, go to the Advanced Field Properties window and select a Lookup List to be used with the Text field.
- The handheld user will see a Lookup List icon in the Text Field. The cursor has to be blinking in the field for the Lookup List icon to be available. Tapping on the Lookup List icon allows the user to select an item from the list and paste it into the Text field. The user can tap on the Lookup List icon more than once.
- Applies to: Text fields only.

Do Not Upload to PC

The Do Not Upload to PC option allows you to choose not to upload data from the handheld to the PC for the selected field.

- To mark a field as non-uploadable to the PC, check the Do Not Upload to PC checkbox on the Data tab of the Form Designer window.
- You may choose not to upload data for a field if, for example, you are linking to an external Access database that has an AutoNumber field which will be generated on the desktop. A number that is generated on the handheld in this field does not need to be sent to the PC.
- If there are fields that you want to only be able to update on the PC, you can make these fields non-uploadable. For example, imagine that you have an Appointment Time field into which you enter 9:00am on the PC, and then send the record to the handheld. Back at the office, the customer calls to change the time to 9:30am. If the handheld modifies the record and synchronizes, the old appointment time of 9:00am will be uploaded to the PC. To prevent the handheld from overwriting the PC in this field, the Appointment Time field can be made non-uploadable.
- You may not want to upload fields that contain calculated results which the desktop PC will calculate.
- Applies to: All fields.

Non-Printing

The Non-Printing option allows you to select which fields should not be printed if a record is printed directly from the handheld using the Print scripting statement, or if a record is e-mailed using Transmit MultiMail or Transmit iMessenger scripting statements.

- To mark a field as non-printing, check the Non-Printing checkbox.
- Applies to: All fields.

10. Form Properties

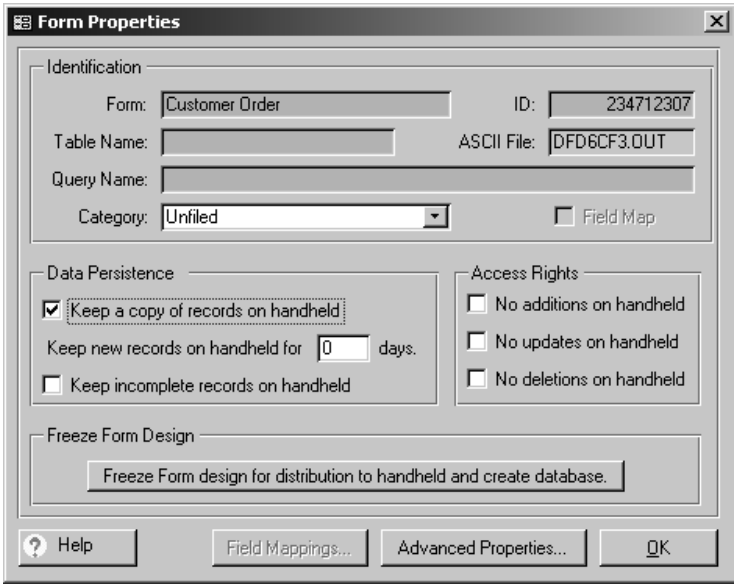
Before you send a form to the handheld, there are some Form Properties that you must set. The Form Properties window is where you select the Data Persistence rules that determine how long records are kept on the handheld. The Form Properties window is also where you freeze a form design in order to create a database table for storing the records associated with that form.

From the Form Properties window you can also access Advanced Form Properties that give you some control over what you want the handheld user to be allowed to do in the form.

Form Properties and Advanced Form Properties can be changed after freezing a form. You will need to redistribute a form design and synchronize for any changes to take effect on the handheld.

Form Properties

To access the Form Properties window, click the name of your form in the Forms Manager, then click the Properties button.



Data Persistence

The Data Persistence section of the Form Properties screen allows you to choose how long records remain on the handheld.

You can change Data Persistence options if needed. Re-distribute the form and synchronize for the changes to take effect on the handheld.

The Data Persistence options are described here:

Data Persistence Option	Meaning
Default option - No checkboxes checked	Records are removed from the handheld during synchronization.
Keep a Copy of Records on Handheld	Records remain on the handheld after synchronization. Checking this box overrides the other data persistence options. If you are linking to an external Access database, you must check this option, and use the Advanced Form Property of Additional Download Criteria to control which records remain on the handheld. See pages 404-405.
Keep New Records on Handheld for X Days	If you leave the Keep a Copy of Records on Handheld checkbox blank, and instead enter a number of days, then after synchronization, records will continue to be stored on the handheld for that number of days. The number X can be from 0 to 999.
Keep Incomplete Records on Handheld	This option can only be used if you have a Completion Checkbox field on your form. See page 78 for information on Completion Checkbox fields. If this option is selected, then only records that have the Completion Checkbox field checked as Yes, will be removed from the handheld during synchronization.

Access Rights

In the Form Properties window, the Access Rights section allows you to choose if the handheld user can add, modify or delete records. You can choose any combination of the Access Rights checkboxes.

You can change the Access Rights even after a form has been frozen. Re-distribute the form and synchronize for the changes to take effect on the handheld.

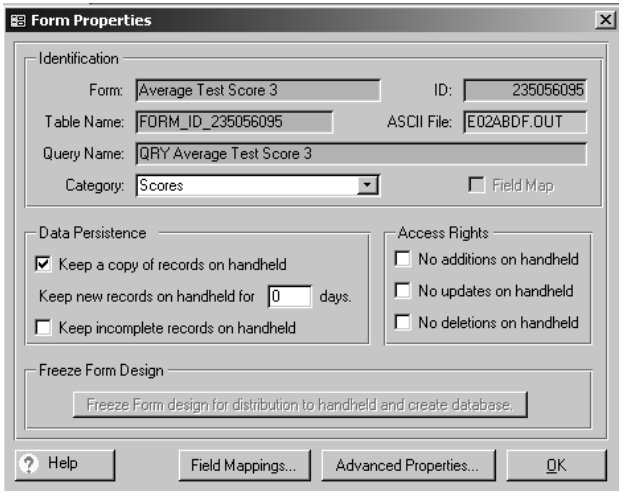
The Access Rights options are shown here:

Access Right	Meaning
Default option - No checkboxes checked	The handheld user is allowed to add new records, modify existing records, and delete records.
No additions on handheld	Check this checkbox if you do not want the handheld user to be able to create new records. This option can be used if you are creating all the records on the PC and then sending them to the handheld, and users are not allowed to create their own new records.
No updates on handheld	Check this checkbox if you do not want the handheld user to be able to modify existing records. Use this option with care. If you want to allow users to start creating a record and then be able to go to other handheld applications and then come back to the record, you cannot use this option. Once a user leaves the record, and comes back to it, the user will be modifying an existing record which is not allowed when No updates is selected.
No deletions on handheld	Check this checkbox if you do not want users to delete any records from the handheld. Use this option with care. If a user starts a new, blank record, and then wants to delete the blank record, they will not be able to.

Category

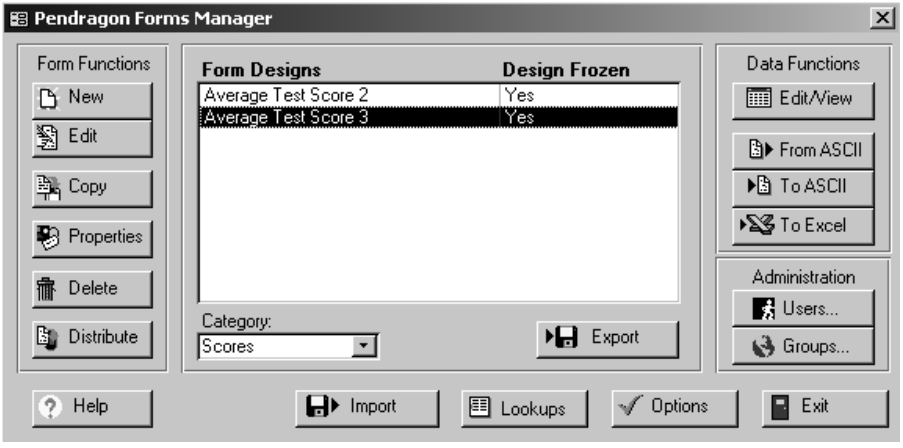
The Category field in the Form Properties window allows to you group form designs into categories.

To create a new category, type a name for the category in the Category field. To assign a form to an existing category, click the arrow in the Category field and select a category.



To view the forms in a Category, select the category name in the Forms Manager window. The Recycle Bin is a unique category that stores deleted form designs.

To take a form out of a category, including the Recycle Bin, first view that category in the Forms Manager, then click on the form, and click the Properties button. In the Category field of the Form Properties window, choose Unfiled as the category.



Freezing a Form

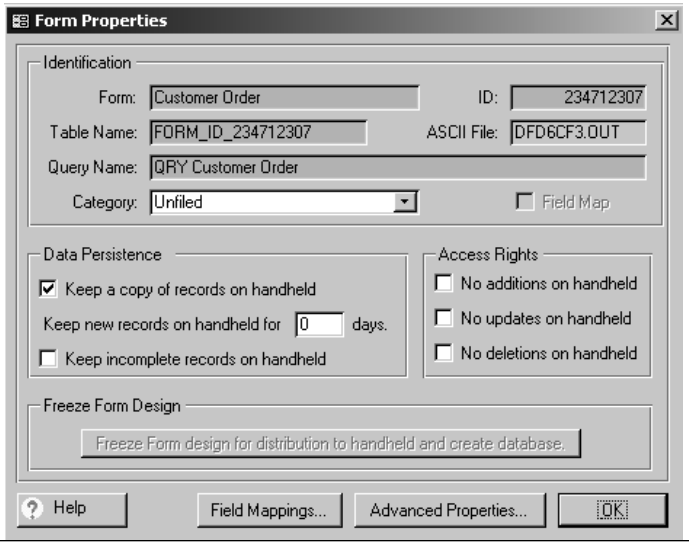
Freezing a form design creates a database table in the Forms Manager database for storing records for a particular form design. You must freeze a form design before you can send it to the handheld.

Once you freeze a form design, you cannot add fields to the form, delete fields from the form or change the field types. To do any of these things, make a copy of the form and modify the copied form, which will not be frozen. See page 32 for information on copying form designs.

To freeze a form design, click the name of the form in the Forms Manager, then click the Properties button. In the Form Properties window, click the button labeled Freeze Form Design for Distribution to Handheld and Create Database. Then click the OK button to close the Form Properties window. Typically, the next activity is to distribute the form by clicking the name of the form in the Forms Manager, then clicking the Distribute button. Synchronize the handheld to send the form to the handheld.

If you click the Freeze Form Design button and receive an error message that prevents the form from being frozen, see Appendix B, *Troubleshooting*, page 439.

Once a form design has been frozen, the Table Name and Query Name fields in the Form Properties window are filled in. The Query Name is the name of the query that makes it possible to view the data for the form when you click the Edit/View button in the Forms Manager.
The Table Name is the name of the Access database table that was created to store the records for the form in the Forms Manager database. You must NEVER delete the Access database table for a form if the form is still in use on the handheld, as deleting the table will break the ability to synchronize the form.



Advanced Form Properties

Advanced Form Properties give you additional control over how a form works on the handheld.

To access the Advanced Form Properties window, click on the name of a form in the Forms Manager, then click the Properties button. In the Form Properties window, click the Advanced Properties button.

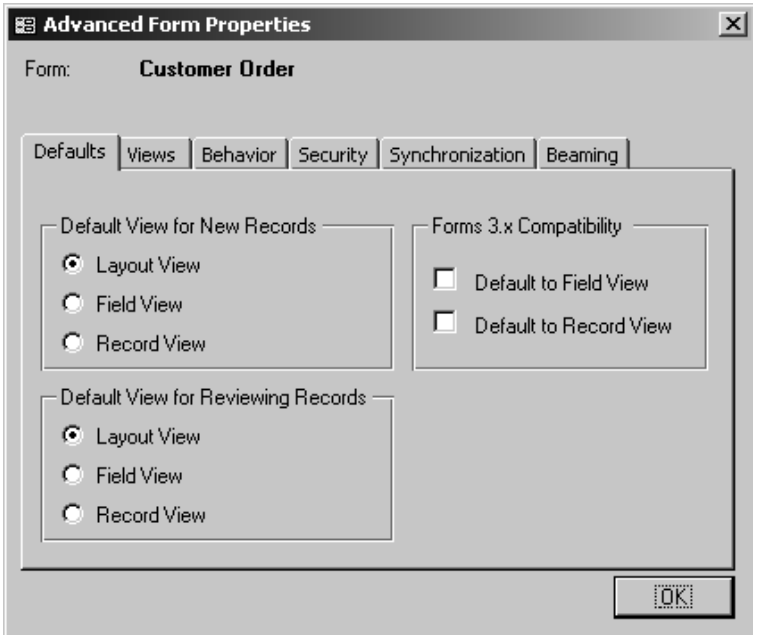
You can change the Advanced Form Properties of a form at any time. In most cases, you will need to re-distribute the form and synchronize for the changes to take effect on the handheld.

Each tab of the Advanced Form Properties window covers a different aspect of the form.

Defaults Tab

On the Advanced Form Properties screen, the Defaults tab lets you choose how the form appears when the handheld user is creating a new record, and how the form appears when the handheld user is reviewing an existing record.

There are three possible views of a form on the handheld: Layout View, Field View and Record View.



Layout View, shown above, is new in Forms 4.0, and this is the default view for both new and reviewed records. When you are designing a form in the Form Designer, Layout View gives you the most flexibility for choosing how many fields appear on a screen, and how many lines on the screen the question and answer components of a field occupy.

Field View and Record View, shown below, were available in earlier versions of Pendragon Forms. Field View displays one field per screen. Record View displays up to 11 fields per screen in a two-column format, questions on the left and answers on the right.

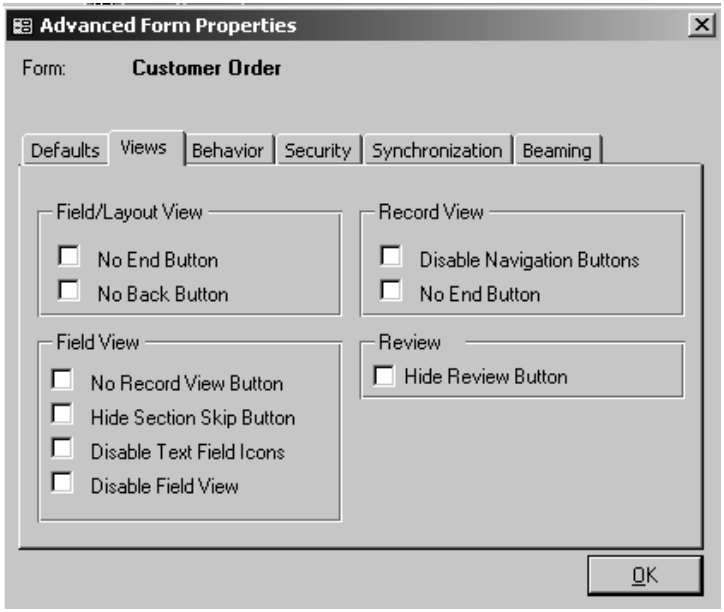
Since Layout View is the default, if you want to use Layout View for both new and reviewed records, you do not need to make any changes on the Defaults tab of the Advanced Form Properties window.

If you want to change which view is used for new or reviewed records, select the appropriate button in the Default View for New Records and the Default View for Reviewing Records sections of the Defaults tab.

For backward compatibility with earlier versions of Forms, the Default to Field View and Default to Record View buttons are present, as these options were available previously. These options do not apply to new forms that you create in Forms version 4.0.

Views Tab

In the Advanced Form Properties window, the Views tab gives you options for controlling whether or not certain buttons appear on the handheld screen. The buttons that appear by default on the handheld screen depend on whether you are in Layout View, Field View or Record View. (See page 170 for descriptions of each of these views.) The Views tab is therefore divided into sections that apply to each view. You can change any of these options at any time, and then re-distribute the form and synchronize for the changes to take effect on the handheld.



No End Button (Field/Layout View)

The End button allows the handheld user to exit a record at any time. If you want to force the handheld user to go through every field on the form before exiting a record, check the No End Button checkbox in the Field/Layout View section of the Views tab. This will hide the End button in Field View or Layout View. The handheld user can only end the record by tapping the right arrow button (in Field View) or the Next button (in Layout View) on the last screen of the form.

No Back Button

In Field View or Layout View on the handheld, there is a left arrow button or Previous button which allows the handheld user to go back to the previous screen of the form. If you want the handheld user to enter a response once and then move onto the next field, and you want to prevent the user from going back and changing answers, you can remove the Back button from the handheld screen. (See also Hide Review Button, page 173.)

No Record View Button

Typically, Field View contains a Record View button that lets the user switch to Record View at any time. If you want the handheld user to enter records in Field View only, you can check the No Record View Button checkbox to remove the Record View button from the Field View screen. The handheld user will not be able to toggle between Field View and Record View. Hiding the Record View button may be useful if you are using Field View and you have branching scripts on your form.

Hide Section Skip Button

Section fields, when viewed in Field View, have a Skip button that allows the handheld user to skip a section and jump to the next section. If you check the Hide Section Skip Button checkbox, the handheld user will not be able to skip over a section. This may be useful if you want the handheld user to go through every section on the form, or if you want to use a section field just to provide instructions to the user. The Hide Section Skip Button option for Field View will apply to all Section fields on the form.

Do not use this Advanced Form Property if you are using Layout View. Instead, you can open the Form Designer window, display the Section field, click the Sizing tab and make the Answer Height of the field zero. Layout View allows you to choose whether or not to hide the Section Skip button for each individual Section field individually.

Disable Text Field Icons

When a Text field is viewed in Field View (one field at a time), two icons appear at the bottom of the Text field - the calendar icon allows the handheld user to insert the current date and time, the clock icon allows the user to insert the current time. If you do not want to allow the handheld user access to these icons, check the Disable Text Field Icons checkbox.

Do not use this Advanced Form Property if you are using Layout View. In Layout View, the Visual tab of the Form Designer window allows you to select whether Text Field Icons are present or not. The default is that Text Field Icons are not visible.

Disable Field View

In Record View (viewing eleven fields at a time), if the handheld user taps on the name of a field, that is, taps in the left-hand column of the Record View screen, then the user will switch to Field View, viewing one field at a time. If you do not want the handheld user to use Field View at all, check the Disable Field View checkbox.

Disable Navigation Buttons

This applies to Record View only.
In Record View (viewing eleven fields at a time), a series of navigation buttons (left and right arrow buttons) at the bottom of the Record View screen allow the handheld user to jump from one record to the next, and also to jump to the first and last records. If you want the handheld user to stay within a record, and not have the ability to jump across records, you can check the Disable Navigation Buttons checkbox.

No End Button (Record View)

This applies to Record View only.
The End button in Record View allows the handheld user to end the record at any time. If you prefer the user to go through every field on the form, you can check the No End Button (Record View) to hide the End button in Record View.

Warning: If you hide the End button in Record View, the handheld user will not have a way to exit the record. You should typically add a Button field at the end of the form, with a click: event script that allows the user to end the form.

Hide Review Button

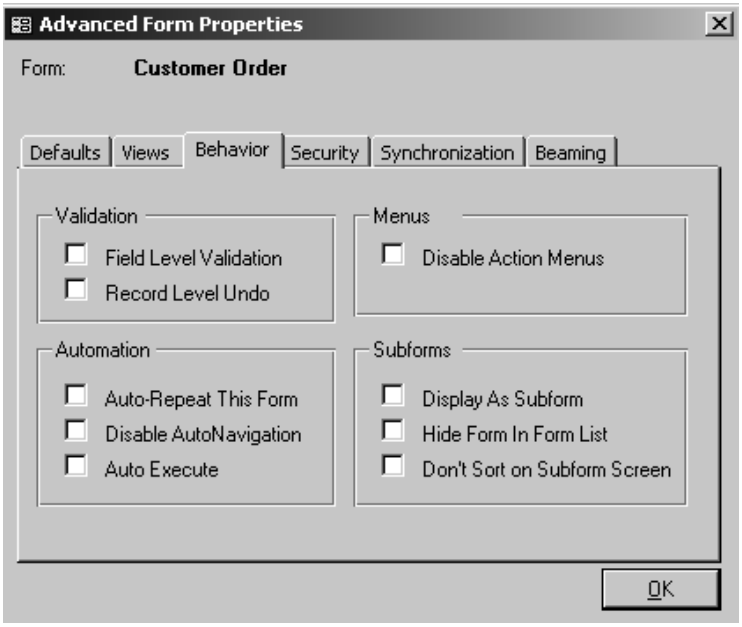
This applies to any form.
On the main Forms screen that displays the list of forms on the handheld, there are two buttons: the New button allows the handheld user to create new records for the form, and the Review button allows the user to review existing records.

If you do not want users to be able to go back and review records, check the Hide Review Button checkbox. Users will still be able to create new records, but not to review the records.

If the reverse is true, i.e., you want users to be able to review records but not create new records, leave the Hide Review Button unchecked, and instead change the Access Rights on the Form Properties screen to not allow additions on the handheld (see page 166).

Behavior Tab

The options on the Behavior tab of the Advanced Form Properties window allow you to change the behavior of a form on the handheld. You can change Advanced Form Properties on the Behavior tab at any time. Simply re-distribute the form and synchronize for the change to take effect on the handheld.



Field Level Validation

If you have Required fields on your form (see page 156), you may want to check the Field Level Validation checkbox. This causes the program on the handheld to display a warning message if the user leaves a Required field blank and tries to move to the next screen of the form. If Field Level Validation is not selected, then Required Fields will only be checked when the user exits the record, not on a screen by screen basis.

Record Level Undo

If Record Level Undo is checked, then when the handheld user is modifying an existing record on the handheld, and taps the End button to exit a record, a dialog box will ask user whether changes are to be kept. If the user chooses Yes, then the record is modified. If the user chooses No, then changes are thrown away, and the record reverts to the way it was before the changes were made.

AutoRepeat This Form

If you want the handheld user to repeatedly enter records on the form, you can check the AutoRepeat This Form button. When the user finishes filling in the last field on the form for one record, the form cycles back to the first field to begin data entry for the next record.

- To break the AutoRepeat cycle, the handheld user can tap the End button on the form to end the current record. When the form autorepeats to create a new record, tap End again and choose to delete the empty new record.
- Alternatively, the handheld user can tap the handheld Menu button, then tap the Record menu and select Delete/Cancel.

Disable AutoNavigation

On the handheld, the user can check the AutoNavigate button to speed up data entry primarily in Field View (see page 51). When AutoNavigate is switched on in Field View, Popup Lists, Lookup Lists, Date and Time fields automatically pop up, and as soon as a selection is made, the handheld user is advanced to the next field on the form. The user can switch off AutoNavigate on the handheld if desired.

If you want to ensure that AutoNavigation is never used for a particular form, you can check the Disable AutoNavigation checkbox. The handheld user will be able to switch AutoNavigate on and off for other forms but not the selected form.

Auto-Execute

Automatically creates a new record when Forms is launched on handheld. Can only be used for one form on the handheld.

Used with Custom Main Menu forms - see page 381.

Disable Action Menus

On the handheld, if the handheld user taps the Menu button (the drop-down menu icon below the House icon), he/she can access the following menu options: Clone (copies a record, including all filled in fields), Mark All Changed (manually flags every record on the handheld as new to force an update to the PC), Print, Print All, Acquire Barcode and Acquire GPS. If you do not want the handheld user to have access to these menu options, check the Disable Action Menus checkbox.

Display as Subform

On the handheld, parent forms and subforms are displayed in the list of forms. To enable data from the parent record to be copied into the subform, it is necessary to always enter data starting from the parent form.

If you check the Display as Subform checkbox, this will ensure that the handheld user cannot enter records in the subform by starting from the subform. The subform will still be visible in the Forms List on the handheld, and the user can review records but not create new subform records except by starting from the parent form. The icon next to the subform will be different from that of regular forms.

- Another solution is hiding the subform from the Forms List entirely. See *Hide Form in Forms List*, below.

Hide Form in Forms List

When using a parent form and one or more subforms or single subforms, the handheld user has to always enter data from the parent form, in order for data to be copied from the parent to the subform. On the Forms List on the handheld, the user will see both the parent form and the subforms listed. If you check the Hide Form in Forms List checkbox for a subform, the subform will not appear in the Forms List on the handheld, and this give the user the appearance that there is just one form in which to enter data, namely the parent form.

Don't Sort on Subform Screen

By default, when subform records are viewed from the parent form, they appear sorted by the Display Key (see page 157) of the subform. This also applies to records in a reference form which are being accessed by a Lookup to the reference form (see page 94).

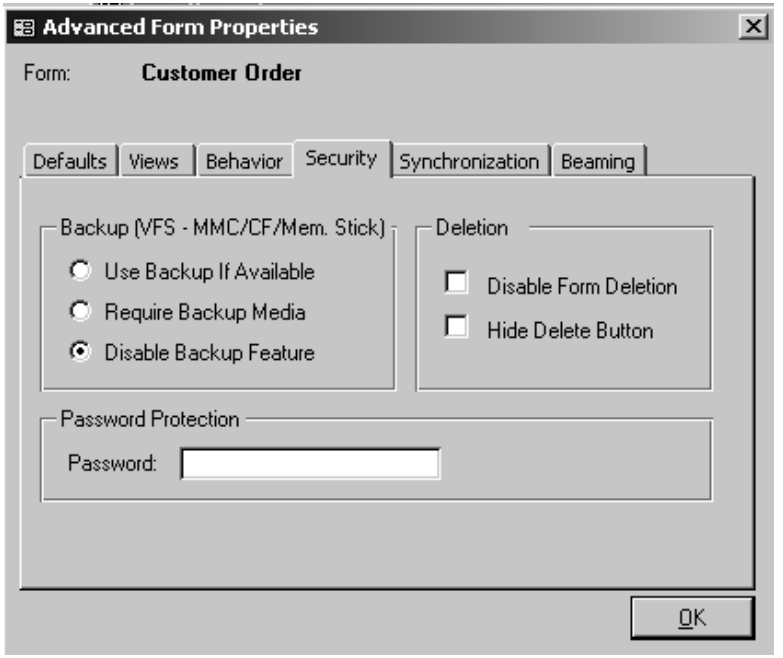
If you have a large number of records in the subform or reference form, it will take extra time to sort the records before displaying them. If you are using bar codes, and are scanning a bar code to find a record in the reference form, then you do not need to sort the records. You can choose to speed up the display of the records in the reference form or subform by selecting the Advanced Form Property of Don't Sort on Subform Screen.

Security Tab

The options on the Security tab of the Advanced Form Properties window allow you to:

- Limit access to the form design on the handheld by not allowing deletion.
- Password protect a given form design.
- If your handheld device supports VFS, Virtual File System, you can also choose whether you are backing up data to external storage media.

You can change Advanced Form Properties on the Security tab at any time. Simply re-distribute the form and synchronize for the changes to take effect on the handheld.



VFS Backup

See page 418 for instructions on performing a VFS backup and restore on the handheld, and for information on the limitations of the VFS Backup mechanism.

Virtual File System, or VFS, is a feature of Palm OS 4.0 (and higher) that allows the handheld to store data on external media such as a compact flash card, an SD (Secure Digital) card, an MMC (Multi-Media Card) or a memory stick. If your handheld device has Palm OS 4.0 or higher, and supports VFS, then the VFS Backup options in Pendragon Forms can be used. Examples of handhelds that support VFS are the Palm Tungsten series or the Palm Zire 71 with SD or MMC cards, and the Sony Clie with memory stick.

The VFS Backup options are:

- **Use Backup If Available**
  This option allows the handheld user to use the VFS Backup if a media card is plugged into the handheld, and to ignore the backup if the media card is not present or is out of memory.

  If this option is selected, then if the external media card is plugged into the handheld, every new record and every modified record for this form design will be written to the external media card in addition to being written to the Forms application in RAM on the handheld.

  If the card is NOT plugged into the device, no backup will occur.

- **Require Backup Media**
  This option means that an external memory card must be plugged into the handheld device for the handheld user to be able to create new records, or review or modify existing records. If the memory card is not plugged into the handheld, the user will be prevented from creating, viewing or modifying records on the handheld, and will receive an error message to this effect.

- **Disable Backup Feature**
  This option is the default setting. It means that no VFS backup is performed even if there is a media card plugged into the handheld.

If you change the VFS Backup option, you will need to re-distribute the form and synchronize for the change to take effect.

Disable Form Deletion

Check this box if you do not want the handheld user to be able to delete the form from within the Forms application on the handheld.

- Note that the handheld user can still delete the entire Forms application and all forms and data via the Delete menu on the Palm OS Applications screen.
- The proper way to remove a form from the handheld is to remove the form from the Default User Group or other User Group in the Forms Manager on the PC, and then synchronize the handheld. (See *How to Delete Forms*, page 42). This applies whether or not Disable Form Deletion is switched on.
- If Disable Form Deletion is switched on and you change your mind and decide to allow the deletion of the form design from the handheld, you will have to un-check Disable Form Deletion and then re-distribute the form and synchronize for the change to take effect.
- If you lose the form design on the PC, and Disable Form Deletion is switched on, there is no way to switch Disable Form Deletion off. In this scenario, the only way to remove the form from the handheld is to delete the entire Forms application, including all form designs and data. Before you delete the Forms application, synchronize to back up your data for the form designs that you do have in the Forms Manager on the PC.

Hide Delete Button

If you check the Hide Delete Button checkbox for a form, then when the user taps on the form in the Forms List on the handheld, the Delete button will disappear. This means that the user cannot go into the form and delete records.

- It is still possible for the user to delete the form and thus delete all associated records. To prevent deletion of the form from within Pendragon Forms, see *Disable Form Deletion*, above.
- If you need to allow the user to delete records, simply un-check the Hide Delete Button, and then re-distribute the form to the handheld. Data on the handheld will not be affected by re-distributing the form.

Password Protection

If you want to password protect a form design, so that the handheld user cannot access the form design without putting in a password, type the password in the Password field. The password is not case sensitive.

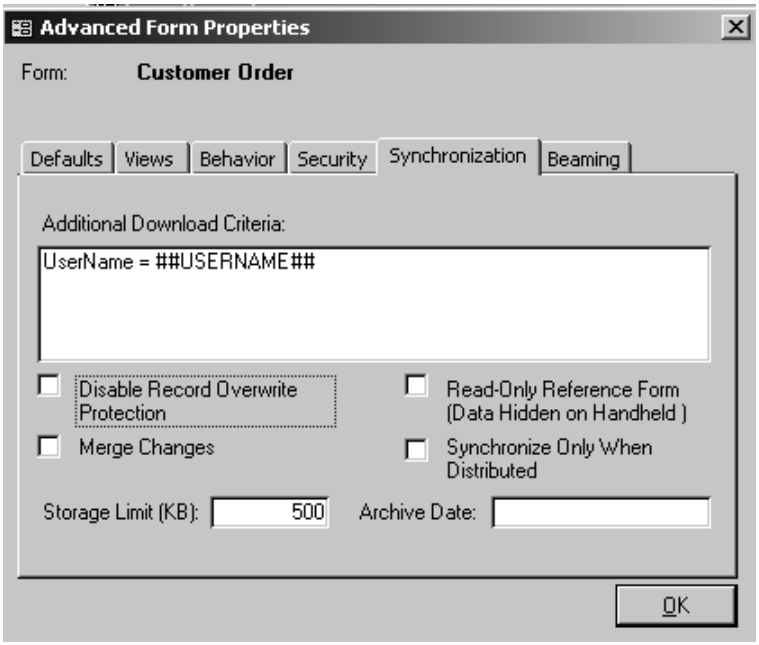
If you forget the password on the handheld, type a new password in the Advanced Forms Properties screen, then re-distribute the form and synchronize the handheld. To stop requiring a password on a form design, erase the password, then re-distribute the form and synchronize.

Warning: Password protecting a form design only prevents the data from being accessed via Pendragon Forms. However, since records on the handheld are not encrypted, a person with technical knowledge of the Palm OS would be able to access the records even without knowing the password.

Some handhelds with Palm OS 5.2 have built-in strong encryption. On other devices, it is possible to purchase security software that encrypts handheld data. In both cases, encryption may be selective, so you should verify that the security mechanism is encrypting Pendragon Forms and its databases in particular.

Synchronization Tab

The options on the Synchronization tab of the Advanced Form Properties window allow you to specify which records are sent from the PC to the handheld, and also provide some control over data going from the handheld to the PC.



Additional Download Criteria

Additional download criteria allow you to select which records from the PC are sent to the handheld.

The default setting is:
UserName = ##USERNAME##
This means that by default, only records in which the UserName field matches the handheld user name, will be sent to a particular handheld. ##USERNAME## is a wildcard used by Pendragon Forms to refer to the handheld user name.

When the default setting is on, users cannot share records. If you need several handhelds to share the same records, you will need to select a different primary key (see Primary Key, page 155) and then delete the UserName = ##USERNAME## statement from the Additional Download Criteria field. Then records from all handhelds will be sent to all handhelds.

In general, the selections made in Data Persistence section of the Form Properties window (e.g.: *Keep a copy of records on Handheld*, or *Keep new records on Handheld for X days* or *Keep incomplete records on Handheld*) are sufficient for determining which records are sent to the handheld. If this is the case, you do not need to specify any Additional Download Criteria.

However, if you are linking to an external database and are not storing the UserName and TimeStamp fields that Pendragon Forms generates for each record, then the Data Persistence options will not apply. In order to select which records go to the handheld, you must specify Additional Download Criteria before field-mapping to the external database. (See page 392 for information on linking to an external Access database.)

The Additional Download Criteria is an SQL WHERE clause (without the word 'Where') which is used to specify the selection criteria for sending records to the handheld.

The WHERE clause has the format:

[*Database-Column-Name*] = *Criteria*

When a form is frozen, each field is assigned a database column name. The database column name for a field can be viewed on the Advanced Field Properties screen, that is, the Data tab in the Form Designer window (see page 153). You have to use the database column names of your form when specifying Additional Download Criteria.

Date Criteria

Additional Download Criteria can be used to select only the records that meet a date-specific criteria. For example:

`[DateofVisit] > now - 30`

To send only records within the last 30 days to the handheld, you will need a Date field or a Date&Time field on your form. In this example, there is a field on the form called Date of Visit. The word ***now*** represents the current date and time. This download criteria will send only those records whose Date of Visit field is in the last 30 days.

`[AppointmentDate] > #05/15/2003#`

In this example, there is a field on the form called Appointment Date. This download criteria will only send records to the handheld if the value in the Appointment Date field is after May 15th 2003.
Enter the date in the Windows short date format used on your PC (see the Control Panel in Windows). The # symbol is used by Access as a quotation symbol when specifying dates in SQL.

Selection List Criteria

Your Additional Download Criteria can depend on the value in a Yes/No Checkbox, Popup List, or Lookup List. It is not recommended for download criteria to depend on the value in a Text field, because users may not all write the exact same text in the Text field. With a selection list field, however, you can guarantee what the possible values in the field are.

Here is an example of using selection list criteria:

([WorkOrderStatus] = "New") OR ([WorkOrderStatus] = "In Progress")

In this example, there is a Popup List or Lookup List field called Work Order Status on the form. Two of the options in the Popup or Lookup List are the phrases New and In Progress.
The download criteria sends records the handheld if the Work Order Status field is either equal to New or In Progress.

The OR statement allows for either the first criteria (New) or the second criteria (In Progress) to apply.

When selecting download criteria based on a Popup List, Lookup List or Yes/No Checkbox field, it is important to include a download criteria if a field is blank. For example, the above example could be changed to:

```
[WorkOrderStatus] = "New"
OR
[WorkOrderStatus] = "In Progress"
OR
[WorkOrderStatus] is null
```

The addition of the last statement allows for records which have not been assigned any Work Order Status to be sent to the handheld.

Completion Checkbox Criteria

If you are using a Completion Checkbox field and your data is being stored in the Pendragon Forms Manager database, you can just check the form property to *Keep incomplete records on Handheld* in the Form Properties window. You do not need to enter any additional download criteria.

However, if you are linking to an external database (see page 392) then you may need to specify download criteria to send incomplete records to the handheld.

You need to know to which external database field type the Pendragon Forms Completion Checkbox field is mapping. If you are mapping a Pendragon Forms Completion Checkbox to a Text field in an external Access database or an ODBC database, you can actually just use the Data Persistence option of *Keep incomplete records on Handheld*, and you do not need to specify any additional download criteria.

If you are using an Access Yes/No (Boolean) field in your external database, then you will need to specify additional download criteria in order to remove completed records from the handheld. The values used by Access are 0 for No and -1 for Yes. SQL Server uses 0 for No and 1 for Yes. Since both databases use 0 for No, that is what is used to test a Completion Checkbox field.

```
[RemoveRecord] = 0 OR [RemoveRecord] is null
```

In this example, there is a Completion Checkbox field called Remove Record on the form. Records are only sent to the handheld if the value in the field is either null (blank) or 0 (zero). This means that incomplete records are sent back to the handheld.

```
([RepairTechnician] = ##USERNAME##) AND
([Completed] is null OR [Completed] = 0)
```

In this example, the external database has a column called RepairTechnician that maps to the UserName field in Pendragon Forms. The form on the handheld and a column in the external database also has a field called Completed.

The AND operator means that both the first criteria and the second criteria have to be met for the record to be sent to the handheld. So the handheld user name has to match the value in the RepairTechnician field, and the Completed field has to be null or 0 (zero) for a record to be sent to the handheld. This means that a user will receive the incomplete records that have been assigned to him or her.

Criteria for Sorting Records as they download to the handheld

Pendragon Forms creates an internal query to download the appropriate records to the handheld. By default the query returns records sorted on primary key columns, but this may vary depending on the version of the database you are using to store records.

To guarantee that records are sent to the handheld in a specific order, you can use an **order by** clause in your additional download criteria.

Not every field type can be sorted, however. Text fields longer than 255 characters, Signature, Sketch, and Image fields cannot be sorted. Section, Jump to Section, Subform and Single Subform fields do not usually contain any data that can be sorted.

`UserName = ##USERNAME## order by [Company]`

The **order by** clause sorts records in ascending order (A..Z) of the specified column.

In this example, records assigned to a given user are sent to the handheld sorted in alphabetic order by a field on the form called Company.

`UserName = ##USERNAME## order by [DateofVisit] desc`

The word **desc** added to the end of an order by clause sorts the records in descending order.

Since Date fields are stored internally as a number (the number of seconds since 01/01/1904), sorting a date field in descending order will put the most recent dates at the top of the list of records.

In this example records assigned to a given user are sorted by a field on the form called Date of Visit, with the most recent dates at the top of the list.

The order by clause must follow a criteria. If you have your own primary key and users are sharing records, you cannot use UserName = ##USERNAME## as the criteria, because users would not be able to share records. Instead you can use a criteria that will always be true, such as:

`1 = 1 order by [LastName]`

In this example, the criteria 1 = 1 is always true, and the order by clause sends records to the handheld sorted in ascending order (A..Z) by a field on the form called Last Name.

If you have the full version of Microsoft Access, you can refer to the Access Help on WHERE clauses for additional information on the types of selection criteria that you can specify.

Disable Record Overwrite Protection

In Pendragon Forms, the default is that records which are newly created on the handheld cannot have a primary key which is already in the database on the PC. If a new record is created on the handheld, and the record has a primary key which is already in the database, the record will not be added to the database, and after a HotSync data transfer, the record will be marked with an arrow to indicate that it was not sent to the PC.

The reason why new primary keys on the handheld are not allowed to match primary keys of existing records is as follows: Imagine that Customer ID# is the primary key, and a record exists in the database on the PC for XYZ Corp., Customer ID# 345. If the handheld user creates a record for a new customer, Alpha Corp, and accidently gives Alpha Corp Customer ID# 345, then the new record on the handheld for Alpha Corp. will overwrite the existing record for XYZ Corp.
To prevent this accidental overwriting of existing records on the desktop, new records on the handheld have to have primary keys which are also new in the database.
NOTE: This restriction only applies to NEW records. Existing records from the database can be modified on the handheld and changes will update the existing records.

In very rare circumstances, you may want new records on the handheld to be allowed to overwrite existing records in the database.

Example 1:
You want to maintain a database for a library in order to keep track of which books have been checked in or out. Each book in the database has a unique bar code number. If a bar code is scanned on the handheld, the record will be new, but you want to be able to update the existing record to mark the book as in or out. In this type of circumstance you can check the checkbox to Disable Record Overwrite Protection.

Example 2:
During the synchronization process, if new records on the handheld are uploaded to the PC, but then something happens to interrupt the synchronization before the records on the handheld are marked for deletion, the records may remain marked as new records on the handheld. This causes a conflict on the next synchronization, because the records that already exist in the database on the PC will have the same primary keys as supposedly new records on the handheld.

In this scenario, first compare the records on the handheld with the records on the database, to verify that the same records are indeed in both places. Then switch on Disable Record Overwrite Protection and synchronize again. The records that were marked as new on the handheld will overwrite the existing records on the PC. If there are no more HotSync Error messages, switch off Disable Record Overwrite Protection again, especially if you are using your own primary keys on the form.

Merge Changes

Warning: This option should only be used if you are sharing records on more than one handheld, and you want to allow a record to be updated with a change to one field on one handheld, merged with a change to a different field on another handheld.

To share records across handheld devices, you need to select your own primary key field or fields that are unique for every record (See page 155). The synchronization rule is that if two people modify the same record, then the last person to synchronize will overwrite the record of the first person.

If the two handheld users never change the same field of the record, and you want to merge changes from both handhelds into the same record, you can switch on Merge Changes.
For example, in a Customer database application, if one user modifies a field called Phone Number, and a different user modifies a field called E-Mail Address, the modified record on the PC will contain both the changed Phone Number and the changed E-Mail Address.

Note that even if Merge Changes is switched on, if two handheld users modify the same field of the same record, then the record on the PC will still be overwritten by the last person to synchronize, even if the first person to synchronize has more up-to-date changes.

Read-Only Reference Form (Data Hidden on Handheld)

If you need to store a large number of records (more than 500) on the handheld for lookup purposes only, you can choose to make a form a Read-Only Reference form. A second form has to be used in conjunction with the reference form, so that the handheld user can perform a lookup to the reference form, and then copy data from the reference form into the second form. Records in the reference form will not be visible except via the lookup mechanism. See page 98 for instructions on creating a Read-Only Reference form and another form to do the lookup.

Before you freeze a form that you want to use as a reference form, you must set the Maximum Length (see page 161) of each Text field on the form to the smallest possible number of characters. This is because Pendragon Forms stores the read-only reference form on the handheld in a fixed-width format for each field, to facilitate a fast lookup over thousands of records. A Text field with a default value of 255 characters will reserve 255 characters for every record, even if only 10 characters are actually in the field.

On the reference form, check the Read-Only Reference Form checkbox on the Synchronization tab of the Advanced Form Properties window. Checking this checkbox also causes the Advanced Form Property *Hide Form in Forms List* to be checked. This is because records in a Read-Only Reference form are not visible by reviewing a form, and cannot be modified on the handheld, and so in most cases it is best for the handheld user not to see the name of the form on the handheld.

The records in the reference form are all stored as Text or Numeric on the handheld. This means that in order to copy data from the reference form into a second form, the fields on the second form must be Text or Numeric fields.

A Read-Only Reference form will synchronize all the records every time the user performs a HotSync data transfer. This will increase the synchronization time. However, if the data in the form does not change often, you can switch on the Advanced Form Property of *Synchronize Only When Distributed* - see below.

Synchronize Only When Distributed

If you have a form that is used for reference purposes only and contains either a lot of records (such as a Read-Only Reference form) or a lot of images, and the records or images originate on the PC and do not change frequently, you can switch on the Advanced Form Property of Synchronize Only When Distributed. This will speed up synchronization time, because the form will not be synchronized unless you click on the name of the form in the Forms Manager and then click the Distribute button. If data in the form only changes once a week, for example, then you can re-distribute the form when the data has been updated. Users will only experience a slow sync time once a week.
Warning: Do not switch on this option if users are allowed to create or modify records, as the records will not be backed up during everyday synchronization.

Storage Limit

The storage limit is the absolute size limit allowed for data on the handheld for each form. In cases where you want to set the form property to *Keep a copy of records on Handheld* (see page 165), if you have thousands of records on the PC, the storage limit prevents the entire handheld memory from being filled with records.

- The default storage limit is 500KB per form. You can change the storage limit for a given form by making this number larger, for example 700KB or 1000KB.
- If there are more records on the PC than can fit on the handheld, records from the PC will be placed on the handheld in ascending order of primary keys. By default Pendragon Forms uses the creation TimeStamp of a record as part of the primary key, which will mean that records will be placed on the handheld starting from the earliest created record, up to a maximum 500KB size. If you are storing months of data on the PC and do not want to put the earliest records onto the handheld, you can use the *Archive Date* (see next topic) to determine the starting date for placing records on the handheld. You can also use an Additional Download Criteria (see page 181) to select which records are sent to the handheld and in what order the records are sorted.

Archive Date

The Archive Date is a cut-off date for placing records on the handheld. Any records created before the archive date will not be placed on the handheld.

- To enter an Archive Date, type in a date in the same format as the Windows short date format on your PC. (The Windows short date format is set in the Windows Control Panel. Click on Start...Settings...Control Panel, and double-click the Regional Settings (or Regional Options) icon in the Control Panel.)
- The Archive Date feature relies on the creation TimeStamp which Pendragon Forms automatically generates. If you are linking to an external database and are not storing the TimeStamp field, then the Archive Date feature will not work. You can use Additional Download Criteria (see from page 181) to determine how records are selected to be placed on the handheld.

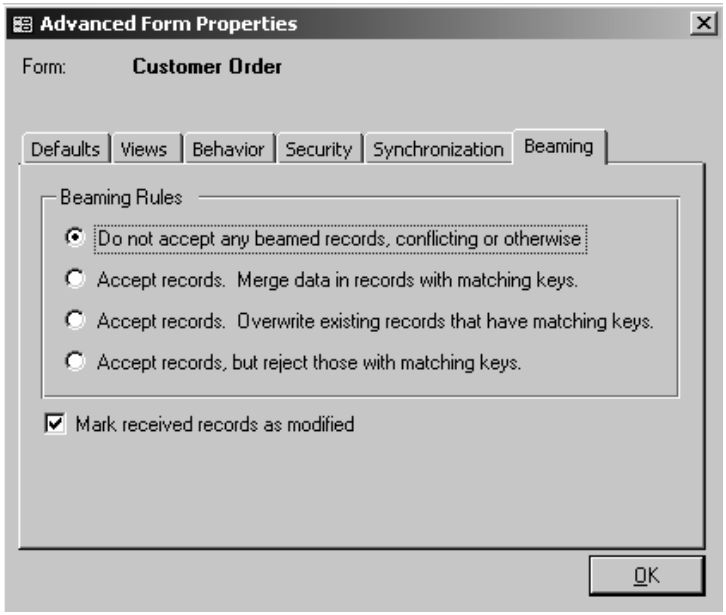
Beaming Tab

This is new in Forms 4.0.
The Beaming tab in the Advanced Form Properties window allows you to set the rules under which infrared beaming of Pendragon Forms records from one handheld to another handheld are allowed.

For beaming to take place, the following conditions are necessary:

1) Both handhelds must already have both the Pendragon Forms application and the identical form design (same Form ID# - see page 461) present on the handheld.
   You cannot beam the Forms application or a form design. Only records can be beamed.
2) Both handhelds must be configured to allow beaming.
3) Typically, you will need to select a primary key field or fields when you design the form.
4) The form design must have a Button field with a script that selects records to be beamed. The script also initiates the beaming.
5) An appropriate Advanced Form Property Beaming Rule must be selected. See page 191.
6) The Advanced Form Property to Mark Received Records as Modified must be set appropriately. See page 192.
7) The Advanced Form Property to Disable Record Overwrite Protection must be switched on. See page 186.

These conditions are discussed in Chapter 19, Beaming Records, page 355. Items 5) and 6) are discussed here.



Beaming Rules

The Beaming Rules are:

- **Do not accept any beamed records, conflicting or otherwise**
  This is the default option. This option means that handheld users are not allowed to beam Pendragon Forms records to each other.
- **Accept records. Merge data in records with matching keys**
  This option means that beaming of records is allowed.
  Merge data in records with matching keys means that if the same record already exists on both handhelds, and both users have modified different fields of that record, the handheld that is receiving the beamed record will have the most up-to-date version of the record, containing both users' changes.

  If both users have modified the same field within the same record, then the handheld that is doing the beaming will overwrite the receiving handheld in that field.

  This option must be selected with care. If both handhelds have modified the same record, the handheld that is doing the beaming will not have the other handheld's changes.
- **Accept Records. Overwrite existing records that have matching keys**
  This option means that beaming of records is allowed.
  Overwrite existing records that have matching keys means that if the same record already exists on both handhelds, the handheld that is doing the beaming will overwrite that record on the receiving handheld, even if the receiving handheld had modified the record or has more up-to-date information.

  If the handheld users can work out who has the more up-to-date information and have that person initiate the beaming, then this option is simpler than the merge changes option, because at the end of the beaming, both handhelds have the same data in the same record.
- **Accept Records, but reject those with matching keys**
  This option means that beaming of records is allowed.
  Reject records with matching keys means that if the same record exists on both handhelds, the beamed record will be discarded by the receiving handheld.

  This option is useful if you only want handheld users to beam new records to each other. That way there is less confusion over what to do with records that are already on both handhelds.

Mark Received Records as Modified

The Advanced Form Property of Mark Received Records as Modified is located on the Beaming tab, and is switched on by default.

If a record that is new or changed on a handheld, is beamed to another handheld, then the record will automatically be marked as changed on the second handheld as well.

When the Mark Received Records as Modified option is switched on, then even existing unchanged records that are beamed from the first handheld will be marked as changed on the receiving handheld. This will force the records to be uploaded to the PC when the second handheld synchronizes.

If handheld users are using beaming as a way to ensure that a record is on more than one handheld, so that if one handheld fails the other handheld has the record, then it is very important to keep the Mark Received Records as Modified checkbox checked. That way the receiving handheld is guaranteed to send the records to the PC on the next synchronization. (Note: the script that beams the records should select and queue all the records in a form in order to guarantee that all records are beamed.)

Changing Advanced Form Properties on a Frozen Form

Once a form design has been frozen and distrubuted to the handheld, if you change any Advanced Form Properties on the Defaults tab, the Views tab, the Behavior tab , the Security tab or the Beaming tab, you will need to a) re-distribute the form design, and b) synchronize the handheld, for the changes to take effect. Data on the handheld is not affected by re-distributing the form.

Changes made on the Synchronization tab of the Advanced Form Properties screen will take place the next time the handheld synchronizes. The form design does not have to be re-distributed in this case.

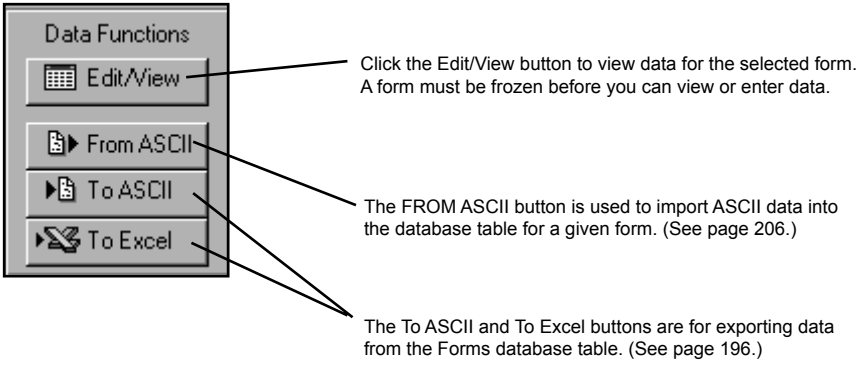
11. Managing Data on the PC

Pendragon Forms supports bi-directional synchronization. When you perform a HotSync data transfer, new or changed records on the handheld are uploaded to the PC, and then records (including new records on the PC) are written back to the handheld.

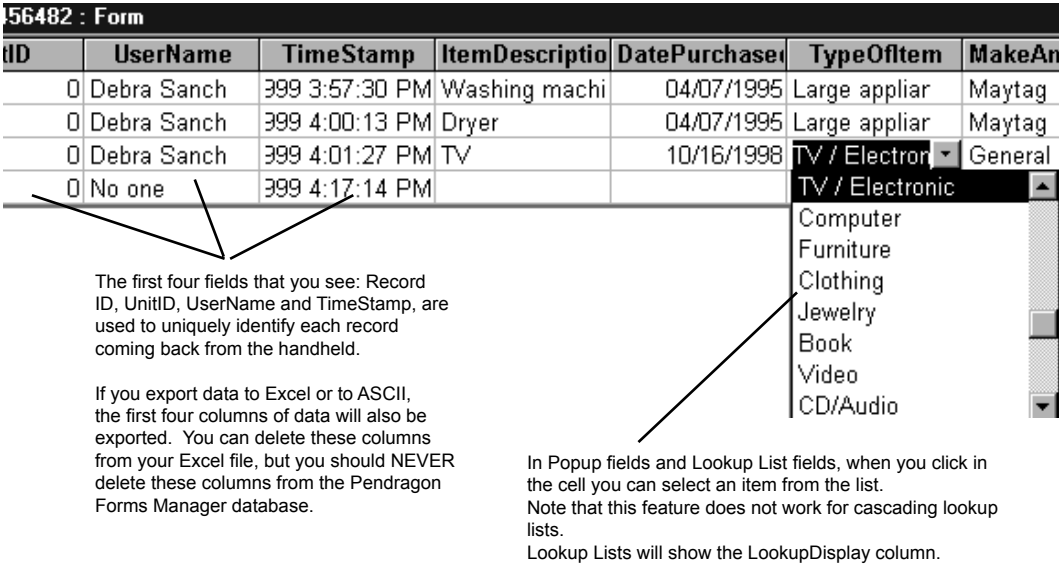
- The records on the handheld overwrite the records on the PC. This means that if the same record is simultaneously modified on both the handheld and the PC, the changes from the handheld will take precedence. (If necessary, it is possible to protect individual fields from being overwritten by the handheld by setting the Advanced Field Property of Do Not Upload to PC - see page163. You can also set the Advanced Form Property of Merge Changes - see page 187.)
- During the synchronization process, data is uploaded directly into the database. The default Pendragon Forms database is Forms3.mdb (Access 97) or Form32k.mdb (Access 2000 or Access 2002), which is stored in the C:\Program Files\Forms3 folder; alternatively you can link to your own external database (see page 392).

Viewing and Editing Data in the Database

1. In the Pendragon Forms Manager on the PC, click on a form to select that form.
2. Click the Edit/View button to display the data associated with that form. An Access form is displayed in datasheet view, to allow you to view and modify your data.



3. The fields in the form appear as columns, and each record is a separate row.
   - To edit a record, click in a cell and type your corrections. To save changes in a row, position the cursor outside of that row.



4. To add a record, click in the blank row (the last row in the list of records.)
   - In the UserName field, select the handheld user who is to receive the record.
   - Then enter information in the various cells, pressing TAB to move from one cell to the next. Position the cursor outside of the row to save the record.
   - When you close the Edit/View window and perform a HotSync data transfer, the new record will be sent to the specified handheld.

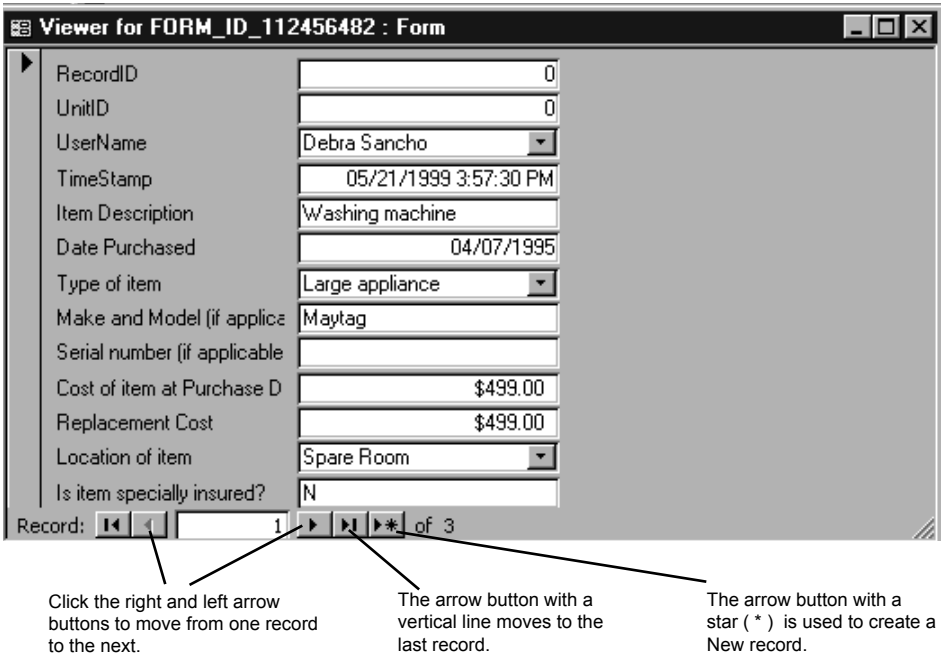
Note: Not all of the features of Pendragon Forms that are available on the handheld are available when editing a record on the PC. For example, cascading lookups do not work when editing on the PC. Similarly, scripts, branching, hidden fields, button fields, jumping to subforms, and checks for required fields or numeric ranges are all features that are present on the handheld but are not present when editing records on the PC.

Alternative Methods for Viewing Data

Instead of clicking the Edit/View button to view the data as a datasheet, in which each field is a column and each row is a record, you can use these alternatives:

- Press the CTRL + Edit/View button.

  This displays an Access form in Form View, which shows one record at a time. Signatures are visible in this format.



- Pressing SHIFT + Edit/View displays a the data in the form of a query.

- Pressing ALT + Edit/View displays the actual Access database table containing the data. This method is useful if you need to quickly find out the name of the Access database table where the data for your form is being stored.

Deleting a Record

1. Click in the gray cell to the left of the row that you want to delete. This will highlight the entire row.
2. Press the Delete key on the keyboard. You will be asked to confirm the deletion. Click Yes to delete or No to cancel.

Note: Deleting a record from the PC will remove the record from the handheld only if the record has not been modified on the handheld. If the record has been updated on the handheld, it will be uploaded to the PC on the next HotSync data transfer, and can then be deleted from the PC.

WARNING: Deletion of records from the PC is permanent. Make sure that you have a backup of the Forms Manager datbase before you delete large numbers of records. (See page 416.)

Exporting Data to Microsoft Excel

To create a report, you can export the data to Microsoft Excel.

1. In the Pendragon Forms Manager, click on a form to select that form.
2. Click on the **To Excel** button to export the data to an Excel spreadsheet file. You will be prompted for a file name for the Excel Spreadsheet.
3. After exporting the data to Excel, close the Pendragon Forms Manager. You can then open the Excel file and use Excel to create your report.

Troubleshooting tip:
If you attempt to export to Excel and get an error message about Installable ISAMs, close the Pendragon Forms Manager. Then click on Start...Programs...Pendragon Forms...Configuration Tool. In the Configuration Tool window, click on the Diagnostics tab and click the button to Register Installable ISAMs. Then re-try exporting data to Excel.

Exporting Data to ASCII (CSV File)

If you need to send the data to another database, you can export the data to ASCII, and then import the ASCII data into your own database.

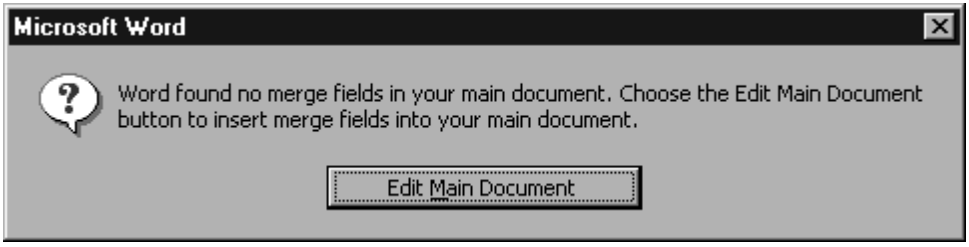
1. In the Pendragon Forms Manager, click on a form to select that form.
2. Click on the To ASCII button to export the data to a comma delimited ASCII file (a .TXT file or a .CSV file - Comma Separated Variable file).
   You will be prompted for a file name for the ASCII file.

Creating a Report in Microsoft Word

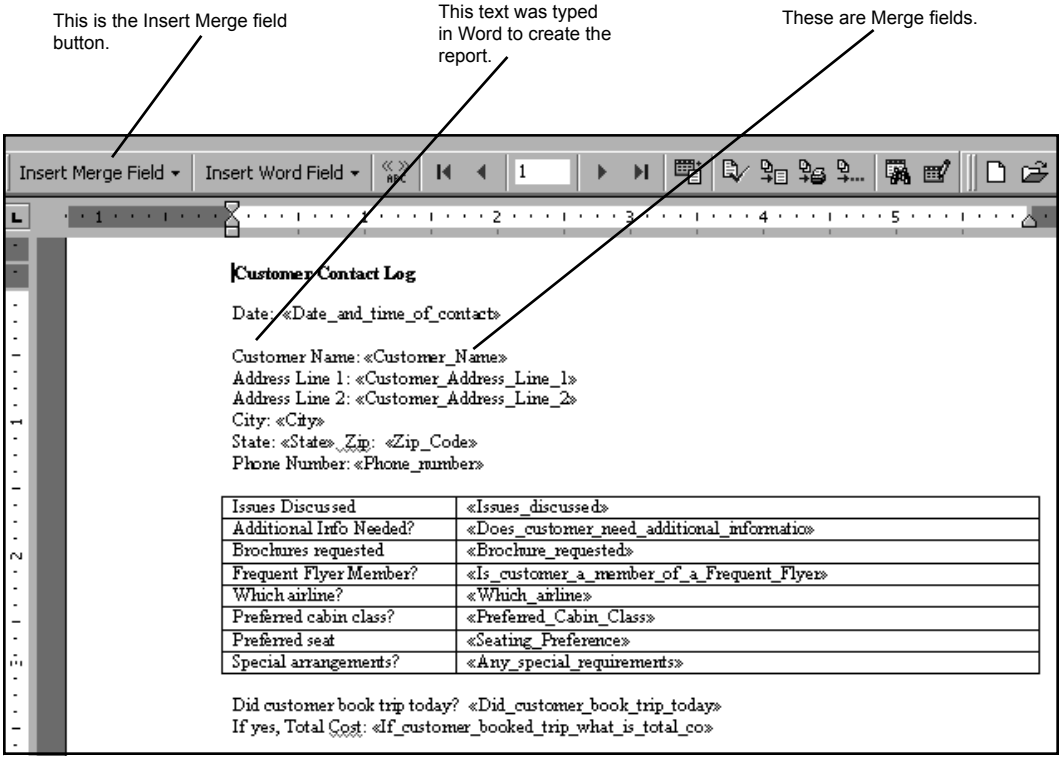
Once you receive data from the handheld back on the PC, you can use Microsoft Word to create a report to print out your data.

The following instructions can be used with Microsoft Word 97 and Word 2000.
For Word 2002 instructions, visit the Support page at www.pendragonsoftware.com.

1. In the Pendragon Forms Manager on the PC, click on a form and then click the To ASCII button.
2. An Export to Text window will appear. Select a directory folder and type a name for the Text file to which the data will be exported. Click Save.
3. Close the Pendragon Forms Manager.
4. Open Microsoft Word, and choose to open a New, blank document.
5. Click on the Tools menu, then click on Mail Merge. The Mail Merge Helper dialog box appears.
6. Click the Create button and choose Form Letters.
7. You will be prompted for a document to use. Choose Active Window.
8. In Step 2 of the Mail Merge Helper, click on the Get Data button, and choose Open Data Source.
9. In the Open Data Source window, change the directory folder where you stored the Text file (in step 2), and select to view files of type *.TXT. Double-click on your selected file.
10. Word will display a dialog box prompting you to click the Edit Main Document button. Click this button.



11. You will be returned to the new, blank document. Word will have an additional button, Insert Merge Field, which will allow you to position fields from your form on the report. (See picture on next page.)



12. Type the text of your report. Whenever you want to position a field on the report, click the Insert Merge Field button, and select the field of your choice. The field will appear in special angled brackets (Example: <<Customer Name >>).
13. Save the Word document. This document will serve as your report template, and can be used over and over.
14. To merge the data into the report, click on the Tools menu, then click on Mail Merge. In Step 3 of the Mail Merge Helper window, click on the Merge button.
15. A Merge window appears. Choose to merge to a New document, then click on the Merge button. The data in the Pendragon Form will be merged into your report.

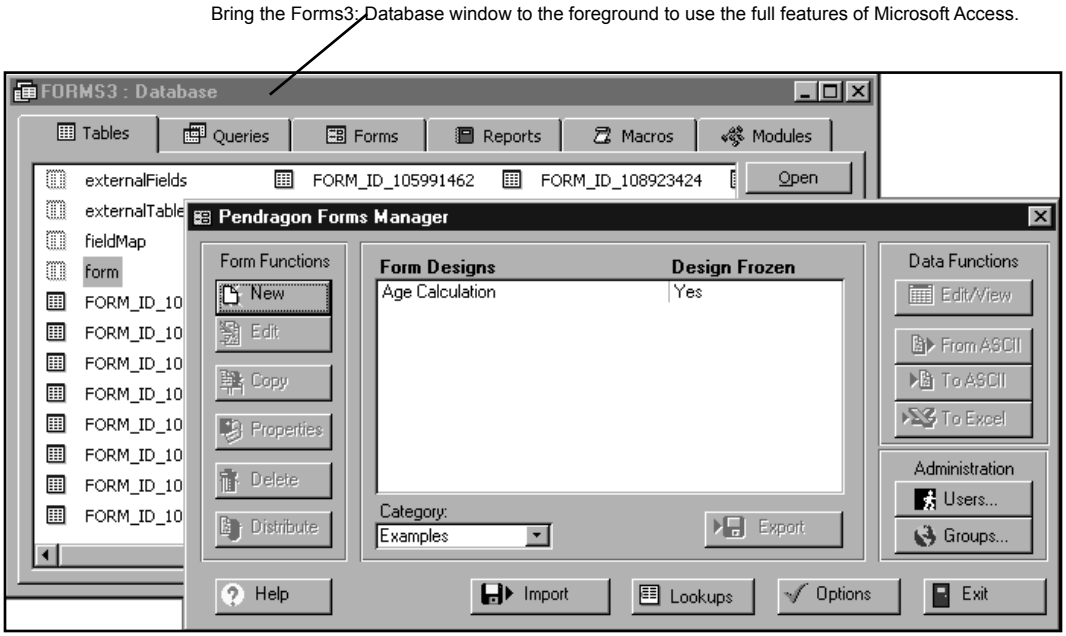
Creating Queries and Reports in Microsoft Access

If you have the full version of Microsoft Access 97, Access 2000 or Access 2002, you can tap into the full features of Access to create queries and reports on your data.

Refer to your Microsoft Access online Help or printed documentation for instructions on creating reports and queries.

The Pendragon Forms database is typically located in the C:\Program Files\Forms3 folder.
The file name is Forms3.mdb if you have Access 97, or Forms32k.mdb if you have Access 2000.

Within the Pendragon Forms Manager, you can bring the Forms3: Database window to the foreground in order to create queries and reports in Access. The Forms3: database window may be minimized, or you may have to click on Windows...Cascade to view this window.



To see which database table corresponds to a form, in the Forms Manager click on the form name and then click on the Properties button. The Form ID is the same as the database table name for that form.

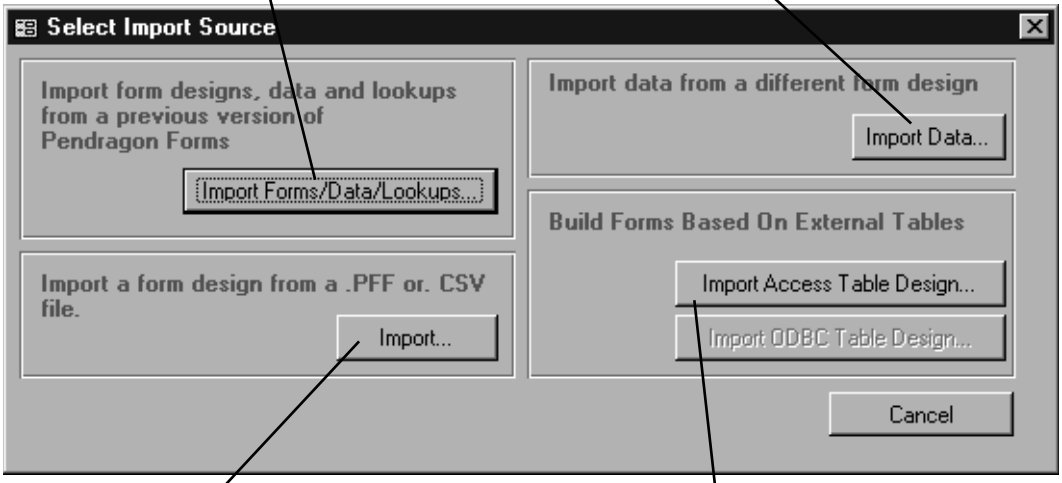
12. Importing & Exporting

Import Button

In the Pendragon Forms Manager, you can click the Import button to access the following screen:

This button allows you to import form designs, data and Lookup Lists from a previous version of Pendragon Forms.

The Import Data button allows you to import data from one form into another. Useful if you have had to copy a form to make changes, but you want to keep the data from the previous form design.



Tthe Import button allows you to import form designs which are in .PFF file format.

You can also create a form design by importing an ASCII Comma Separated Variable file.

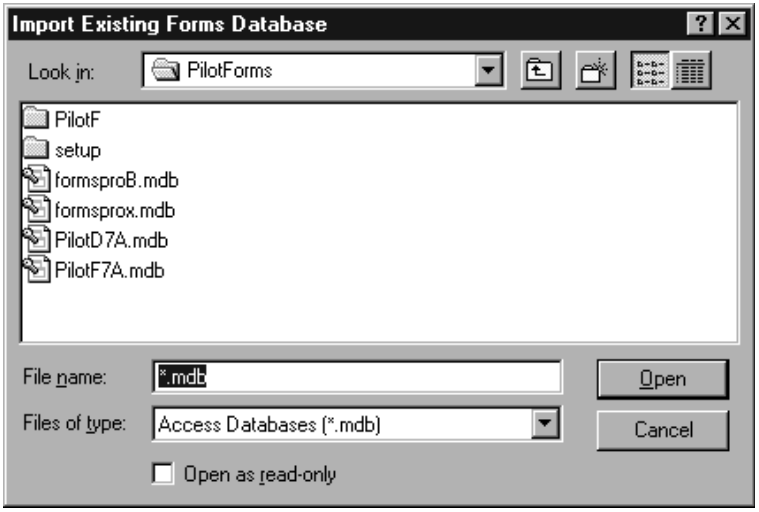
These buttons allow you to create form designs from external database tables. See Linking to external databases, page 392 and 412.

Importing from a previous Pendragon Forms database

If you have been using an earlier version of Pendragon Forms, you can import your form designs, data and lookup lists into the current Forms database.

To import from a previous version of Pendragon Forms:

1. In the Pendragon Forms Manager, click the Import button, then click the Import Forms/Data/Lookups button.
2. An Import Existing Forms Database window will prompt you to select the Forms database to open.

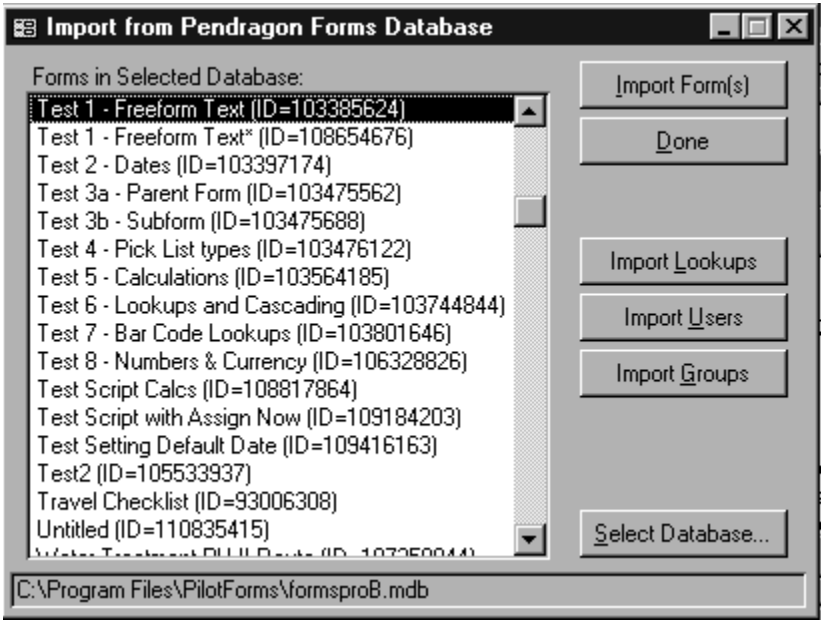


Valid database names to select are shown here:

Version of Pendragon Forms	Name of Database
Pendragon Forms version 4.0 Pendragon Forms version 3.2 Pendragon Forms version 3.1 Pendragon Forms version 3.0	Forms3.mdb (Access 97) Forms32k.mdb (Access 2000 / Access XP)
Pendragon Forms version 2.0	FormsProB.mdb FormsProA.mdb FormsPro.mdb
Pendragon Forms version 1.2	PilotD7A.mdb

Select a database and click Open.

3. A list of forms in the selected database will be displayed.
   - To import a form design and the data in that form, click on the name of the form and then click the Import Form button. Repeat for each form that you want to import; or you can use CTRL + click on each form design that you want to import.
   - To import all of your Lookup Lists, click the Import Lookups button. (Do this only once.)
   - For Forms version 3 and higher only: Use the Import Users and Import Groups buttons to import the User List and User Groups into the current database.

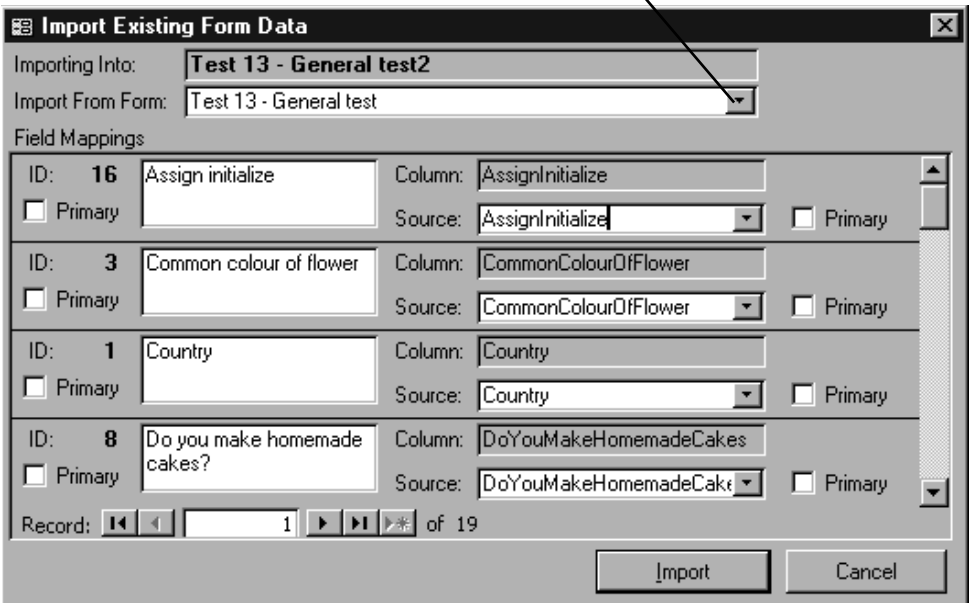


After the import process is complete, click on the name of each form in the Pendragon Forms Manager and click the Edit/View button to verify that your data has been imported correctly.

Importing Data from a Different Form Design

When you copy a form in order to make changes to the form design, the data associated with the original form is not automatically copied into the new form. If you need the data from the original form, you can import the data as follows:

1. After you have made the necessary modifications to the copied form, freeze the copied form.
2. In the Pendragon Forms Manager, click on the name of the copied form, then click the Import button, and then the Import Data button.
3. An Import Existing Form Data window appears. Select the form whose data you want to import.



4. Once the original form has been selected, a list of fields will be displayed.
   - If the column names of the copied form were kept the same as the original column names, then click the Import button to map data from the original form to the copy.
   - If database column names were changed in the copy, then select the old column name for each field, by clicking on the arrow in the Source field for each field on the form. Click the Import button when you have finished mapping the old column names to the new column names. NOTE: If you accidently map a Text field to a Yes/No field or Popup List, data for these fields will not be sent to the handheld.

Importing & Exporting Form Designs

If you want to design a form on one PC, and then use the form on another PC, you will need to export the form design.

- The Export button in the Pendragon Forms Manager window allows you to export your form design to a file. Form designs are stored in a .PFF file format when exported.
- The Import button in the Pendragon Forms Manager window allows you to import a form design from a .PFF file format.

Limits of Import and Export functions

The Import and Export buttons only convert form designs into .PFF files. Lookup Lists are not automatically converted. If your form uses Lookup Lists, you will need to import/export the Lookup Lists in addition to the import/export of the form design.

To Import a Form Design

1. Click the Import button in the Pendragon Forms Manager window, then click the Import...button. A Select Pendragon Forms Design File window appears. Pendragon Forms Design files (*.PFF) will be displayed by default.
2. Select the directory where the form to be imported is stored.
3. Select the name of the file to be imported.
4. Click the Open button. The selected form will be imported into your Form Designs List in the Pendragon Forms Manager.
5. If the form that you are importing contains Lookup Lists, you will need to import the Lookup Lists separately. See *Importing & Exporting Lookup Lists*, page 205.

To Export a Form Design

1. In the Pendragon Forms Manager, click on the form to be exported.
2. Click the Export button. An Export Data window appears.
3. Select the directory where the form to be exported will be stored.
4. Type a file name for the form to be exported. The file will be saved as a Pendragon Forms Design file (.PFF).
5. Click the Save button.
6. If the form that you are exporting contains Lookup Lists, you will need to export the Lookup Lists separately. See *Importing & Exporting Lookup Lists*, page 205.

Importing & Exporting Lookup Lists

You may want to import a Lookup List if you already have ASCII data that you want to use in a Lookup List. You may also need to import a Lookup List if you are importing a form design, and the form contains Lookup Lists. The Lookup Lists have to be imported separately from the form design. You may need to export a Lookup List if you design a form and want to export your form design. Any Lookup Lists used by the form will have to be exported separately.

To Import Data into a Lookup List

Data must be in a CSV file format (see page 196) to be imported into a Lookup List. The CSV file can have one or two columns: one column of data for the Lookup Display field, and a second, optional column of data for the Lookup Value field.

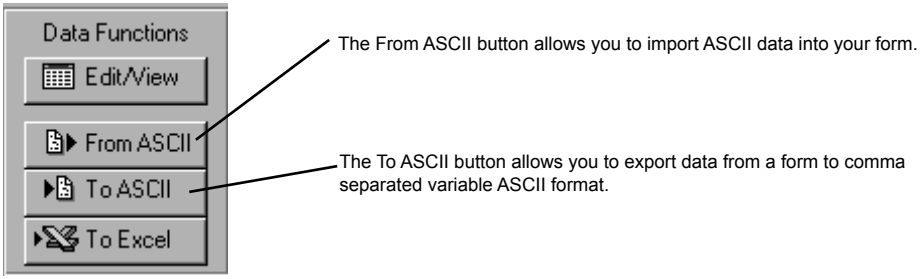
1. In the Pendragon Forms Manager window, click the Lookups button. The Lookup Lists window will appear.
2. In the Lookup Lists window, click in the blank row below all the existing Lookup Lists, and type a name for a new Lookup List. If you are importing a Lookup List for use with a form which is also being imported, the name that you type here for the Lookup List must exactly match the name of the Lookup List in the Lookup List field on the form.
3. Click the Edit button to the right of the Lookup List name.
4. In the Lookup Editor window, click the Import Lookup button.
5. Select the directory where the Lookup List CSV (ASCII) file is stored.
6. Select the Lookup List CSV file to be imported.
7. Click Open.

To Export a Lookup List to an ASCII (CSV) file

1. In the Pendragon Forms Manager window, click the Lookups button. The Lookup Lists window will appear.
2. In the Lookup Lists window, click the Edit button next to the Lookup List that you want to export.
3. Click the Export Lookup button.
4. Select the directory where the Lookup List to be exported will be stored.
5. Type a file name for the exported Lookup List. The file will be saved as a CSV (ASCII) file.
6. Click the Save button.

Importing & Exporting Data

In the Pendragon Forms Manager, the Data Functions buttons allow you to import and export data from your forms.



Importing Data

You can import data which is in comma delimited (or comma separated variable .CSV) ASCII format into a form. (See next page for information on CSV files.)

- In order to import data correctly from a CSV file into the database table for a form, the column names in the CSV file must exactly match the column names in the Forms database table.
- After you freeze your form, click on the name of the form, then hold the Shift key down and click the Edit/View button. You will be able to see the column names. You may need to widen the columns to view the entire column names. Make a note of these column names, and use the identical names in your CSV file.

To import ASCII data into a form:

1. Click on the name of a form, then click the From ASCII button.
2. You will be prompted to enter a handheld user name to whom the records in the ASCII file will be assigned. If you do not want to assign the records at this time, leave the default of No One. Click OK.
3. You will be prompted to select the ASCII .CSV file to import. Select the appropriate .CSV file and then click OK.
4. Click the name of the form and then click the Edit/View button to verify that your data has imported correctly.

Exporting Data

Once data comes back to the PC from the handheld, you can choose to export the data. You can *Export Data to Excel* or *Export Data to ASCII*, page 196.

Creating an ASCII (CSV) File

If you have data in Excel or in a database, you can use this data to create a form, or to import into the fields on the form. Data has to be in an ASCII format called comma delimited ASCII or comma separated variable ASCII (.CSV file extension) in order to work with Pendragon Forms.

Format of a CSV File

A CSV File is a text file in which the first row identifies the field names, and all subsequent rows are individual records. Data within each record is separated by a comma (hence the name comma separated variable or CSV). Text is surrounded by double quotes.

Sample CSV File:

```
Name,Address,IDNumber,FavoriteColor
"John Smith","22 Cherry Lane",45,"Blue"
"Peter Panera","418 N. Filmont Ave.",78,"Green"
"Sarah Jane Smyth","71 Barley Lane",5180,"Purple"
```

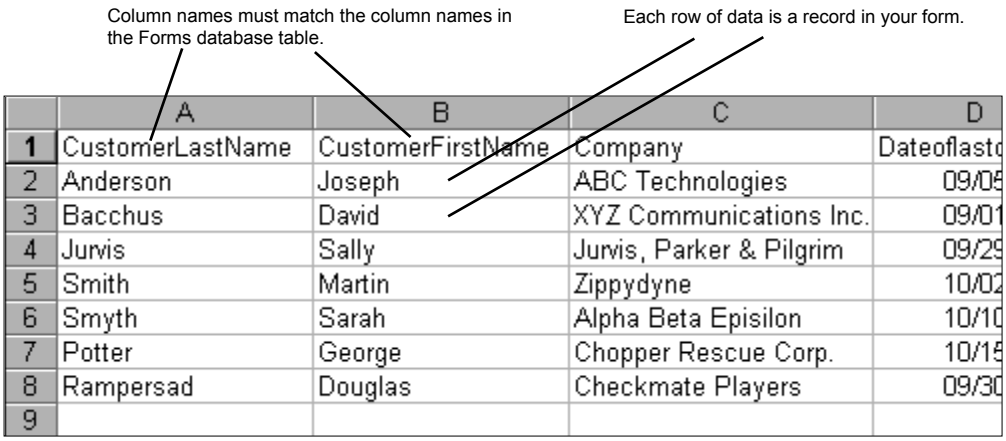
IMPORTANT:
The column names in the first row of the CSV file must exactly match the column names in the database table of the form. To see the column names used by the form:

1. In the Pendragon Forms Manager, create the form and freeze the form.
2. Click on the name of the form to select it, then hold down the SHIFT key and press the Edit/View button. This will display the columns in the database table for the form.
3. You may need to widen the columns to view the entire column names. Make a note of the exact column names, and use the same column names in your CSV file.

To create a CSV File from Microsoft Excel

Refer to the picture on the next page.

1. In your data file, the first row should contain the name of each column of data. These names must correspond to the column names in your form.
2. Each row should contain a separate data record.
3. Keep your file in its original format (e.g. an Excel worksheet). But also make a copy and save the copy as file type .CSV - comma delimited ASCII.



	A	B	C	D
1	CustomerLastName	CustomerFirstName	Company	Dateoflastc
2	Anderson	Joseph	ABC Technologies	09/05
3	Bacchus	David	XYZ Communications Inc.	09/01
4	Jurvis	Sally	Jurvis, Parker & Pilgrim	09/29
5	Smith	Martin	Zippydyne	10/02
6	Smyth	Sarah	Alpha Beta Episilon	10/10
7	Potter	George	Chopper Rescue Corp.	10/15
8	Rampersad	Douglas	Checkmate Players	09/30
9				

Creating a Form from a CSV File

Once you have data in a comma delimited ASCII format (or comma separated variable .CSV file), you can use the CSV file as the basis for creating a form. Once the form is created, you can import the data from the file into the form, and then send both form and data to the handheld.

1. In the Pendragon Forms Manager window, click the Import button, then click the Import...button.
2. A Select Pendragon Forms Design File window will appear. Instead of displaying files of type .PFF, select to display files of type .CSV. Select the directory where the CSV file is stored. Double-click on the CSV file to select it.
3. An Import Data dialog box will appear, prompting you for a name for the form whose design will be based on the CSV file. Type a name for the form.
4. The new form will be displayed in the Forms List in the Pendragon Forms Manager. Click on the form and then click the Edit button.
5. Review the form. You may want to make minor changes, such as:
   - Change text fields to Yes/No fields, Popup Lists or Lookup Lists as appropriate. Or change Numeric fields to Currency fields, as appropriate.
6. When you are satisfied with the design of the new form, you can freeze the form design.
7. To import the data in the CSV file into the form, see page 206.

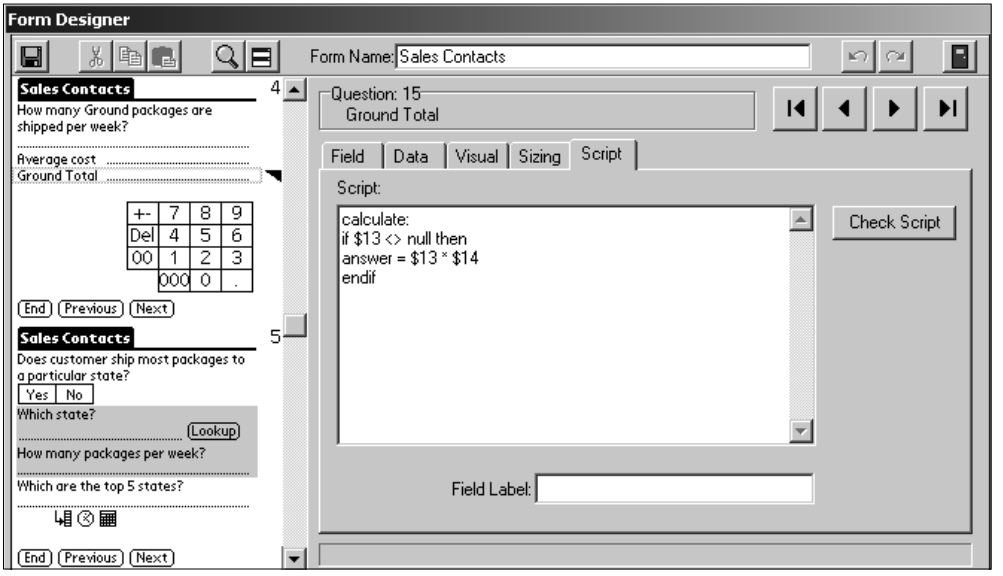
13. Scripting Reference

The Scripting tab in the Form Designer window allows you to write scripts to control what happens when the handheld user makes a selection in a field, or enters or exits a field or a screen.

Scripting allows you to:

- Perform calculations in fields.
- Create branching, so that the user's response in one field determines which field(s) are displayed next.
- Minimize handheld data-entry by pre-filling certain fields.

NOTE: If you are converting from an earlier version of Forms to Forms version 4.0, refer to Appendix C, page 463, for some tips on scripting changes you may need to make.



Format of a Script

A script consists of at least one event procedure. An event procedure contains:

- An event procedure label + statement(s)

The event procedure label determines when the script will be run.
The statements are the actions which are performed when the script is run.

The pages which follow describe the possible event procedures and statements which you can put in a script.

To create a script for a field:

1. In the Form Designer window, click on a field in the Preview Area to select the field.
2. Click the Script tab.
3. Type the script for the field. A script consists of an event procedure and one or more statements. (See following pages.)
4. Click the Check Script button to check the syntax of the script.
5. You can change a script even after you freeze a form design.
   This means that if you need to modify a script, you can do so, and then just re-distribute the form to the handheld. You do not need to copy the form design in order to modify a script.

How Scripting Works & Limits of Scripts

Scripts are transferred to the handheld in ASCII format. When the form first needs to use a script, it will compile the script and then run the script.

Limits of scripts include:

- The text in each script cannot exceed 2000 characters.
- Some scripting events only run in Layout View, others may only run in Field View. Other scripting events run in Layout View, Field View and Record View.
  You must decide which view the handheld user will be using, and only use scripting events that work in that view.
- Since the computer processor on the handheld is not very fast, scripts which are very long will cause a noticeable delay as the processor runs the script. The solution is to limit the use of scripts and to minimize the length of scripts.

Field Labels

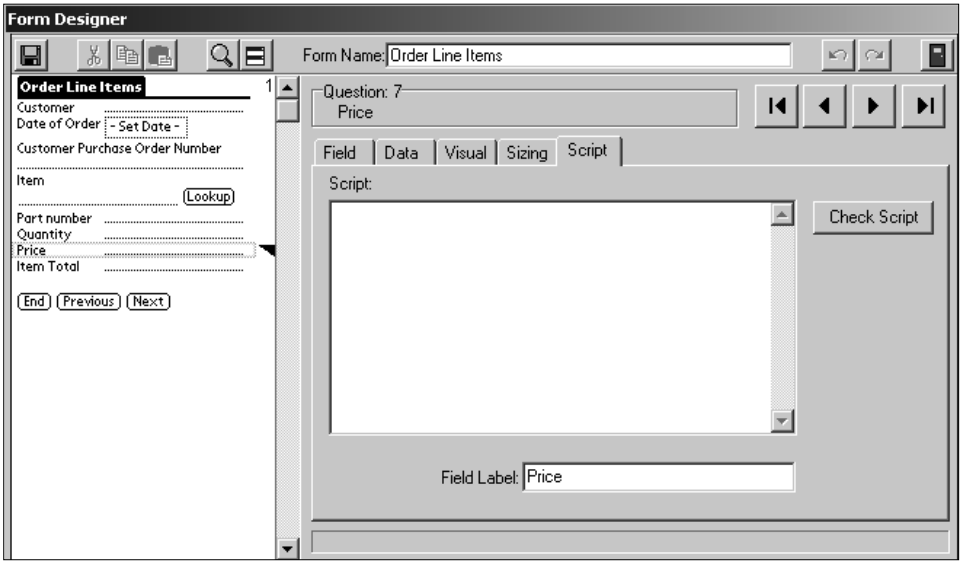
In versions of Pendragon Forms prior to version 3.2, fields had to be referred to by their field number in a script. For example, the value in Field 3 of a form is referred to as $3 in a script. Or, to jump to Field 17, a script would have a statement such as goto 17.

One limitation of referring to fields by their field numbers is that if you copy a frozen form and then insert fields into the copied form, the field numbers may all change. For instance, what was Field 4 on the original form may become Field 5 on the copied form after an extra field is inserted. If a field number changes, then any references to to that field number in any script also has to change.

New from Forms 3.2 and in Forms 4.0 is the ability to assign a field label to a field, and then reference that field in a script by referencing the field label. In this way, if the field number changes, the script does not have to change.

To assign a field label to a field, click the Script tab in the Form Designer window.
In the Field Label field, type a word or phrase that will be the label for that field. The field label must not exceed 50 characters, and must contain only alphanumeric characters and no spaces.

In the picture below, field 7 is given a field label of Price. (The field name is also Price in this instance.)



Field labels are referenced in scripts by placing the label in square brackets. For example, if Field 8 of a form is given a label of ItemTotal, the value in that field can be referred to in a script as

```
$[ItemTotal]
```

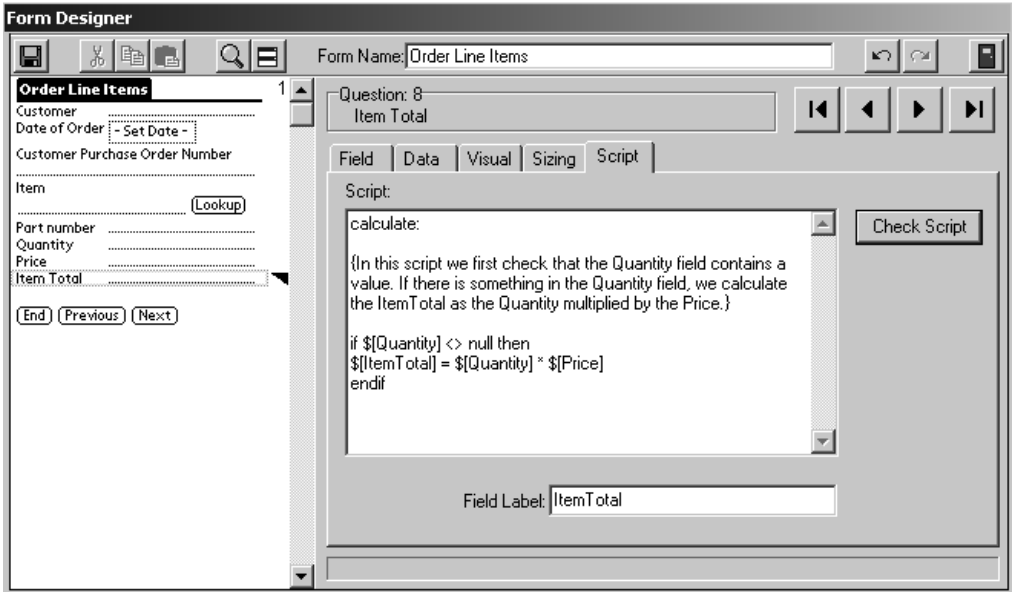
The $ symbol means the value in the field.

Similarly, scripting statements that might reference a field number, such as goto 8, can now reference the field label, such as:

```
goto [ItemTotal]
```

You can add field labels at any time, even after a form is frozen.

Note, however, that if you assign a field label to a field and then you want to change that field label, any scripts that reference the old field label will have to be manually changed to contain the new field label.



Adding Comments to Scripts

New in Forms 4.0 is the ability to add comments to scripts. Comments help to document the script, but are not sent to the handheld and are not part of the script instructions.

To add a comment to a script, put the comment is curly brackets { }.
For example: `{Here is a comment}`
The picture above shows an example of a comment in a script.

Event Procedures

An event procedure's label determines when a script will run. Every script must contain at least one event procedure. There are fourteen event procedures. The following table describes each event procedure, and identifies whether that event procedure will run in Layout View, Field View or Record View on the handheld.

Event Procedure	Purpose	Layout View	Field View	Record View
enterscreen:	The **enterscreen:** event runs as soon as the user arrives on a screen in Layout View. The enterscreen: event can be used to pre-fill certain fields on a screen as the user gets to that screen.	√		
exitscreen:	The **exitscreen:** event runs as soon as the user leaves a screen to go to another screen in Layout View. The exitscreen: event can be used to pre-fill certain fields on the next screen based on values entered in the current screen. A **goto** statement (see page 248) in an exitscreen: event lets the user branch to a specified screen.	√		
enter:	The **enter:** event occurs when the field is about to be drawn. This means that the script is run when the user displays the field on the handheld. In Field View an enter: event can affect any field as the handheld user views the field. *In Layout View and Record View, an enter: event can only be triggered by Text, Numeric and Currency fields, when the handheld user taps in these fields.	√ (See * note)	√	√ (See * note)
exit:	In Field View, the **exit:** event occurs when the user exits a field, that is, the user taps the Next arrow button to move to the next field. The exit: script is only run when the user is moving 'forward', for example from field 8 to field 9, and not 'backward' from field 9 to field 8. *In Layout View and Record View, an exit: event is only triggered by leaving a Text, Numeric, or Currency field.	√ (See * note)	√	√ (See * note)

Event Procedure	Purpose	Layout View	Field View	Record View
select:	The **select:** event occurs when the user selects an option or accepts a dialog associated with a field. The select: event is typically used in branching, so that when the user selects an option, he/she branches to a field depending on the selection made. A select: event is only triggered in fields that allow a selection, such as a Popup List, Lookup List or a checkbox. Leaving a selection field blank will cause the select: script not to run. *Text, Numeric and Currency fields do not trigger a select: event.	√ (See * note)	√ (See * note)	√ (See * note)
calculate:	A **calculate:** event is used to place the result of a calculation into a field. Typically, the calculated result depends on the values in other fields. The **calculate:** event is triggered when any field is updated manually or updated via a script. As you exit the updated field, any calculate: script in Field 1 is run, followed by a calculate: script in Field 2, then Field 3, etc. There is a performance penalty if there are a lot of fields on the form - for example, if you have a form with 150 fields and the form contains one calculate: script, then that script will be run 150 times as you enter data and then exit each field.	√	√	√
initialize:	The **initialize:** event runs only once when a new record is created. The initialize: event is often used to set values in date and date&time fields, so that when the user creates a new record, these fields are already filled in.	√	√	√
open:	The **open:** event runs only once whenever a record is entered. The open: event is used instead of an initialize: event if you need a script to run every time a record is accessed.	√	√	√

Event Procedure	Purpose	Layout View	Field View	Record View
click:	A **click:** event is primarily used in Button fields. The click: event allows a script to run when the handheld user taps on the button in the Button field. See page 302. A click: event can also run when you tap in a Lookup List field, before the list is displayed. This is useful if you are performing a Lookup to Another Form, and you want to filter the records that are displayed in the list. See page 372. New in Forms 4.0: A click: event can be run in a Section field, if you tap the question area or graphic in a Section field. See page 383. Also new in Forms 4.0, a click: event can run in a Custom Control field, provided that the creator of the Custom Control application allows it.	√	√	√
scan:	A **scan:** event runs when a bar code is scanned. All scan: events run in sequence, so that scan: events in Field 1 run first, followed by scan: events in Field 2, etc. A scan: event can only be used with Symbol Technologies SPT 1550 and SPT 1800 family of handheld devices. See page 308.	√	√	√
validate:	A **validate:** event runs when the handheld user leaves a record. The script in a validate: event can be used to perform additional validation on various fields.	√	√	√
cascade:	A **cascade:** event is used on a subform to allow a change on a parent form to populate a change on the subform records associated with that parent record. A cascade statement in a script on the parent form is used to trigger the cascade: events on the subform.	√	√	√

Event Procedure	Purpose	Layout View	Field View	Record View
report:	The **report:** event is triggered by a **printreport** statement in a script. The report: event specifies the layout of printer output from the handheld. report: events run in sequence, so that a report: event in Field 1 will run first, followed by a report: event in Field 2, Field 3, etc. the report: events on a parent form run first, followed by report: events on a subform. See page 324.	√	√	√
report2:	The report2: event runs after all report: events on a parent and subform have been run. Report2: is used if you need to print infomation from a parent form after all the subform records have been printed. See page 324.	√	√	√

Variables

Variables are used in statements to represent values in calculations, and to refer to the values of fields.

The following variables are used in Pendragon Forms scripts:

answer — Represents the value of the current field.
Example: `answer = 10` puts the number 10 in the current field.
Example2: `answer = $7` puts the value in field 7 into the current field.
Example3: `answer = result` puts the value that is currently in the result variable into the current field.

result — Used as a temporary variable for storing intermediate calculations. Several scripting statements also place values into the **result** variable.
Example: `result = 6 + 19` stores the number 25 in the result variable.
Example 2: `result = $5 + $6` adds up the values in fields 5 and 6, and places the sum of the two fields in the result variable

$*number* — **$** is a field reference, used to refer to the value in the specified field.
Example: `$5` means the value in field 5
Example2: `$[OrderTotal]` means the value in a field with the field label of OrderTotal.

temp — **temp** is a 'free' variable that can be used to store data. Whereas scripting statements place values into the **result** variable, the value in the temp variable can be set in a script and will be preserved until you change this value in a script yourself, or until Pendragon Forms is no longer the active application on the handheld.

null — Null is a constant which is equivalent to an empty string.

buffer — New in Forms 4.0: **buffer** is another 'free' variable that can be used to store data, similar to the temp variable. The buffer variable can be set in a script and will be preserved until you change this value in a script yourself, or until Pendragon Forms is no longer the active application on the handheld.

Functions

Functions are like read-only variables that are used to retrieve recently acquired data or information about the state of the system.

now	Now is a function, used to store the current date and time.
username	Username stores the handheld user name of the handheld device.
scandata	Scandata is a function that stores the most recently scanned bar code. Maximum size can be up to 2000 characters. Text fields are only 255 characters by default, so if your bar code is more than 255 characters, increase the Maximum Length of the Text field before the form is frozen, in order to store the full value of scandata.
scanfield	Scanfield records the field that the user was in when the last bar code scan took place.
scantype	Scantype records the bar code symbology of the last bar code scanned.
cascadename	Cascadename stores the value of the parameter (up to 15 characters) that was given to the last cascade statement. The value of Cascadename can then be used to determine what action is to be performed in a Cascade event on a subform.
reportname	Reportname stores the value of the parameter (up to 15 characters) that was given to the last printreport statement. The value of Reportname can then be used to determine what type of report is printed.
pagenum	Pagenum stores the page number of the page that is currently being printed from the handheld. Before you print anything, the value of Pagenum is 1.
linenum	Linenum stores the line number of the line currently being printed. Before you print anything, the value of linenum is 1.

webdata	Stores the HTML data returned by a server after the Transmit Web statement in a script has sent an HTTP request to the server. The Web server has to return the HTML data between <PFDATA> and </PFDATA> tags, and the Webdata function will store the data that occurs between these tags. The Maximum size of Webdata is 2KB.
column *number*	If a record is selected with the select statement (see page 270), the column function returns the value of the specified column *number* in the record.
selectedbutton	Stores the name of the button that was tapped to generate the current exit event. Valid values are End, Next or Other, meaning that the End button has been tapped, or the Next button (right arrow button) or another button.
recordtimestamp	Returns the creation date and time of the record.
tapx	New in Forms 4.0. Stores an X-coordinate (horizontal coordinate) when a user taps in a Section field in **Layout View**. On a handheld device (even a high resolution device), the screen has X-coordinates ranging from 0 - 159. The **tapx** function can be used to determine where on a picture in a Section field a user has tapped horizontally.
tapy	New in Forms 4.0. Stores a Y-coordinate (vertical coordinate) when a user taps in a Section field in **Layout View**. On a handheld device (even a high resolution device), the screen has Y-coordinates ranging from 0 - 159. Pendragon Forms reserves Y-coordinates 0-15 for the title bar, and Y-coordinates 145-159 for the buttons at the bottom of the Layout View screen. Valid values for **tapy** are therefore in the range 16-144. The **tapy** function can be used to determine where on a picture in a Section field a user has tapped vertically.
flashid	Stores the serial number of the handheld device, provided that the device has flash ROM. Zire devices do not have flash ROM, but Zire 71 devices do have flash ROM, as do Tungsten devices.

Scientific Functions

Scientific math functions are available in scripts provided that an additional .PRC file, called MATHLIB.PRC, is installed on the handheld. MathLib is not a part of Pendragon Forms, it is a free shared library that can be used by handheld devices. MATHLIB.PRC is available in the MATHLIB.ZIP archive which is installed into the C:\Program Files\Forms3 folder.
To install MATHLIB.PRC, unzip the MATHLIB.ZIP file, double-click the MATHLIB.PRC file and then synchronize the handheld.

The scientific functions that are supported via scripts are specified starting on page 280.

Operators

The Pendragon Forms scriping language contains unary and binary operators which make it possible to perform calculations.

UNARY OPERATORS
Unary operators act on one variable. Unary operators include:

integer *value*

Converts a number to its integer part.
For instance, 10.6 is converted to 10.
In this example, the answer in the current field is given the value of the integer part of field 5.

```
answer = integer $5
```

- (Minus Sign)

Converts a number to a negative number.
Example: `answer = -$8`

length *value*

Returns the number of characters in a value.
This example returns the number of characters in field 5.

```
calculate:
 answer = length $5
```

BINARY OPERATORS

Binary operators act on two variables. Binary operators include:

+ (Addition)	Adds two values. Example: `answer = $4 + $5` adds the value in field 4 to the value in field 5.
- (Subtraction)	Subtracts one value from another. Example: `result = $18 - 20` subtracts the number 20 from the value in field 18.
* (Multiplication)	Multiplies two values. Example: `$6 = $5 * $4` multiplies the values in fields 5 and 4, and places the result in field 6.
/ (Division)	Divides one value by another. Example: `answer = $12 / $13` divides the value in field 12 by the value in field 13.
# (Contains)	Looks for a character string. Example: `if answer # Red then goto 4 endif` looks for the string Red in the answer. Quotation marks are used if the string has spaces, example: `if answer # "Critical condition" then require 5 endif`
% (Modulo division)	Returns the remainder of a division. Example: `result = $4 % 12` returns the remainder after dividing field 4 by the number 12.
& (Concatenate)	Concatenates two strings. Example: If field 2 contained the word Red, then `answer = $2 & " apples"` would put the string "Red apples" into the current field.
AND	Performs a bitwise AND operation on a binary number. Used to extract information from Multi-Selection fields. See page 304.
OR	Performs a bitwise OR operation. Used to assign a value to a Multi-Selection field.

Statements

There are three types of statements which can be used in scripts: Assignment statements, Conditional stetements and Action statements.

Assignment Statements

Assignment statements place a value into a field or into a temporary variable. A dollar sign before a field number means the value in that field. For example, $7 means the value in field 7, whereas 7 means the number seven.

You can also use field labels to reference a field by a label instead of by field number.
If field labels are being used, they must appear in square brackets. A dollar sign in front of a field label means the value in that field, e.g. $[SubTotal] means the value in a field whose field label is SubTotal.

The assignment statements are:

answer = <expression> Places the result of a calculation into the current field.
Note that only simple expressions, involving not more than two values and one operator (+ - * /) can be used.
In the following example, the value in field 4 is multiplied by the value in field 5, and the calculated result is placed in the current field.

```
calculate:
 answer = $4 * $5
```

In this example, the value in field 8 is divided by the number 10, and the result is placed in the current field.

```
calculate:
 answer = $8 / 10
```

The Answer statement can be used with field labels.
In this example, one field has a field label called ItemTotal and another field has a label called TaxRate. Clicking a button calculates the tax and places the calculated result into the current field.

```
click:
 answer = $[ItemTotal] * $[TaxRate]
```

result = <expression>

Result is a temporary variable. Since not more than two values can be calculated at a time, result is used as extra 'storage space' for intermediate calculations. Several scripting statements also use the Result variable to store the result of a calculation.

In the following example, the values in fields 4, 5, 6 and 7 are being added, and the final calculated result is placed in the current field.

```
calculate:
 result = $4 + $5
 result = result + $6
 answer = result + $7
```

To calculate an expression like 8*(9+7), the script would be

```
calculate:
 result = 9 + 7
 answer = 8 * result
```

The Result statement can be used with field labels.
In this example, fields are given labels of Discount, Retail Price and Discounted Price. If the handheld user selects to give a discount, the discount amount is calculated by multiplying the discount by the price. The discounted price is then calculated by subtracting the discount from the retail price.

```
select:
 if answer == Y then
  result = $[Discount] * $[Retail Price]
  $[Discounted Price] = $[Retail Price]
                              - result
 endif
```

$N = <expression>

This assignment statement is used to assign a value to a field from another field.
In the following example if the handheld user selects Yes, then field 15 is set to the number 10; if the handheld user selects No or leaves the field blank, then field 15 is set to the number 5.

```
select:
 if answer == Y then
  $15 = 10
 else
  $15 = 5
 endif
```

Field labels can be used when assigning a value to a field.
In this example a field with the label Daily Total is assigned the value of the sum of a field with the label Total and a field with the label Surcharge.

```
calculate:
 $[Daily Total] = $[Total] + $[Surcharge]
```

temp = <expression>

Temp is a temporary variable, similar to Result. However, whereas the Result variable is used by various scripting statements to store a value, the Temp variable is reserved for use by you, the form designer. This means that if you assign a value to the Temp variable, that value will remain until you change that value or until the handheld user exits the Forms application on the handheld.

assign

Assigns a value to the current field. Functions in the same way as answer =. However, answer = is preferred because an answer statement is less ambiguous and easier to read.
The following script creates a default value of 100 for a numeric field

```
calculate
 if answer = null then
  assign 100
 endif
```

Conditional Statements

The IF...THEN...ENDIF statement, and the IF...THEN...ELSE...ENDIF statement are conditional statements that are used to make a decision depending on a response that the handheld user has entered.

New is Forms 4.0 is the ability to do nested IF statements, that is, an IF statement within another IF statement.

if *condition* **then** *statements* **endif**
if *condition* **then** *statements* **else** *statements* **endif**

Tests for a condition and allows you to take action if the condition is true. The conditions are made with conditional operators:
= equals (numeric equality)
== string equality (equality between two text strings)
> greater than
< less than
>= greater than or equal to
<= less than or equal to
<> not equal to
contains (string)

This example checks to see if the current field has been left blank, and if yes, places the value N into the current field.

```
exit:
 if answer = null then
  answer = N
 endif
```

In this example, if field 2 contains the word Basement, the script jumps to field 6, and if field 2 contains the phrase Level 1, the script jumps to field 10. Quotes are used around the phrase “Level 1” because there is a space in the phrase.

```
exit:
 if $2 # Basement then
  goto 6
 endif

 if $2 # "Level 1" then
  goto 10
 endif
```

In this example, if the answer selected in the current field is High Priority Case, the script will make fields 12 - 18 visible, and jump to field 12. Any other selection in the field causes fields 19 - 21 to be made visible, and causes a jump to field 19. Quotes are used around the phrase “High Priority Case” because there are spaces in the phrase.

```
select:
 if answer == “High Priority Case” then
  show from 12 to 18
  goto 12
 else
  show from 19 to 21
  goto 19
 endif
```

The use of the == (string equality operator) means that the answer selected must exactly match the text string given. String equality is recommended for use in Popup List, Lookup List or Yes/No checkbox fields, where you can exactly predict the possible answers that the user can select.

IF...THEN...ENDIF statements and IF...THEN...ELSE...ENDIF statements can be used with field labels.

In this example, one field has a label TaxExempt, and another field has a label ItemSum. If the TaxExempt field is No, the current field is calculated as (1 + TaxRate) * ItemSum. If the TaxExempt field is Yes, the current field is calculated as just the ItemSum.

```
calculate:
 if $[TaxExempt] == N then
  result = 1 + $[TaxRate]
  answer = $[ItemSum] * result
 else
  answer = $[ItemSum]
 endif
```

New in Forms 4.0 is the ability to do a nested if...then...endif or if...then...else...endif statement. This means that you can have one or more if...then...endif statements inside another if...then...endif.

For example, imagine a field with a field label of Score is a Numeric field for storing a test score. In another field with a field label of grade, a student gets:
Grade A if their score is in the range 90 -100,
Grade B if their score is in the range 80-89,
Grade C if their score is in the range 70-79,
Grade D is their score is in the range 60-69 ,
A failed grade if their score is less than 60.

A nested **if...then...else...endif** can be used to detect the range.

```
exitscreen:
if $[Score] >= 80 then
    if $[Score] < 90 then
       $[Grade] = B
    else
       $[Grade] = A
    endif
else
    if $[Score] >= 70 then
       $[Grade] = C
    endif

    if $[Score] < 70 then
       if $[Score] >= 60 then
         $[Grade] = D
       else
         $[Grade] = Failed
       endif
    endif
endif
```

Action Statements

Action statements allow a script to perform an action, such as branching to a different field, showing or hiding a field, or displaying a message. The action statements are:

abortform Aborts the form, deleting the current record from the handheld device. Can be used in Click, Select, Exit and Scan events only.
In the following example, the record is deleted and the form is aborted if the value in field 5 is less than zero.

```
exit:
 if $5 < 0 then
  abortform
 endif
```

acquire "*settings*" "*startpattern*" "*stoppattern*"
Opens the handheld serial port to acquire data from an attached device, and places the collected data in the Result variable.
The settings parameter specifies the serial communications, and consists of the baud rate, parity, data bits, stop bit and optionally the handshaking method. (See Transmit Serial statement for typical values.)

The startpattern identifies the character(s) in the data string that mark the start of the data. The serial port will read data but not collect the data until the startpattern is encountered.

The stoppattern identifies the character(s) in the data string that mark the end of the data. When the stoppattern is encountered, the serial port of the handheld is closed. If the stoppattern is not found, then data will be collected up to a maximum of 2KB or until communications time out (15 seconds of inactivity).

The collected data that is placed into the Result variable does not contain the startpattern, but does include the stoppattern.

In this example, clicking a button on a form opens the handheld serial port at 9600 baud, no parity, 8 data bits, 1 stop bit, using hardware handshaking. Data is immediately collected since there is no start pattern. Data stops being collected when the ASCII 13 (carriage return) character is encountered. The collected data is placed in Field 4.

```
click:
 acquire "9600-N-8-1" "" "\\013"
 $4 = result
```

also

Used to combine `select` statements for the same form, to narrow the selection of records that are displayed when performing a lookup to another form.

Typically, select statements only work one at a time, meaning that if one select statement is followed by another, the second select statement will cause the first select statement to be discarded. The use of the also statement between two select statements causes the first selection to be kept, and the second selection to be performed on the subset of records from the first selection.

Note: The also statement only works if the select statements are referencing the same form.

As with any lookup to another form, the current form must have a Lookup List field that references the name of the reference form. Also, fields that you want to copy from the reference form to the current form must have the same field name and field type in both the reference form and the current form.

In this example, imagine that Field 2 of the current form contains a State and Field 3 contains a City. The "Employee List" reference form also contains a State and City. The click: event script is placed in the Lookup List of the current form that is doing the lookup to the reference form. The first select statement selects all employees in the specified State. The also statement retains that selection, and the second select statement then selects all employees within the selected State who are in the selected City.

```
click:
 select "Employee List" where field 1 is $2
 also
 select "Employee List" where field 2 is $3
```

beam "*caption-name***" {IR | BT }**

New in Forms 4.0.
Used in conjuction with the `select` and `queue` statements, to beam queued records from one handheld to another.

Beaming should be performed in a click: event in a button field, to allow the handheld user to control when the beaming starts.

A select statement selects the records from a form, based on the criteria in the select statement. Select statements include `select all`, `select where`, `select current` and `select matching`. A queue statement queues the selected records to be beamed. A beam statement actually performs the beaming.

You can have several select-queue sequences to queue records from multiple forms. The beam statement will beam all queued records from all forms.

The *caption-name* parameter is word or phrase that the handheld user will see when their handheld prompts if they want to accept the beamed data. You can put the name of the form as the caption, or some other phrase. In addition to specifying the *caption-name*, you must specify a beaming method. There are two options:

IR - stands for Infrared. If you choose this option, records will be beamed via the handheld's infrared port.

BT - stands for Bluetooth. If you have handheld devices that support Bluetooth, and you choose this option, records will be beamed via Bluetooth.

In this example, all the records of a form named Patients are selected with a select statement, but then only the changed records (i.e. new records or modified records) are queued to be beamed. The beam statement then beams the queued records via infrared.

```
click:
 select all "Patients"
 queue changed
 beam "Patients" IR
```

In this beaming example, a select where statement is used to select only the records in a form named Work Orders that have a value on N in field 18. These might be incomplete work order records that one user is beaming to another to finish the work. The queue all statement queues all the selected records to be beamed. The beam statement beams the queued records via Bluetooth.

```
click:
 select "Work Orders" where field 18 is "N"
 queue all
 beam " Incomplete Work Orders" BT
```

In this example, changed records from a parent form and a subform are beamed. The parent form is called Patient Main Form, and the subform is called Patient Visit. Each form is selected in turn, and then all the changed records (i.e. new or modified records) for that form are queued to be beamed. The beam statement beams all queued records, so queued records from both parent and subform are beamed.

```
click:
 select all "Patient Main Form"
 queue changed

 select all "Patient Visit"
 queue changed

 beam "Patient Record Information" IR
```

In this example only the current record is selected. The queue changed statement means that the record is only queued for beaming if the record is new or has been modified. To beam the record whether or not it has been changed, queue all would have been used instead of queue changed.

```
click:
 select current
 queue changed
 beam "My new record" IR
```

beep

Sounds a standard warning beep.
In the following example, if the handheld user exits the current field without entering any data, the program will beep and then display a message.

```
exit:
 if answer = null then
  beep
  msgbox
       "Please do not leave this field blank."
 endif
```

call {*creator* | *URL*}

The **call** statement allows you to call the CodeWarrior or C application whose creator code is specified. You will need to be familiar with CodeWarrior and C programming to use this scripting statement.

The **call** *creator* statement locates the first application with type 'appl' and the
specified creator code, and sends it the custom launch code 33333.
The data parameter for the call points to a buffer containing the **result** variable. The called application may modify this buffer, and after the call, the **result** variable (2KB max) will be set to the value in the buffer.

With the **call** *URL* statement, the URL parameter must start with either "palm:" or "palmcall:" and follow the URL format defined in the PalmSource Web Clipping documentation which is available at www.palmsource.com.
The URL parameter specifies the creator code, the application type, and may include additional parameters in a URL encoded format.
The URL is itself passed to the called application via the SysAppLaunchCmdGoToURL launch code.

In this example, the appropriate URL parameter is placed in the result variable. In the URL, myap is the creator code, appl is the application type, and the value in field 5 is added to the URL as part of a parameter called size.

```
result = "palmcall:myap.appl?size=" & $5
call result
```

callmethod *field-number* **"***methodname***"**

New in Forms 4.0.
For use with custom controls that provide methods for you to call from a script.

A method is a term for a callable function that is built-in to a custom control. The callmethod statement calls the named method in the custom control that is located in the specified field.

A custom control is a separate program from Pendragon Forms. If the custom control is not loaded or visible on the current screen of your form design on the handheld, then you cannot use callmethod (it will have no effect).

The result variable is passed to the custom control, and the result variable may be modified by the call.

Each custom control will have its own documentation that specifies what methods are available to be called. See page 130 for information on Custom Controls and how to access the documentation for a Custom Control.

In this example, the GPS Custom Control in field 5 has a method called GPSINFO. The GPS Custom Control runs the click: event script written in field 5. The GPSINFO method puts GPS data into the result variable. This data is copied to the temp variable, and then extract statements are used to extract the GPS Latitude and put the value in field 6, the GPS Longitude is put in field 7, etc. (Refer to the GPS Custom Control documentation for more information.)

```
click:
 result = ""
 callmethod 5 "GPSINFO"
 if result <> null then
   temp = result
   extract "GPS.LAT" from temp
   $6 = result
   extract "GPS.LONG" from temp
   $7 = result
   extract "GPS.KNOTS" from temp
   $8 = result
   extract "GPS.ALTITUDE" from temp
   $9 = result
 endif
```

cascade *label*

The cascade statement on a parent form triggers cascade: events on each subform record associated with the parent record. For example, if a Completion Checkbox is marked on the parent, a cascade statement on the parent can be used to trigger cascade: events on the subform records that mark the subform records as complete also.
(Note: You do not currently need to use cascade in a script in order to cascade Completion checkbox fields from parent to subform. The Forms program will automatically do this for you.)

The *label* parameter that is given to the cascade statement can be retrieved in a cascade: event using the Cascadename function. The label can be up to 15 characters. The value of Cascadename can be used on the subform to determine what action to take on the subform.

If you want a Completion Checkbox on a parent form to cascade to a Completion Checkbox on the subform, the following script can be used in the Completion Checkbox field on the parent form:

```
select:
 cascade answer
```

If the handheld user selects Yes in the parent form's Completion Checkbox, the `cascade answer` statement places the value Y (for Yes) in the Cascadename function. The following script in the subform then causes all the subform records associated with that parent record to be marked as Y also. (The subform script is in the Completion Checkbox field of the subform in this case.)

```
cascade:
 answer = cascadename
```

Important: A cascade statement and a cascade: event cannot be used to make a change to any of the fields that are common to both the parent and the subform. This is because Pendragon Forms uses the values that are in fields with identical names on both the parent and the subform in order to determine which subform records are associated with a given parent record. If a field that exists on both parent and subform is changed on the parent, you will 'orphan' the subform records, because the subform records will no longer match the parent.

clone

The clone statement saves the current record, then creates a new record with identical values in all the fields as the original record. Scripting statements that occur after the clone statement are applied to the new record.

Clone statements work well when using barcode scanners, as the clone statement reduces the need for manual data entry. See page 314 for an example of using a clone statement in a scan: event script.

When you use the clone statement, no validation is done on the record that you are leaving nor on the new record created by the clone statement. If you are using your own primary key, the combination of the primary key fields has to be unique for every record. You can use the `keyunique` statement before the clone statement, to check if the record that you are leaving has a unique primary key. If the record that you are leaving does not have a unique primary key, you can display a message to alert the user, and abandon cloning the record.

In this example, if you have a form in which fields 1, 2 and 3 basically remain the same, but fields 4 and 5 vary every time you record data, you might make Field 6 a Yes/No checkbox that asks the handheld user "Do you need to make another reading?" If the user selects Yes in the following script, the record will be cloned and the values in fields 4 - 6 will be made null so that the user can enter the new values for these fields while retaining the existing values in fields 1 - 3.

```
select:
 if answer == Y then
  clone
  $4 = null
  $5 = null
  $6 = null
 endif
```

column *number*

Column is a function that is used with a `select` statement to retrieve the value in a specified field of a selected record in a reference form.

The *number* is the column number (i.e. the field number) of the reference form.

In this example, a bar code is placed into field 1 of a form, and then a select statement is used to lookup that barcode in a reference form called Inventory. If a match is found, field 2 of the current form is populated with data from column 3 of the reference form. Field 3 of the current form is populated with data from column 5 of the reference form.

```
scan:
 $1 = scandata
 select "Inventory" where field 2 is $1
 $2 = column 3
 $3 = column 5
```

count *field-number*

Checks the current record against all the other records in the database, to see how many records have the same value in the specified field. The number of records that match is placed into the Result variable.

Note: For performance reasons, the count statement should not be used in calculate: events.

If you need to check for uniqueness in a primary key, use the `keyunique` statement instead of count, because keyunique can check for uniqueness even if the primary key is comprised of more than one field.

This example checks to see if field 6 is unique.

```
validate:
 count 6
 if result > 0 then
  msgbox "This is a duplicate barcode"
 endif
```

delete

Used in conjuction with select statements to delete all the selected records in a reference form.

WARNING: Should only be used with extreme caution to avoid accidentally deleting records from a reference form.

Records are selected with a `select`, `select matching` or `select where` statement.
Not recommended for use with select all statement, due to the possibility of deleting all records in a reference form.

deletemode "*formname***"**

New in Forms 4.0.
Used in a **click:** event in a Section field or a Button field of a Custom Main Menu form to allow the user to be able to delete records from the specified form.

With a Custom Main Menu form, users cannot access the Delete screen to delete records unless you provide this option via the deletemode statement. The Delete screen allows users to delete form designs as well as records, so typically you may want set the Advanced Form Property to Disable Form Deletion.

See page 385 for an example of using the deletemode statement.

disable barcode

Disables the barcode scanner of a handheld device. To switch on the barcode scanner, see the `enable barcode` scripting command. For a list of compatible devices, see Chapter 15, *Using Bar Codes*, page 308.

This scripting command is equivalent to switching off the laser in the Diagnostics application of an SPT 1550/1800 - (Scanner Enabled checkbox unchecked). This can be used to prevent the handheld user from scanning a bar code into a Text field which is not supposed to be a bar code field.

Important: Setting the scanner is a global setting, meaning that if you switch off the scanner or enable just one bar code symbology in a script, then these settings will apply across all fields and forms, and possibly across other applications on the handheld (unless the other applications also make global settings). Since scanner settings are global across all fields, if you switch the scanner off in one script and forget to switch the scanner on again, you will not be able to scan into any field on the form.

To prevent the handheld user from scanning randomly into fields on a form, the following script can be used to switch off the laser scanner:

```
open:
 disable barcode
```

The laser scanner can then be switched on when needed. In this example, the scanner is switched on once the current field is filled.

```
exit:
 if answer <> null then
  enable barcode
 endif
```

disable { endbutton | nextbutton | backbutton | navbuttons | icons | menus }

Note: It may be easier to switch off the use of these options via Advanced Form Properties - see page 171.

In some form designs, you may want to hide certain buttons and menu options that are usually available to the handheld user. The `disable` statement will hide the specified button, and the `enable` statement will display the specified button. Disable be used in an **open:** event if you want the button or menu to be hidden in both new and existing records.

The `endbutton` specifier will hide the End button. You may want to hide the End button to prevent a handheld user from exiting a form before viewing all the fields on the form. Warning: if you hide the End button on a form, you will have to give the user a way to exit the form, such as a Button field that when tapped, runs a script to end the form.

The `nextbutton` specifier will hide the Next button (in Layout View) or the right arrow button (in Field View). You may want to hide the Next button on a form that is being used as a 'main menu' from which the user jumps to other forms.

The `backbutton` specifier will hide the Previous button (in Layout View) or the leftarrow button (in Field View). You may want to hide the Previous button on a form that is being used as a 'main menu' from which the user jumps to other forms. Or you may want to hide this button if your form requires users to answer a question and not go back to view or change answers.

The `navbuttons` specifier will hide the navigation buttons in Record View. The Navigation buttons in Record View allow the handheld user to jump from record to record, and can be disabled if you want the handheld user to stay within a given record until the form is filled out.

The `icons` specifier will hide/show the timestamp/datestamp icons that are usually visible in Text fields in Field View. Normally, the handheld user can tap these icons to add the current date or date & time to a Text field.

The `menus` specifier will hide certain options that normally appear if the handheld user taps the handheld Menu button (the drop-down menu icon below the house icon on the handheld). The menus that are disabled include: Clone, Mark All Changed, Print, Print All, Acquire Barcode, Acquire GPS. You may want to hide these menu options if your form design does not use them and you do not want to allow the handheld user access to these menu options.

In this example, the End button, Navigation buttons and menu options are all disabled in an open: script in Field 1 of a form:

```
open:
 disable endbutton
 disable navbuttons
 disable menus
```

Since the End button is disabled in the above script, a Button field is added to the end of the form to give the handheld user a way to exit the form. The script in the Button field is:

```
click:
 endform
```

enable barcode

Enables the barcode scanner of a handheld device. To switch off the barcode scanner, see the `disable barcode` scripting command. For a list of compatible devices, see Chapter 15, *Using Bar Codes*, page 308.

This scripting command is equivalent to switching on the laser in the Diagnostics application of an SPT 1550/1800 - (Scanner Enabled checkbox checked).

Important: Setting the scanner is a global setting, meaning that if you switch on the scanner in a script, then these settings will apply across all fields and forms, and possibly across other applications on the handheld (unless the other applications also make global settings). Since scanner settings are global across all fields, if you switch the scanner on in a script you will be able to scan into any field on the form.

To prevent the handheld user from scanning randomly into fields on a form, the following script can be used to switch off the laser scanner:

```
open:
 disable barcode
```

The laser scanner can then be switched on when needed. In this

example, the scanner is switched on when the handheld user reaches the current screen of the form (in Layout View).

```
enterscreen:
 enable barcode
```

enable { endbutton | nextbutton | backbutton | navbuttons | icons | menus }

Note: It may be easier to switch off the use of these options via Advanced Form Properties - see page 171.

In some form designs, you may want to hide certain buttons and menu options that are usually available to the handheld user. The `disable` statement will hide the specified button, and the `enable` statement will display the specified button. Disable should be used in an **open:** event to ensure that the button or menu is hidden in both new and existing record. Enable can be used in a scripting event where it makes sense to do so. For example, if you use the disable statement or Advanced Form Properties to hide an End button, you can have a button field with a **click:** event that allows the user to tap the button to end the form. Or you can have a Yes/No Checkbox field and use a **select:** event script that ends the form is the user selects Yes.

The `endbutton` specifier refers to the End button that allows the user to end a form at any time.

The `nextbutton` specifier refers to the Next button (in Layout View) or the right arrow button (in Field View).

The `backbutton` specifier refers to the Previous button (in Layout View) or the left arrow button (in Field View).

The `navbuttons` specifier refers to the navigation buttons in Record View. The Navigation buttons in Record View allow the handheld user to jump from record to record.

The `icons` specifier refers to timestamp/datestamp icons visible at the bottom of Text fields in Field View. (In Layout View you can choose on a field by field basis whether to display the Text icons in a text field.)

The `menus` specifier refers to certain options that normally appear if the handheld user taps the handheld Menu button (the drop-down menu icon below the house icon on the handheld). The menus include:

Clone, Mark All Changed, Print, Print All, Acquire Barcode, Acquire GPS. If you disable the menus via a disable script or Advanced Form Properties, and you want to use a script to enable the menus, you will turn on all the menus. You cannot select a particular menu to enable.

In this example, the End button, Navigation buttons and menu options are all disabled in an open: script in Field 1 of a form:

```
open:
 disable endbutton
 disable navbuttons
 disable menus
```

Since the End button is disabled in the above script, a Yes/No Checkboxfield is added to the end of the form to give the handheld user a way to exit the form. If the user selects yes to end the form, the end button appears. The script in the Yes/No field is:

```
select:
 if answer == Y then
  enable endbutton
 endif
```

Also, see the use of endform as a means of exiting a form that does not have an End button.

endform

Equivalent to pressing the End button. Saves relevant data, then exits the form. This statement is only available in click:, select:, exitscreen:, exit: and scan: events.

In the following example, if the answer in the current field contains the word Finished, then the record is saved and the form is exited.

```
exitscreen:
 if answer # Finished then
  endform
 endif
```

In this example, a Button field is used to exit a form.

```
click:
 endform
```

extract "*entity***" from** *value*

Extracts XML formatted data from the specified value.
The XML formatted data can originate from a transmit web statement, a `call` to an external CodeWarrior application or a Custom Control.

Extracted data is placed into the Result variable.

The *entity* parameter defines the XML tags that delimit the data.
The *value* parameter depends on where the XML data originates from.

When the Transmit web statement is used, data returned from a Web server is stored in the Webdata function. The Extract...From statement can be used to extract XML from Webdata. In this case the *value* parameter in the extract statement is the Webdata function.
See page 353 for an example.

In this example, clicking a button on a form sends a part number stored in Field 6 to a Web URL. The data returned by the Web server is stored in the Webdata function, and the Extract statement is used to place a sale price into Field 8 and the quantity in stock in Field 9.

```
click:
 transmit web "http://www.site.com/cgi-bin/
inventory.cgi?partnum=$6$"
 extract "saleprice" from webdata
 $8 = result
 extract "qtyinstock" from webdata
 $9 = result
```

fieldview

Used to switch from Record View to Field View.
Note that with Forms 4.0, Layout View lets you can control how many fields are visible per screen, so you can design a form layout that works for your users without having to resort to using scripts to manipulate the layout of a form.

The fieldview command only takes effect after an entire script is run, so a fieldview statement in the middle of a script does not mean that the form will switch to Field View and then the remainder of the script will run.

If you want the handheld user to default to Field View, set the Advanced Form Property for the default view for new records and the default view for reviewing records, instead of using scripts.
See page 169.

The fieldview statement can be used to automate "zooming in" to Field View from Record View for certain types of fields. For example, it may be easier for the handheld user to enter data in a Text field in Field View, but then return to Record View for the rest of the form.
The `recordview` statement is the counterpart to the fieldview statement.

In this example, entering a text field switches to Field View, and then exiting the field returns to Record View:

```
enter:
 fieldview

exit:
 recordview
```

filtercount *field-number*

Used to check uniqueness within a subform. In a subform, records are filtered to display only those which match the parent record. A filtercount statement should be placed in a script in the subform, to check the current record against currently filtered records, to determine how many filtered records match in the specified field. The number of records that match is placed into the Result variable.
Note: For performance reasons, filtercount should not be used in a calculate: event.

This example checks to see if field 13 in a subform is unique:

```
validate:
 filtercount 13
 if result > 0 then
   msgbox "A record already has this value."
 endif
```

font {**answer** | **question**} {**bold** | **normal** | **large**}

Sets the font for the question or answer area of the current field. This scripting command only applies to Field View and is only available in enter:, select: and exit: events.
(Note: This feature requires Palm OS 3.0 or higher.)

In Forms 4.0, Layout View does not require this scripting command because you can set the question and answer font of each field separately when designing the form (see page 139).

The following example causes the field name to be displayed in bold font, and the handheld user's response to be displayed in large font.

```
enter:
 font question bold
 font answer large
```

format *value* {**date** | **time** | **datetime** | **currency** | **fixed**}

Internally, Pendragon Forms stores dates and times as a number - the number of seconds since 01/01/1904. Currency fields are stored internally as a number of cents. No special formatting is required if these types of fields are stored in the appropriate field type - for instance, if a currency amount is stored and displayed in a Currency field, no formatting is required.

However, if a Date, Time, Date&Time or Currency field needs to be printed directly from the handheld, or displayed in a Text field, the format statement can be used to display the field in a way that is readable to the handheld user. The formatted *value* is placed in the Result variable.

The following example causes the date in Field 1 to be formatted, and the formatted date to be placed in Field 8.

```
calculate:
 format $1 date
 $8 = result
```

The `fixed` specifier displays a currency without a currency symbol, and the `currency` specifier displays a currency with a currency symbol. In this example, if Field 7 contains the value of $15.95, then Field 8 will contain 15.95 and Field 9 will contain $15.95.

```
calculate:
 format $7 fixed
 $8 = result
 format $7 currency
 $9 = result
```

formsum "*name-of-form***"** *fieldnumber*

Adds up the values across all records for the specified form and the specified field, and places the calculated result in the Result variable. Mainly recommended for use in click: events.

In the following example, clicking a button adds up all values of field 17 across all records in the form "Daily Sales". The result is then put in field 8 of the current form.

```
click:
 formsum "Daily Sales" 17
 $8 = result
```

getaddress

Prompts the user to select an address from the AddressBook application and then pastes the contact information for the selected record into corresponding fields on the form. Use in a Button field with a **click:** event. Not available in calculate: events.

The fields on the form must have one or more of the following field names (including uppercase characters and colon (:) character) to receive the corresponding AddressBook data.
First name:
Last name:
Title:
Company:
Address:
City:
State:
Zip:
Country:
Tel:
Other:
Email:
Custom:
Tel refers to the Work phone number. Custom is the Custom 4 field.

In the following example, a click: event is used in a button field to allow the handheld user to lookup an AddressBook contact by clicking a button.

```
click:
 getaddress
```

goto *field-number*

Moves to the specified field on the form and then exits the current script. Can be used in the following scripting events:
select: event
click: event
scan: event
exitscreen: event (**in Layout View only**)
exit: event (**in Field View only**)

In the following example, when the handheld user exits the current screen in Layout View, the script checks the response in field 6. If the response contains the word Red, the scripts jumps to field 7; if the response contains the word Blue, the script jumps to field 12; if the response contains neither Red nor Blue, the script jumps to field 20.

```
exitscreen:
 if $6 # Red then
  goto 7
 endif

 if $6 # Blue then
  goto 12
 else
  goto 20
 endif
```

With a goto statement, a field must be visible for the script to be able to execute. If a field is hidden, the goto statement will go to the next visible field. For instance, if a script says goto 5, but field 5 is hidden, the goto statement will go to field 6. If there are no more visible fields after the specified field, the goto statement will do nothing.

Generally, if you use a goto statement to go to a specific field, you should also include a goto statement for the case in which you do not want to go to that field. Normally, Forms will move you to the next field automatically. However, if you use a script Forms may not move to the next field in the normal way, unless you add another goto statement. In this example, selecting Yes in a Yes/No checkbox jumps you to Field 5. Selecting No or not making a selection at all, jumps you to Field 4.

```
select:
 if answer == Y then
  goto 5
 else
  goto 4
 endif
```

gotosubform *formname* **{ new | review | normal}**

The Gotosubform statement allows programmatic jumps to subform records without the use of a Subform List field on the parent form. The Gotosubform statement can be used to make the transition from a parent form to a subform transparent to the handheld user.

The `normal` specifier causes the Gotosubform statement to behave just like a regular Subform List field, meaning that a review screen of existing subform records is displayed and the handheld user has the option to review an existing subform record or to create a new record.

The `new` specifier causes a new subform record to be created, without the handheld user seeing a list of existing subform records.

The `review` specifier is similar to using a Single Subform field on the parent form, and provides a way to create a form with more than 250 fields by linking together more than one form design. Using the review specifier displays the most recently created subform record, or if none exists, a new subform record will be created.

In this example, clicking a button creates a new subform record.

```
click:
 gotosubform "Item Ordered" new
```

hide *field-number*
hide from *field-number* **to** *field-number*

The Hide statement is used to hide a single field on a form. Hide From...To is used to hide multiple fields. Works in all views on the handheld: Layout View, Field View and Record View.

In this example, as the user exits the current screen, field 51 is hidden if the answer in the current field is Y:

```
exitscreen:
 if answer == Y then
  hide 51
 endif
```

This example hides fields 4 - 20 if the value in the current field is 1.

```
exitscreen:
 if answer = 1 then
  hide from 4 to 20
 endif
```

imagefilename *fieldnumber*

New in Forms 4.0.
Fieldnumber is the field number of an Image field.
Given the specified *fieldnumber*, the **imagefilename** statement places into the **result** variable the name that an image in that field must be called in order to be attached to the image field in Pendragon Forms.

For example, if the value placed into the result variable is:
"0ABCDEF80000000A0003", this means that
0ABCDEF8 is the hexadecimal value of the Form ID number,
0000000A is the hexadecimal of the Record ID,
0003 is the hexadecimal of the field number.
The image file also needs a file extension in addition to a file name.

The imagefilename statement just tells you what an image file should be called in order to be attached to the Image field of that *fieldnumber*. Note that the imagefilename statement does not actually assign the file name to an image, nor does it attach the image file to the field. Other statements in the script will be needed to perform these function.

The imagefilename statement was designed for use with the Zire 71 Camera Custom Control that ships with Pendragon Forms. For instructions on this custom control, see page 343.

insert into "*formname***"** Creates a new record in the specified form and selects the new record. The handheld user cannot see the record, and the only means for filling in the fields of this record is via the use of the **update field** statement .

In this example, when the handheld user taps a button, the **select** statement checks if field 2 on the current form matches field 1 on the “Inventory” reference form. If not, a new record is created in the “Inventory” form, and fields 2 and 3 of the current form are copied into fields 1 and 2 of the new record.

```
click:
 select “Inventory” where field 1 is $2
 if result = 0 then
  insert into “Inventory”
  update field 1 = $2
  update field 2 = $3
 endif
```

invalidate "*message*"

Only used with the **validate:** event. The invalidate statement flags the record as having an invalid value, and the handheld user cannot exit the record until the invalid value is corrected. A message is displayed on the handheld screen, with buttons for the user to Edit or Delete the record.

Note that a validate: script only runs when the user exits the form. If the form has a lot of fields, it may be easier to use an exitscreen: script (in Layout View) to check that fields contain valid data before the user moves to the next screen.

In this example, when the user tries to exit a record, if field 25 has a value greater than 100, an error message is displayed and the record is invalidated. The user has to edit field 25 or delete the record.

```
validate:
 if $25 > 100 then
  invalidate "Grade cannot exceed 100 points"
 endif
```

keycolumn *number*

Normally, the **lookup** *value* **within** *formname* statement (page 320) finds a record in the form *formname* by matching the specified *value* to contents of the Display Key field of the form *formname*. (If no Display Key is specified, field 1 of the form is the Display Key field by default.)

The keycolumn statement allows you to perform a lookup to another form using a field other than the Display Key field of the reference form. The specified *number* is the alternate column of the reference form that the lookup...within statement will use to search for a matching record. After the lookup...within statement is run, the keycolumn is reset to the Display Key field once more.

In this example, the lookup...within script searches field 5 of a form called "Inventory Form".

```
click:
 keycolumn 5
 lookup $3 within "Inventory Form"
```

keyunique

New in Forms 4.0.
Determines whether the primary key of the current record is unique on the handheld.

Keyunique places the value 1 in the Result variable if the primary key of the current record is unique on the handheld, or places the value 0 in the Result variable if the primary key is not unique.

Keyunique is typically used before a **clone** statement. For instance, if you have a barcode as a primary key field, and you are using the clone statement to create new records automatically, before you clone a record you can use keyunique to check that the record has a unique primary key. If the record does not have a unique primary key, the user can be prompted to correct the error before making a new record.

In the example below, field 1 is used to store a barcode. The first time the user scans a barcode, field 1 is null (blank). The barcode is placed into field 1, and the keyunique statement is used to check that the barcode is unique. If the barcode exists in another record, then a message is displayed to the user.

The next time that the user scans a barcode, field 1 is not null. Keyunique is again used to check that the existing record has a unique primary key. If the primary key of the current record is unique, then the clone statement is used to create a new record and place the new barcode into the new record. If the primary key of the existing record is not unique, then a message is displayed to the user.

```
scan:
 if $1 is null then
  $1 = scandata
  keyunique
  if result = 0 then
    msgbox "Barcode has already been scanned"
  endif
 else
  keyunique
  if result = 1 then
    clone
    $1 = scandata
  else
    msgbox "Barcode has already been scanned"
  endif
 endif
```

launch *creator*

Launches a CodeWarrior application that contains the specified creator code. The Launch statement ends the Pendragon Forms application and launches the specified application.

left *value length*

Extracts the left-most characters and places the extracted characters into the Result variable.

The **value** specifier is the value from which the left-most characters are to be extracted.

The **length** specifier is the number of characters to be extracted.

The following example puts the value MXP in the current field.

```
enter:
 left "MXP53802" 3
 answer = result
```

This example puts the first 4 characters from field 16 into the Result variable, and then into the current field.

```
enter:
 left $16 4
 answer = result
```

lookup *value* **within** *lookup-list-name*
lookup *value* **within** *form-name*

Used to lookup a value in a Lookup List or in another form.

The **value** specifier is the display entry to search for.

If a *lookup-list-name* is specified, this is the name of the Lookup List to search. The Lookup List that you use should be set to Store Lookup Values in the Lookup field (see page 86). The value that is found (if any) is put into the Result variable. Your script can then place the value in the **result** variable into a field on the form.

Imagine that you want to create a form with a field called Item Name and a field called Price. When you select the Item Name in field 1, you want to see the correspond Price appear in field 2. To create this requires two Lookup Lists on your form. One Lookup List contains the item names. The second Lookup List, called 'Prices', contains the item names and prices, and is set to Store Lookup Values in the Lookup field. The script in field 1 should be as follows:

```
select:
 lookup $1 within "Prices"
 $2 = result
```

See page 306 for a specific example.

If a *form-name* is specified instead of a Lookup List name, the lookup...within script will perform a lookup to the specified form. The field that is being looked up must be the Display Key on the reference form. See page 320 for an example. If a match is found in the reference form, all fields that are named the same on both forms will be copied from the reference form into the current form.

You can use the **keycolumn** statement to look up a field other than the Display Key field when doing a lookup...within another form.

Note: You do not need to use a lookup...within script to perform a manual lookup to another form - see page 94. Where a lookup...within script is useful is if you want to perform the lookup to another form in a **scan:** event when a bar code is scanned into a field - see page 320.

mid *value start length*

This function copies *length* characters from *value*, starting at position *start*, and places the characters into the Result variable.
The following example places "123" into the Result variable, and then into the current field.

```
calculate:
 mid "012345678A" 2 3
 answer = result
```

In this example, 10 characters are extracted from field 5, starting from th 7th character position in field 5. The extracted characters are placed in field 6.

```
calculate:
 mid $5 7 10
 $6 = result
```

msgbox "*string***"**

Displays a dialog box on the handheld. An individual string cannot exceed 64 characters. If you need longer strings, **concatenate** two strings and place into the Result variable, then use **msgbox result**.
This example displays a message if the user enters a value greater than 100 in the current field.

```
exitscreen:
 if answer > 100 then
  msgbox "The temperature is very high"
 endif
```

optional *field-number*
optional from *field-number* **to** *field-number*

Makes the specified field optional. Used to override setting the field as Required in the Advanced Field Properties screen. (Note that all fields are optional by default, unless made Required either by setting the Advanced Field Property of Required, or by making the field Required in a script.)
In this example, if the answer in the current field is Y, then field 7 is optional.

```
exitscreen:
 if answer == Y then
  optional 7
 endif
```

In this example, if the response in field 8 is "Never", fields 9 to 15 are optional.

```
exitscreen:
 if $8 == "Never" then
  optional from 9 to 15
 endif
```

print { **serial | IR** }

Not for use with PalmPrint. If you are using PalmPrint, use a **printreport** statement instead.

Used in a click: event to print the current record either via the serial port or via infrared.

The Print statement does not allow you to control how the printed output looks. The format of the print output is similar to Record View on the handheld, in which there are two columns - the left-hand column contains the field names, and the right-hand column contains the responses. If a response is too long to fit in the right-hand column, the field name will be printed on one line, and the response will be printed on the next line.

Signature fields print out as the word 'Signed' or the word 'Unsigned', depending on whether a signature has been recorded or not. The actual signature will not print. Also, Sketch fields and Image fields will not print.

If you do not want to print a field, you can set the Advanced Field Property of Non-Printing. (See page 163.)

In this example, clicking a button prints the current record via the infrared port to an infrared printer.

```
click:
 print IR
```

printleft *value column*

Used in **report:** and **report2:** events.
Positions the text contained in the *value* parameter as left-justified, starting from the specified *column*. Note that a **printline** statement is required after the printleft statement to send the text to the handheld's memory.

The number of columns per page depends on your printer specifications. A printer printing to 8.5" x 11" paper typically prints 80 characters (also called 80 columns) per line, and 54 lines per page.

This example prints the phrase "Chopper Rescue Corp." on the current line, starting in column 20:

```
report:
 printleft "Chopper Rescue Corp." 20
 printline
```

In this example, the phrase "Customer Name:" is printed starting in column 1, followed by the contents of Field 7.
Since "Customer Name:" takes up 14 characters, in order to leave a space after the colon symbol, Field 7 is printed starting in column 16.

```
report:
 printleft "Customer Name:" 1
 printleft $7 16
 printline
```

printline

Used in **report:** and **report2:** events.
Commits the current line to the end of the current report in the handheld's memory. A printline statement is needed to actually print a line of text. Typically a printline statement follows a **printleft** or **printright** statement.

To obtain a blank line, use two printline statements in a row. For example:

```
report:
 printleft "Invoice Number:" 10
 printleft $1 16
 printline
 printline
```

printmemo *value* **"***startcolumn***:***endcolumn***:***maxlines***"**

Used in **report:** and **report2:** events.
Allows a Text field to word wrap in a block of text. If a printmemo statement is not used on a Text field, the first line of text will be printed, and then the remainder of the field will be truncated.

The **startcolumn** and **endcolumn** specifiers indicate the column in which to start printing the text, and the column in which to end the block of text. The number of columns per page depends on your printer specifications. A printer printing to 8.5" x 11" paper typically prints 80 characters (also called 80 columns) per line, and 54 lines per page.

The **maxlines** specifier indicates the maximum number of lines to print in the block of text.

A **printline** statement after the printmemo statement is required to actually print the block of text.

This script prints Field 8 in a text block that starts in column 5, ends in column 75, and prints up to 6 lines of text.

```
report:
 printmemo $8 "5:75:6"
 printline
```

printnewpage

Used in **report:** and **report2:** events.
Sends the current report to the printer, then begins a new page.
To know when to begin a new page, you can use the **pagenum** and **linenum** functions. Pagenum retrieves the current page number, and linenum retrieves the current line being printed on the current page.

The number of lines per page depends on your printer specifications. A printer printing to 8.5" x 11" paper typically prints 80 characters (also called 80 columns) per line, and 54 lines per page.
In this example a new page is started if the report has reached line 50 of the current page.

```
report:
 if linenum = 50 then
  printnewpage
 endif
```

printreport *name* {**serial** | **IR** }

Used in a **click:** event.
Printreport is an alternative to using the Print statement, and allows you to customize print output from the handheld. If you are using PalmPrint software, you will need to use the printreport statement.

A Printreport statement triggers the **report:** and **report2:** events on a form. The report: and report2: events specify the printer output.

The *name* specified is stored in the **reportname** function, and gives you the capability of printing different types of reports from the same form. If you are just printing one report, you can use the word VIA as the report name.

The serial or IR specifier tells the handheld whether to print via the serial port or via the infrared port.

In this example, clicking a button prints the current record via infrared. The Printreport statement causes the report: events on the form to be run in sequence, meaning that a report event in Field 1 runs first, then a report: event in Field 2, etc.

```
click:
 printreport via IR
```

printright *value column* Used in **report:** and **report2:** events.
Positions the text contained in the *value* parameter as right-justified, ending at the specified *column*. Note that a **printline** statement is required to send the text to the handheld's memory.

The number of columns per page depends on your printer specifications. A printer printing to 8.5" x 11" paper typically prints 80 characters (also called 80 columns) per line, and 54 lines per page.

Printright is useful if you need print lines of currency values, and you need to line up the decimal points.

In this example, fields 9 and 10 are right-justified against column 70 on two lines of a report:

```
report:
 printright $9 70
 printline
 printright $10 70
 printline
```

queue { all | changed } New in Forms 4.0.
Typically used in a **click:** event.
Used with **select** statements to put the selected records in a queue, ready to be beamed to another handheld. A **beam** statement is then used to beam the queued records.

The **all** specifier means that all of the selected records will be queued to be beamed.
The **changed** specifier means that of the selected records, only those which are new or modified records will be queued to be beamed.

Several sequences of select statements and queue statements can be used with one beam statement.

In this example, all records of a form called Customers are selected, but only the new or modified records are queued to be beamed. The beaming is performed via infrared (IR).

```
click:
 select all "Customers"
 queue changed
 beam "Customer data" IR
```

readonly *field-number*
readonly from *field-number* **to** *field-number*

Used to make a field or a range of fields read-only.

Instead of using a script, you can also make a field read-only in the Form Designer window (see page 146).

In this example, if the value in field 15 is greater than 100, field 16 and fields 20 - 25 are made read-only.

```
exit:
 if $15 > 100 then
  readonly 16
  readonly from 20 to 25
 endif
```

readwrite *field-number*
readwrite from *field-number* **to** *field-number*

Used to make a read-only field updatable.
In this example, field 27 is made writable:

```
enter:
 readwrite 27
```

require *field-number*
require from *field-number* **to** *field-number*

Makes the specified field(s) required, meaning that the field(s) cannot be left blank.

Instead of using a script, you can also make a field required in the Form Designer window (see page 156).

In this example, if the response in the current field is Y, then field 45 is a required field:

```
select:
 if answer == Y then
  require 45
 endif
```

In this example, if the response in the current field is “Critical”, then fields 18 to 22 are required.

```
exitscreen:
 if answer == "Critical" then
  require from 18 to 22
 endif
```

return

Returns from the current script without executing any more instructions. Useful if you want to prevent default instructions from being executed after an IF statement.

In this example, a field with the field label Quantity is to be multiplied by a field labeled Price, and stored in a field labeled Total. However, if the Quantity field is left blank, a message is displayed to the user and the return statement stops the script before the multiplication takes place.

```
calculate:
 if $[Quantity] is null then
  msgbox "Please fill in the quantity"
  return
 endif
 $[Total] = $[Price] * $[Quantity]
```

reverselookup *value* **within** *lookup-list-name*

Reverselookup...Within is the opposite of Lookup...Within. Reverselookup takes the lookup value of a Lookup List and returns the corresponding lookup display item, and places the result in the Result variable.

review *"formname"*

New in Forms 4.0.
Used primarily in a **click:** event or in a **scan:** event.
Used to go to the Review screen for the specified form, so that the user can select and edit a record.

The review statement can be used in conjunction with making your own custom 'Main Menu' that users see when they launch the Forms application. See Chapter 21, *Creating a Custom Main Menu*, page 381.

The review statement can be used with select statements.
A **select where** statement can select records based on a certain criteria, and then the review statement allows the user to see and edit the filtered records. See page 390.

In this example, tapping a picture in a Section field that is part of a custom 'Main Menu' displays a list of records in a form called Customer Log.

```
click:
 review "Customer Log"
```

right *value length*

Extracts the right-most characters and places the extracted characters into the Result variable.

The **value** specifier is the value from which the right-most characters are to be extracted.

The **length** specifier is the number of characters to be extracted.

In this example, the value "129" is placed into the current field.

```
enterscreen:
 right "Procedure Code 129" 3
 answer = result
```

Here the last five characters from field 35 are placed into the current field.

```
exitscreen:
 right $35 5
 answer = result
```

scanner *conversion-code* { **enable** | **disable** }

Enables or disables some barcode conversions. Conversions are used, for example, to convert a shortened 7-character UPCE code to a standard 10-character UPCA code.

Sample script to allow conversion from UPCE to UPCA:

```
enterscreen:
 scanner UPCETOUPCA enable
```

Valid conversion codes are:

```
UPCETOUPCA          EAN8TOEAN13       CODE39TOCODE32
UPCE1TOUPCA         I2OF5TOEAN13
```

scanner { **enable | disable** } **all**

Enables or disables all barcode symbologies. Enabling all bar code symbologies means that any bar code can be scanned into a Text field. Disabling all symbologies means that no bar codes can be scanned into any Text fields.

Important: Since scanner settings are global across all fields, if you disable all symbologies in one script and forget to enable any, you will not be able to scan into any field on the form.

A sample script to enable all symbologies is:

```
open:
 scanner enable all
```

An **open:** event is used in the example above so that the scanner is enabled on both new records and existing records.

scanner { **enable | disable**} *symbology*

Switches on or off specific types of bar codes which can be scanned.

Sample script to switch ON the ability to scan the UPCA symbology:

```
open:
 scanner enable UPCA
```

Sample script to switch OFF the ability to scan the EAN13 symbology:

```
open:
 scanner disable EAN13
```

Valid symbologies are:

```
CODE39        I2OF5         MSI_PLESSEY
UPCA          CODABAR       UPCE1
UPCE          CODE128
EAN13         CODE93        BOOKLAND_EAN
EAN8          TRIOPTIC39    ISBT128
D2OF5         UCC_EAN128    COUPON
```

scanner {**system_character | no_preamble | system_character_country_code**} *symbology*
scanner {**checkdigit | no_checkdigit**} *symbology*

Switches on or off whether leading/prefix or trailing/suffix barcode digits are recorded.

A **system_character** or **preamble** is the leading digit of the bar code, and a **checkdigit** is the trailing character of the bar code.

Sample script to switch ON the leading character of UPCA bar codes:

```
open:
scanner system_character UPCA
```

Sample script to switch OFF the leading character of UPCA bar codes:

```
open:
scanner no_preamble UPCA
```

Symbologies which use leading characters (**system_character** or **preamble)** are:

```
UPCA          UPCE          UPCE1
```

Sample script to switch ON the trailing character of UPCA bar codes:

```
open:
scanner checkdigit UPCA
```

Sample script to switch OFF the trailing character of UPCE bar codes:

```
open:
scanner no_checkdigit UPCE
```

Symbologies which use **checkdigits** are:

```
UPCA          CODE39
UPCE          I2OF5
UPCE1         MSI_PLESSEY
```

scanner {**verify | no_verify**} *symbology*
scanner {**opcc_checkdigit | uss_checkdigit**} **I2OF5**

CODE39 and I2OF5 bar code symbologies may or may not use the last character of the bar code as a check digit. If verification of the check digit is switched on, then the scanner will assume that the final character of the barcode is a checkdigit, which means that if you scan a barcode without a checkdigit, the scan will probably fail. If you switch verification off, then the scanner will accept barcodes both with and without a checkdigit. Note that when verification is off, barcodes with a checkdigit are not checked, just accepted.

I2OF5 barcodes also have two types of checkdigits, OPCC or USS checkdigits, and you can choose which type of checkdigit the scanner will allow.
Sample script to switch OFF verification of CODE39 bar codes:

```
open:
 scanner no_verify CODE39
```

Symbologies with which scanner verification is valid:

```
CODE39              I2OF5
```

select all "*formname***"**

Selects all records in the specified form. Might be used to undo a **select matching** statement or a **select where** statement, or to show all records in a reference form if a matching criteria was not specified. Can also be used with **queue** and **beam** statements to select records to be beamed.

The *formname* is the name of a reference form.

If you are performing a lookup to another form, the current form must have a Lookup List field that references the name of the reference form. If you want to copy records from the reference form into the current form automatically, the field names and field types have to match in both the reference form and the current form.

In this example, the script is written in a Lookup List field that references a reference form. If field 5 of the current form is null (blank), then the **select all** statement selects all records of the Parts List reference form. If field 5 of the current form is filled in,

then the **select where** statement selects only those records that match field 2 of the Parts List form to field 5 of the current form.

```
click:
 if $5 = null then
  select all "Parts List"
 else
  select "Parts List" where field 2 is $5
 endif
```

In this example, a select all statement is used to select all the records from a form called Customer Info. The queue changed statement queues only the new or modified records to be beamed. The beam statement does the beaming.

```
click:
 select all "Customer Info"
 queue changed
 beam "Customer Info" IR
```

select current

New in Forms 4.0.
Selects the current record in the current form.

Used primarily in a **click:** event, and in conjunction with **queue** and **beam** statements, to beam the current record to another handheld. The receiving handheld must already have Pendragon Forms and the particular form design installed on the handheld.

In this example, the current record is selected, queued for beaming, and then beamed.

```
click:
 select current
 queue all
 beam "My record" IR
```

In the above example, using a **queue all** statement means that the record will be beamed even if there are no changes to the record. The rules that determine whether the receiving handheld will accept a record that has not been changed are set in Advanced Form Properties. See page 191 for more information.

To beam a record only if it is new or has been modified, the **queue changed** statement can be used instead.

select matching *formname*

Used to perform cascading updates or deletes from a parent form to a subform.

Can also be used with **queue** and **beam** statements to beam subform records. If you beam subform records, you should also beam the parent record.

Selects all records in the subform called *formname* that match the current record of the current (parent) form. The first 10 fields of the current form are used, and the field names and values in those fields must match in the current form and the subform for a record to be selected. The Result variable stores the number of matching records.

Once selected, the subform records can be updated with the **update field** statement. Alternatively, the selected subform records can be deleted with the **delete** statement.

WARNING: If you change the values in any fields that are used to match the parent record to the subform records, you will lose the link from parent form to subform and the parent form will appear not to have any subform records.

In this example, a parent form has a Yes/No checkbox field with a field name such as “Do you want to delete this equipment log and all related equipment readings?”. Choosing Yes runs a select: script to delete all the corresponding records on the “Equipment Readings” subform.

```
select:
 if answer == Y then
  select matching "Equipment Readings"
  delete
 endif
```

NOTE: This type of subform record deletion will only work in the case where you are not storing records on the handheld after synchronization. If you are choosing to keep records on the handheld, deleting subform records only works if the record is a newly created record that has not been backed up to the PC. If records have been backed up to the PC, then those records will be re-sent to the handheld during the next synchronization. The solution in this case is to either use a Completion Checkbox field within the first 10 fields of the parent and subform, or to have a field for storing the status of the field (e.g.: Active or Deleted), and then use Additional Download Criteria (see page181) to send only Active records to the handheld.

select *formname* **where field** *field-number* **is** *expression*

The **select where** statement is used to select records from a reference form. This has the effect of performing a filter on the reference form, and is useful if you want to limit the list of records that the handheld user sees when performing a lookup to another form.
Only one form can be selected at a time.

A select where statement can also be used with **queue** and **beam** statements to select the records that you want to beam to another handheld.

The *formname* is the name of the reference form.
The *field-number* is a field number (or column number) in the reference form.

The *expression* is the criteria for finding a matching record in the reference form. The expression can be:
A text string (e.g.: "Cherry Street"). For example:

```
select "Addresses" where field 4 is  "Cherry Street"
```

A numeric value (e.g. 15). For example:

```
select "Inventory" where field 3 is 15
```

A value in a field (e.g. $8 means the value in field 8). For example:

```
select "Parts List" where field 1 is $8
```

A function that takes no arguments (e.g. scandata). For example:

```
select "Bar Code Inventory" where field 1 is scandata
```

New in Forms 4.0:
The *expression* in a select where statement can also contain a range, such as:
Greater than (> numeric comparison). For example:

```
select "Student Scores" where field 6 > 90
```

Less than (< numeric comparison). For example:

```
select "Sale Items" where field 2 < 995
```

(Note that if field 2 is a Currency field, 995 means $9.95)

Equal (= numeric comparison). For example:

```
select "Items to Re-Stock" where field 5 = 0
```

Contains a character sequence (e.g.: contains "Ave"). For example:

```
select "Addresses" where field 2 contains "Ave"
```

Starts with a character sequence (e.g.: startswith "Tr"). For example:

```
select "Countries" where field 1 startswith "Tr"
```

The number of records that match the select where criteria is stored in the Result variable.

The **also** statement can be used to combine selection criteria for the same form.

If a lookup to another form is being performed, then one field on the current form has to be a Lookup List field type that references the name of the reference form. A **click:** event script in the Lookup List field causes the select where statement to be run when the handheld user taps in the Lookup List field, so that the user sees the filtered list of records. Fields that are named the same on both the reference form and the current form will automatically copy from the reference form into the current form when the user selects a record from the list.

In this example, the user enters a value in field 2 of the current form. Tapping in a Lookup List displays all the records in the Customers reference form, where field 4 of the reference form matches field 2 of the current form. When the user taps on a record, all the fields named the same in both forms are copied from the reference form into the current form.

```
click:
 select "Customers" where field 4 is $2
```

If you are looking up records automatically via a script, fields can be copied from the reference form to the current form using the **column** function, or fields on the reference form can be updated or deleted.

In this example, the barcode on a student badge is scanned into field 2 of the current form. The select statement selects the record where field 1 in a form called StudentID matches field 2 in the current form. After the match is found, the value in field 3 of StudentID is copied into field 4 of the current form.

```
scan:
 $2 = scandata
 select "StudentID" where field 1 is $2
$4 = column 3
```

selectfile *fieldnumber* **{ copy | move}**

New in Forms 4.0.

Used in a **click:** event to allow the user to attach an image on an external media card (e.g.: SD card or Memory Stick card) to the current record. This enables the user to attach images from cameras (or other binary files) and have them uploaded to the PC.

The selectfile statement opens a file browsing screen that enables the user to view files on the storage card. After the user selects a file on the card, the file is either copied or moved to a folder on the card that is reserved for Pendragon Forms attachments.

The form to which you are attaching the image must have a Button field for running the selectfile statement in a click: event. The form must also have an Image field.

The *fieldnumber* parameter is the field number of the Image field that will hold the attached image.

The **copy** directive copies the selected file to the FORMS4 folder on the storage card, and renames the copy. The copy directive is the safest method to use, because in the event that the file attachment is deleted from within Pendragon Forms, the original file still exists in the original folder on the storage card.

The **move** directive moves the selected file from its original location on the storage card to the FORMS4 folder, and renames the file.

For example, if the user selects the file /CAMERA/IMG0001.JPG, the file is first copied to /FORMS4/0D1234560000234B0004.JPG. The filename 0D1234560000234B0004 represents the form ID number, the record ID number and the field number. If the copy directive was used, the original /CAMERA/IMG0001.JPG file still exists. If the move directive was used, the original /CAMERA/IMG0001.JPG file is deleted from the card.

In this example, clicking a button allows the user to select an image from the storage card to attach to field 4 of the current record. (Field 4 has to be an Image field on the form.)

```
click:
 selectfile 4 copy
```

show *field-number*
show from *field-number* **to** *field-number*

Makes a hidden field or range of hidden fields visible.
In this example, if the answer in the current field is N, then field 4 is made visible.

```
select:
 if answer == N then
  show 4
 endif
```

In this example, several hidden fields are displayed.

```
exit:
 if $3 # "More" then
  show from 8 to 30
 endif
```

subformsum "*name-of-subform" field-number*

Used to add all values in a specific field across all subform records associated with a given parent record. The Subformsum statement is placed in a script on the parent form, typically a **click:** event.
The calculated sum is placed in the Result variable.

The *name-of-subform* is the name of the subform.
The *field-number* is the field on the subform which is to be added across all subform records for that parent.

In this example, clicking a button on the parent form adds up the values in Field 6 of the Items Ordered subform. The calculated result is placed in Field 12 of the parent record.

```
click:
 subformsum "Item Ordered" 6
  $12 = result
```

transmit imessenger *"E-mail address"*

Used in conjunction with Palm VII and Palm i705devices.
Places a text version of the current record into the Palm VII iMessenger Outbox. When the handheld user sends iMessenger e-mail, the record will be sent.
Recommended for use in **click:** events only.

Not all fields on a form will be included in the e-mail. Signature fields, Sketch fields and Image fields cannot be e-mailed.

If you do not want a field to be e-mailed in a transmit imessenger statement, set the Advanced Field Property of Non-Printing (see page 163).

In this example, the current record is e-mailed to sales@xyz.com.

```
click:
 transmit imessenger "sales@xyz.com"
```

In this example, the current record is e-mailed to the e-mail address that was entered into Field 3.

```
click:
 transmit imessenger $3
```

transmit multimail *"E-mail address"*

Used in conjunction with additional VersaMail e-mail software from www.palm.com. Creates a text version of the current record and adds it to the e-mail Outbox to be sent to the specified recipient when next the handheld user sends e-mail. Use in **click:** events only.

In this example, the current record is e-mailed to sales@xyz.com.

```
click:
 transmit multimail "sales@xyz.com"
```

In this example, the current record is e-mailed to the address that was entered in Field 7.

```
click:
 transmit multimail $7
```

transmit palmnet *"address"*

Warning: This option can only transfer small amounts of data, typically less than 500 bytes of data.

Used in conjunction with Palm i705.
The transmit palmnet statement asks the Palm i705 Web clipping application to display the Web page at the specified URL.

NOTE: Requires familiarity with Web and Internet concepts.

By choosing the address parameter appropriately, it is possible to send the contents of the current record to a Web site. Depending on the way the Web site software is written, the returned Web page could contain the results of a search, or simply save the record on the Web server.

Note that Pendragon Forms does not interact with the data that is returned by the server. For example, if the handheld user sent a request for information on a particular item, and received a Web page containing the response "Item out of stock", then it would be the handheld user's responsibility to use the information received when filling in the Pendragon form. Information from the server would not be placed into the form automatically.

Option 1: If the address parameter is a simple address, such as "http://www.ourcompany.com"
the Palm VII or Palm i705 will display the contents of the Web page at http://www.ourcompany.com.

Option 2: If the address parameter contains a question mark and ends with an ampersand, Pendragon Forms will append the data in all fields in the current record to the URL before sending. The data is written using the standard "Quoted Printable" format. The data is appended in the following format:
FID=<formID>&TS=<timestamp>&Q1=<field value>&Q2=<field value>...

FID stands for "Form ID" and is followed by the form's ID number.
TS stands for TimeStamp, and is the creation date of the record provided in seconds since 01/01/1904. See next page for an example.

Example: Imagine that your form contains two fields: Field 1 contains a Customer Name which you fill in as John Smith, and Field 2 contains the customer's zip code, which you fill in as 90125.

If your address parameter in the Transmit Palmnet statement is: "http://www.site.com/cgi-bin/getinfo.cgi?check=1&"

then the actual URL that would be sent to the Web server is:

"http://www.site.com/cgi-bin/
getinfo.cgi?check=1&FID=12345&TS=32415236&Q1=John+Smith&
Q2=90125"

The page that would be displayed on the Palm VII depends on the way that the getinfo.cgi script was written. For example, the getinfo.cgi program could be programmed to expect Q2 to be a zip code, and return a listing of your company outlets in or near the zip code.

Option 3: If you do not want to send data from all the fields on your form to the Web server, you can specify the value in a given field by using the field number between two $ signs in the URL. For example, 8 means the value in Field 8.

In this example, only Fields 1 and 4 are sent to the Web server:

```
       click:
        transmit palmnet "http://www.site.com/cgi-
bin/testdate.cgi?preferdate=$1$&altdate=$4$"
```

For an example of a Transmit Palmnet script, see page 352.

transmit printer *value*

Similar to the **transmit serial** statement, but requires printer driver software to be installed on the handheld. No communications parameters need to be specified. Instead, the printer driver software handles the communications settings. Works with serial and infrared printing. The value specified is a Text string up to 2KB.

In a text string, the value \\013 represents a carriage return (ASCII 13), and \\010 represents a line feed (ASCII 10). These values must be in double quotes in order to be interpreted properly by the script compiler on the handheld. You can use the concatenate operator (&) to connect two text strings together to transmit to the serial port.

In this example, the Text string "Invoice #" is printed, followed by the value in Field 1. On a new line, the value in Field 2 is printed.

```
click:
 temp = "Invoice #" & $1
 temp = temp & "\\013\\010"
 temp = temp & $2
 transmit printer temp
```

transmit serial *value*

Uses the **result** variable to specify communications parameters for communicating via the serial port of the handheld device. The specified *value* is the data string that is sent to the serial device.

The serial communications parameters that the result variable needs to contain are the baud rate, the parity, the number of data bits, the number of stop bits and the handshaking method (optional). Hyphens separate each of these parameters.

For example, the following statement sets up the communications parameters as 9600 baud, No parity, 8 data bits, 1 stop bit, hardware handshaking method:

```
result = "9600-N-8-1"
```

Valid values depend on the serial device to which you are connecting the handheld. Typical values are:
Baud rate: Any standard speed up to 115200 baud.
Parity: N (No parity), E (Even parity), O (Odd parity)
Data bits: 7 or 8
Stop bits: 1 or 2
Handshaking (optional parameter; default is hardware handshake):
N (No handshaking), B (hardware handshaking)

In a text string, the value \\013 represents a carriage return (ASCII 13), and \\010 represents a line feed (ASCII 10). These values must be in double quotes in order to be interpreted properly by the script compiler on the handheld. You can use the concatenate operator (&) to connect two text strings together to transmit to the serial port. A maximum of 2KB can be transmitted.

In this example, the text string "My Company", followed by a carriage return and line feed, followed by Field 1, another carriage return and line feed and then Field 2 are sent to the serial port:
(**temp** is a scripting variable used for temporary storage.)

```
click:
 result = "9600-N-8-1"
 temp = "My Company\\013\\010"
 temp = temp & $1
 temp = temp & "\\013\\010"
 temp = temp & $2
 transmit serial temp
```

transmit web *"URL"*

Used in conjunction with Palm devices that have a TCP/IP connection, such as a Palm Tungsten C with WiFi connection, or a Handspring Treo 300 with high speed data service, or a Kyocera 7135.
(Note that the Palm i705 does not use TCP/IP through its built-in radio.)

The Transmit Web statement transmits the URL to a Web server and returns all the data contained between <PFDATA> and </PFDATA> tags. The data that is returned by the Web server is accessible via the Webdata function, which may return up to 2KB of data. See page 353.

To send the value of a field to the Web server, you can reference the field number in the URL by using the field number between $ signs. For instance, 16 means the value in Field 16.

In this example, clicking a button sends the value in Fields 2 and 7 to the Web server.

```
click:
 transmit web "http://www.mycorp.com/cgi-bin/
 premium.cgi?age=$2$&smoke=$7$"
```

update field *number* = *expression*

Updates selected records in a reference form by setting the value of the field *number* to the specified *expression*.

The reference form cannot be a read-only reference form.

Records in the reference form are selected using one of the following statements: **select where**, **select matching**, **select all** or **insert into**.

The *number* is the field number of the reference form.

The *expression* is the value that will be assigned to the specified field. The expression can be:
A text string (e.g.: "Active Customer"). For example:

```
update field 2 = "Active Customer"
```

A numeric value (e.g. 42). For example:

```
update field 4 = 42
```

A value in a field (e.g. $16 means the value in field 16) on the current form. For example:

```
update field 7 = $16
```

A function that takes no arguments (e.g. scandata). For example:

```
update field 1 = scandata
```

In this example, the current form is used to scan a product barcode in field 1, and the handheld user counts the number of an item in the warehouse, and enters the quantity in stock in field 2. The user then taps a button to update the “Inventory Items” form. A select statement matches the barcode in field 1 with the corresponding record in the Inventory Items form. Field 3 of the Inventory Items form is updated with the quantity that the handheld user entered in field 2 of the current form. If the quantity is less than 3, field 4 of the Inventory Items form is updated to read “Time to re-order”.

```
click:
 select “Inventory Items” where field 1 is $1
 update field 3 = $2
 if $2 <= 3 then
  update field 4 = “Time to re-order”
 endif
```

Scripting Errors on the Handheld

Every time you write a script for a field, you should click the Check Script button to check that your script is valid.

If you forget to check your scripts, you may see compilation errors on the handheld. A compilation error occurs when the program on the handheld tries to compile a script which is invalid in some way. For example, you may have an if-then statement without an endif at the end of the statement. When a compilation error occurs on the handheld, an error message will be displayed, and typically the script which is causing the problem is also displayed. You can correct the script on the PC and then re-distribute the form to the handheld.

A second type of error which can occur on the handheld is a runtime error. If, for example, you have a script in Field 8 which divides Field 2 by Field 4, and the handheld user enters zero as the value of Field 4. Division by zero causes a runtime error. If a runtime error occurs, an error message is displayed. Since a script with a calculate: event runs every time a field is updated, it will take a little guesswork to determine the problem. For instance, the script in Field 8 is the problem, but the error occurs after Field 4 is filled in. By looking at the scripts which use Field 4, you can find the script with the problem. (In the case of division by zero, you may want to add a line in your script which tests if the answer is zero, and takes some action to prevent division by zero.)

A third type of error which can occur is an error in the logical flow of the script. This type of error occurs if, for example, your script says goto 5 but you meant it to say goto 6, or if the script says $5 + $8 when it should be $5 * $8. The script will compile and run flawlessly, but it will not do what you had originally intended. The only way to catch this type of error is to go through the form field by field, selecting every possible option in turn, and seeing if the script branches correctly and if all calculated results are correct. You can correct any scripts and re-distribute the form as necessary.

Using Scientific Functions in Scripts

Scientific math functions are available in scripts provided that an additional .PRC file, called MATHLIB.PRC, is installed on the handheld. MathLib is not a part of Pendragon Forms, it is a free shared library that can be used by handheld devices.

MATHLIB.PRC is available in the MATHLIB.ZIP archive which is installed into the C:\Program Files\Forms3 folder. To install MATHLIB.PRC, unzip the MATHLIB.ZIP file, double-click the MATHLIB.PRC file and then synchronize the handheld.

Scientific functions that are available in scripts if MathLib is installed on the handheld are:

sin *value*

Returns the sine of the angle *value*, expressed in radians.

To convert degrees to radians, multiply by pi / 180.

Pi is a constant representing the number π

.

In this example, an angle in radians is entered into field 5. The sine of the angle is then placed into field 6.

```
calculate:
 $6 = sin $5
```

In this example, an angle in degrees is entered into field 5. The angle is first converted to radians for use with the sin function, and the sine of the angle in radians is placed into field 6.

```
calculate:
 result = $5 * pi
 result = result / 180
 $6 = sin result
```

cos *value*

Returns the cosine of the angle *value*, expressed in radians.

In this example, an angle in radians is entered into field 7. The cosine of the angle is placed in the current field.

```
calculate:
 answer = cos $7
```

tan *value*

Returns the tangent of the angle *value*, expressed in radians.

asin *value*

Returns the arcsine of the number *value*. The resulting angle is expressed in radians.

To convert radians to degrees, multiply by 180 / pi.

Pi is a constant representing the number π.

In this example, clicking a button calculates the arcsine of a number in field 24, and places the result in field 25. The angle in field 25 is expressed in radians, and so the script then converts the radians to degrees and places the angle in degrees in field 26.

```
click:
 $25 = asin $24
 result = $25 * 180
 $26 = result / pi
```

acos *value*

Returns the arccosine of the number *value*. The resulting angle is expressed in radians.

To convert radians to degrees, multiply by pi / 180.

Pi is a constant representing the number π.

atan *value*

Returns the arctangent of the number *value*. The resulting angle is expressed in radians.

To convert radians to degrees, multiply by pi / 180.

Pi is a constant representing the number π.

sinh *value*

Returns the hyperbolic sine of the number *value*.

cosh *value*

Returns the hyperbolic cosine of the number *value*.

tanh *value*

Returns the hyperbolic tangent of the number value.

sqr *value*

Returns the square root of the number value.

In this example, a number is entered in field 12. The square root of the number is placed in the current field.

```
calculate:
 answer = sqr $12
```

value1 **pow** *value2*

Pow is a binary operator that calculates the number *value1* raised to the power of *value2*.

For example, the answer in this script would be 10 * 10 * 10 = 1000.

```
calculate:
 answer = 10 pow 3
```

In this example, a number in field 4 is squared.

```
calculate:
 answer = $4 pow 2
```

In this example, a number in field 6 is raised to the power specified in field 7, and the calculated result is placed in field 8.

```
click:
 $8 = $6 pow $7
```

exp *value*

Exp calculates the number ***e*** raised to the power *value*.
e is an irrational number that begins with: *e* = 2.7182818284590...

In this example, e is squared.

```
calculate:
 answer = exp 2
```

In this example, e is calculated to the power specified in field 3. The calculated answer is placed in field 4.

```
calculate:
 $4 = exp $3
```

log *value*

Returns the log base ***e*** of the number *value*.

In this example, the current field calculates the log base ***e*** of the number in field 5.

```
calculate:
 answer = log $5
```

log10 *value*

Returns the log base 10 of the number *value*.

In this example, the log base 10 of the number in field 3 is placed into field 4.

```
calculate:
 $4 = log10 $3
```

round *value*

Rounds the number *value* to the nearest whole number.
For example, 20.5 rounds up to the nearest integer, namely 21.
20.49 rounds down to 20.

In this example, field 7 is rounded to the nearest whole number, and the answer is placed in field 9.

```
calculate:
 $9 = round $7
```

In this example, fields 10 and 11 are multiplied together, and then rounded to the nearest whole number.

```
calculate:
 result = $10 * $11
 answer = round result
```

trunc *value*

Truncates the number *value*, discarding any decimal places and leaving the integer part of the number. No rounding occurs, so truncating the number 29.9 returns the number 29.

In this example, the number in field 23 is truncated and the integer part of the number is stored in the current field.

```
calculate:
 answer = trunc $23
```

14. Scripting Examples

This chapter shows some examples of using scripts in forms. Before you read this chapter, it is important to read Chapter 13, *Scripting Reference*, starting on page 209, to learn about the scripting language used in Pendragon Forms.

Other chapters that follow will show examples of using scripts in:

- Forms designed for use with bar codes - see Chapter 15, *Using Bar Codes*, page 308.
- Printing from the handheld - see Chapter 16, *Printing from the Handheld*, page 323.
- Forms that attach images - see Chapter 17, *Working with Images*, page 337.
- Forms that allow beaming - see Chapter 19 - page 355.
- Performing lookups from one form to another - see Chapter 20 - page 365.

Using Scripts to Perform Calculations

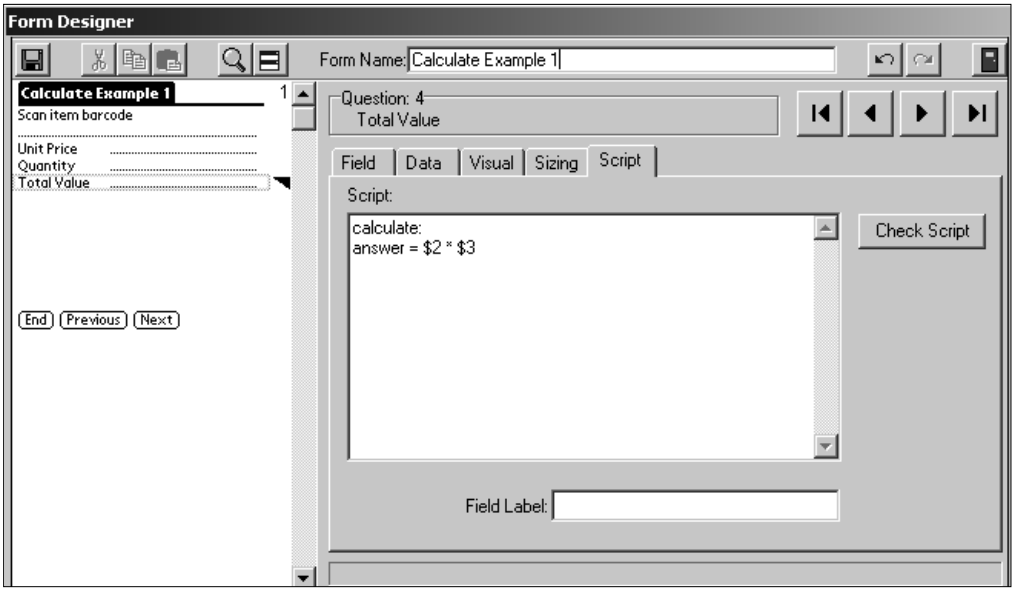
If you need to perform a calculation, you can add a script to the field in which you want to display the result of the calculation.

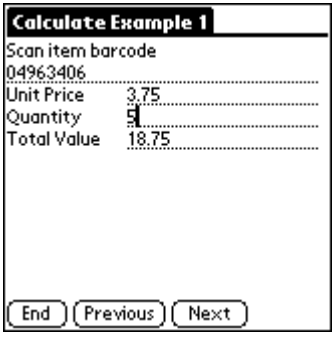
- The **calculate:** event is most commonly used in calculation scripts. Since the calculate event will run the script whenever any field on the form is updated, fields can be updated in Layout View, Field View or Record View on the handheld.
- If you do not want the handheld user to be able to overwrite the result of a calculation, you can make the field which displays the result a read-only field (see page 146).
- The **answer** statement assigns a value to the current field of the form. (See example 1.) For example, answer = $1 + $2 adds the values in fields 1 and 2 and places the result in the current field.
  The **$N =** *expression* statement assigns the value in the calculated expression to field number N. For example, $5 = $3 * $4 multiplies the values in fields 3 and 4 and puts the result in field 5.
- Only binary math expressions are supported on any line of a script. This means that a math expression such as A + B + C takes two lines of a script. (See examples 2 and 3.)
- If a calculation involving a currency is performed, and the result is placed into a currency field, the result will display properly as a currency. If the result is placed in a Numeric or Text field, the number displayed will be in cents. A line can be added to the script to convert the cents to dollars and cents.

Calculation Example 1: Performing a simple calculation

In the following form, the user can enter the price of an item and the quantity being purchased, and then calculate the total value of the items being purchased. The script to perform the calculation is in Field 4.

answer = $2 * $3 means that the answer to be placed in Field 4 is the multiplication of the value in Field 2 and the value in Field 3.





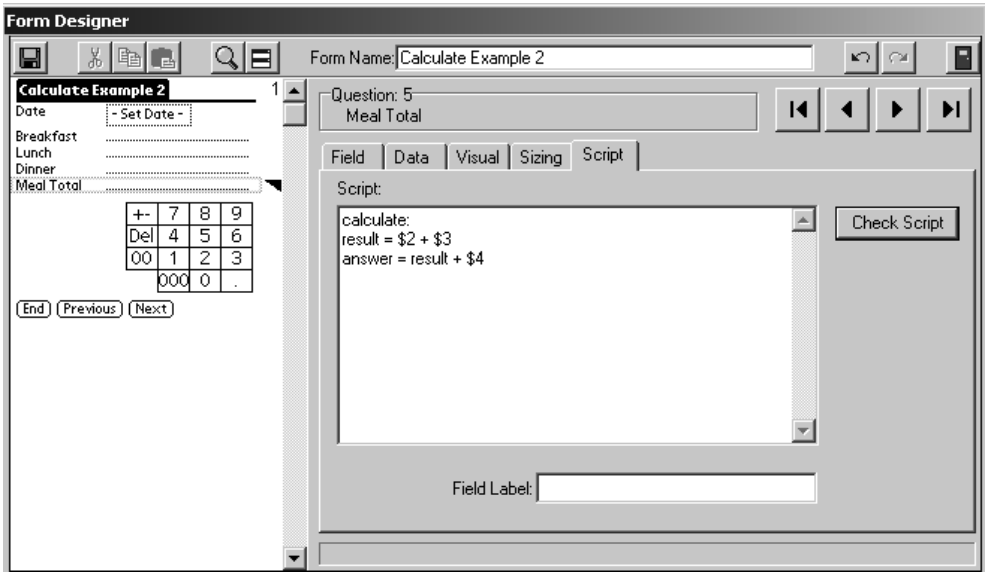
On the handheld, the **calculate:** script triggers when any field on the form changes. The user has to leave a field for the change in that field to be registered.

When the user fills in the Unit Price and Quantity, he/she will need to tap in any field for the calculation to occur.

Calculation Example 2: **Adding more than two values together**

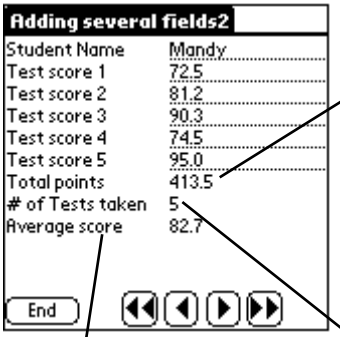
The scripting language in Pendragon Forms only supports binary math functions, that is, math functions with two numeric expressions. In order to add more than two values, you can break a calculation into smaller parts, using the **result** variable as temporary extra storage space for storing intermediate results of a larger calculation.

In the form below, in order to calculate total meal expenses for the day in field 5, the statement **result = $2 + $3** stores the sum of Breakfast (field 2) and Lunch (field 3) in the **result** variable. The statement **answer = result + $4** stores the sum of the **result** variable + Dinner (field 4) in the current field (field 5, the Meal Total).



Calculation Example 3: Adding more than three values together

In this example, in order to calculate an average test score, the sum of test scores 1 through 5 must first be calculated.




```
calculate:
 result = $2 + $3
 result = result + $4
 result = result + $5
 answer = result + $6
```

Script in field 7 to calculate Total points

The "# of Tests Taken" field records how many tests have been taken, by adding a 1 for each non-zero score.

```
calculate:
 result = 0

 if $2 <> null then
  result = result + 1
 endif

 if $3 <> null then
  result = result + 1
 endif

 if $4 <> null then
  result = result + 1
 endif

 if $5 <> null then
  result = result + 1
 endif

 if $6 <> null then
  result = result + 1
 endif

 answer = result
```

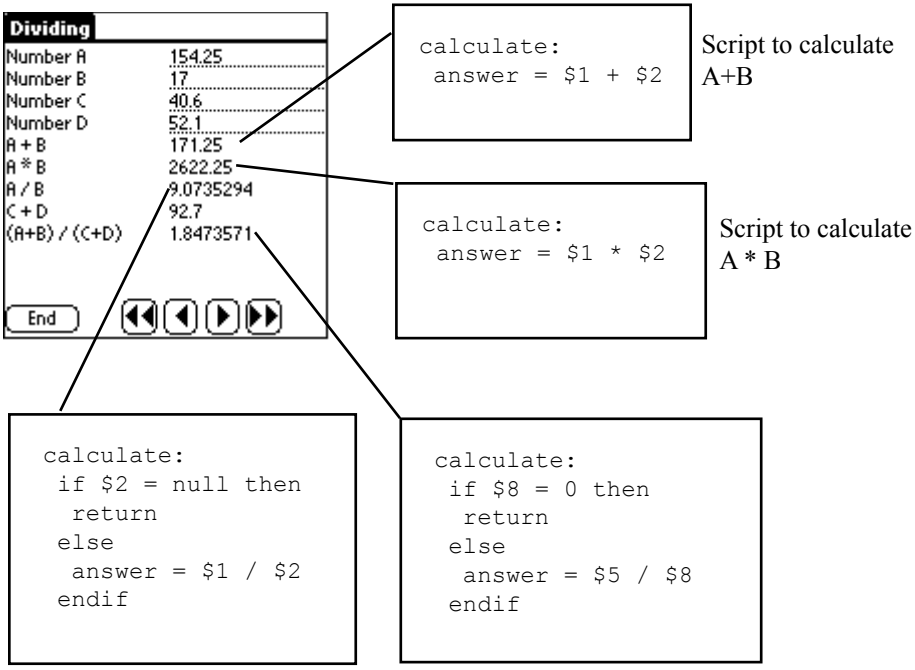
```
calculate:
 if $8 = 0 then
  return
 endif

 answer = $7 / $8
```

The script which calculates the average has a check to see if the number of tests taken (Field 8) is zero. If it is zero, the return statement ends the script to prevent a divide by zero error.

If Field 8 is not zero, then the average of Total points / # of tests is calculated.

Calculation Example 4: Dividing

Whenever you perform a division in a form, you have to be careful to avoid division by zero errors. These errors can occur because **calculate:** scripts are triggered whenever an entry has been made in a field. If you have a form in which a number X is entered, followed by a number Y, and you want to calculate X/Y, the value of Y will be zero until the handheld user enters a value. As soon a a value is entered for X, the calculate script will run, and X/0 will cause an error on the handheld. There are simple scripting statements which can be used to prevent the calculation from occurring until field Y has a non-zero value.

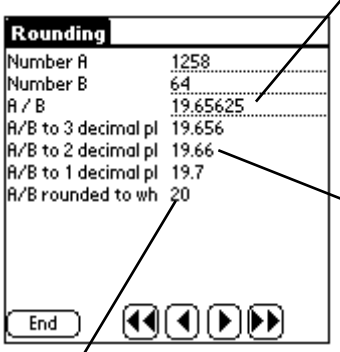


To calculate A/B in Field 7, a check is first done to see whether the divisor (number B in Field 2) is null (blank). If Field 2 is null, the return statement breaks out of the script so that the division is not performed. If Field 2 is not null, then the division of Field 1 by Field 2 proceeds.

Similarly, to calculate (A+B) / (C+D) in Field 9, a check is first carried out to see if the divisor (C+D) in Field 8 is zero.

Calculation Example 5: Rounding

When you divide one number by another, the handheld displays as many decimal places as possible. In some instances you may prefer to round your answer to a specific number of decimal places.




```
calculate:
 if $2 = null then
  return
 endif

 answer = $1 / $2
```

Script to calculate A/B, protecting against divide by zero errors. The answer has many decimal places.

```
calculate:
 if $2 = null then
  return
 endif

 result = $1 / $2
 result = result * 100
 result = result + 0.5
 result = integer result
 answer = result / 100
```

The script shown above is in Field 5, and rounds the calculation of A/B to 2 decimal places.

Multiplying by 100 preserves two decimal places' worth of precision. Adding 0.5 rounds up if the decimal part is greater than 0.5. The integer statement discards the unwanted decimal places. Finally, dividing by 100 reverts to the correct level of precision.

To round to 3 decimal places, multiply and divide by 1000 instead of 100.
To round to 1 decimal place, multiply and divide by 10 instead of 100.

```
calculate:

 result = $3 + 0.5
 answer = integer result
```

Field 7 rounds the calculation of A/B in Field 3 to a whole number.

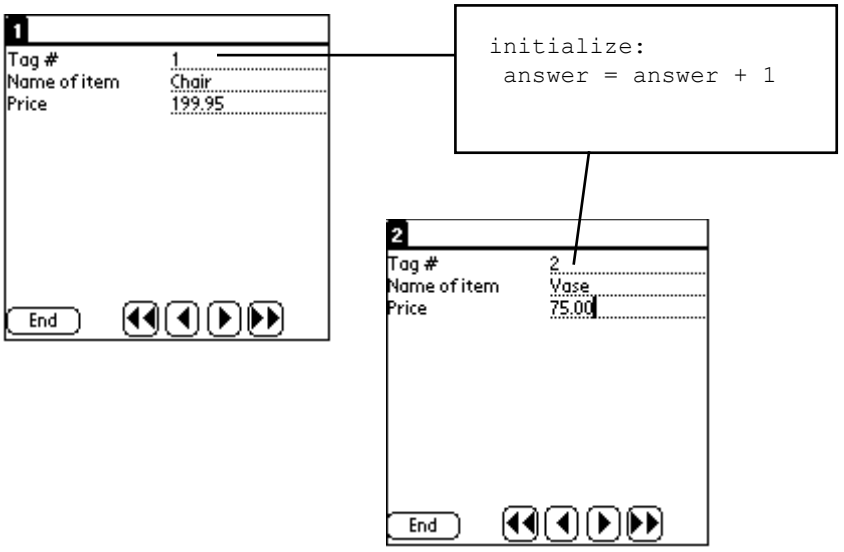
Adding 0.5 to the value in Field 3 causes Field 3 to be rounded up if the decimal part is greater than 0.5.

The integer statement takes the integer part of Field 3 and discards the decimal part.

Calculation Example 6: Counter field

If you need to count the number of records in a form, there is a simple initialization script which can be used.

- In addition to the script, it is necessary to make the counter field an Autodefault field on the Advanced Field Properties screen for that field. (See page 154.)



Setting Field 1 to autodefault means that when a new record is created, the value of the previous record is retained. The initialize script then adds 1 to increment the counter.

If you need to start the counter from 300, for example, simply enter the number 300 in the first record created. Subsequent records will be 301, 302, 303, etc.

Note that if the form is re-distributed to the handheld, or if the handheld is reset, the counter will be reset to 1.

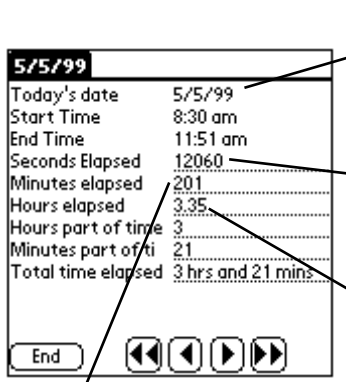
Working with Dates

Time fields, Date fields and Date & Time Fields can be used in calculations. Some notes:

- Dates are converted to numbers for calculations - the number of seconds since 01/01/1904.
- Results of calculations with dates must be stored in Text fields. It is not possible to subtract two times, for instance, and display the result in a Time field.
- The result of a calculation of two dates is expressed in seconds. The seconds can then be converted back to minutes, hours or days, as appropriate. (See Example 1.)
- An **initialize:** script can be used to set a default of the current date in a Date field, or the current date and time in a Date&Time field (see Example 1). Note however that the earliest date that you can set as a default is 01/01/1970.

Date Example 1: Today's date, and Time Elapsed

In this form, the first field defaults to today's date, and other fields calculate the time elapsed between a starting and ending time.




```
initialize:
 answer = now
```

The script in field 1 only runs once, when the record is created. The **answer = now** statement places the current date (& time if a Date&Time field) into Field 1.

```
calculate:
 answer = $3 - $2
```

A calculation of dates results in an answer in seconds.

```
calculate:
 result = $3 - $2
 answer = result / 60
```

To calculate minutes, divide the seconds by 60.

```
calculate:
 result = $3 - $2
 answer = result / 3600
```

To calculate hours, divide the seconds by 3600. (There are 3600 seconds in an hour.)

Date Example 2: Displaying Time Elapsed in Hours and Minutes

Since most people are used to expressed elapsed time in hours and minutes, you may want to display the results of date calculations in this way.


```
calculate:
 answer = $3 - $2
```

In Field 4, the time elapsed is calculated in seconds.

```
calculate:
 result = $4 / 3600
 answer = integer result
```

The seconds are converted to hours by dividing by 3600, since there are 3600 seconds in an hour.

The integer statement takes just the whole number of hours, and this is placed into a field for storage.

```
calculate:
 result = $4 % 3600
 result = result / 60
 answer = integer result
```

The modulo (%) statement records a remainder, in this case the remainder of seconds after the whole number of hours is discarded.

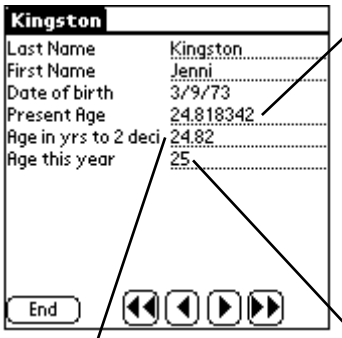
The seconds are converted to minutes, and the whole number of minutes is stored in a field.

```
calculate:
 result = $7 & " hrs and "
 result = result & $8
 answer = result & " mins"
```

Finally, to display the time elapsed as the phrase " X hrs and Y mins", the concatenate operator (&) is used to combine the whole number of hours, + the phrase " hrs and " + the whole number of minutes + the phrase " mins".

Date Example 3: Calculating Ages

A useful date calculation is to calculate a person's present age.




```
calculate:
 result = now - $3
 result = result / 86400
 answer = result / 365.25
```

The statement **result = now - $3** calculates the number of seconds from the date of birth to the present time, and put the answer in the result variable.

The result is divided by 86400 to convert seconds to days.

The number of days is divided by 365.25 to convert to years. (There are approx. 365.25 days in a year, accounting for leap years.)

```
calculate:
 result = $4 * 100
 result = result + 0.5
 result = integer result
 answer = result / 100
```

The result can be truncated to two decimal places by multiplying by 100 to preserve two decimal places' of precision, then adding 0.5 to round up. The integer statement takes a whole number and discards the excess decimal places, and then dividing by 100 reverts to the correct level of precision.

```
calculate:
 result = $4 + 0.5
 answer = integer result
```

To round the present age to the age that the person will be this year, add 0.5 to round up and then the integer statement takes the whole number of years.

Branching

Scripts can be used in fields to allow branching on a form. With branching, the handheld user's response in one field determines which additional fields are displayed.

- The way in which you write branching scripts depends on whether you want your users to use Layout View or Field View on the handheld. Record View is not as suited to branching as Layout View or Field View.
- **Layout View** is geared towards displaying several fields on a screen at a time. If you are branching from a Layout View screen, it is best to cluster all the extra questions on one screen, and as the user exits the current screen, branch (jump) to that screen if needed, or jump past that screen if it is not needed.
  The **exitscreen:** event can be used for this purpose in Layout View.
  A **select:** event can also be used for branching in Layout View if you want the user to jump to another part of the form immediately as a selection is made in a Popup List, Yes/No Checkbox or Lookup List field.
- **Field View** displays only one field at a time.
  In Field View, an **exit:** event runs the script when the user exits the field.
  A **select:** event runs a branching script as soon as the user makes a selection in a Popup List, Yes/No Checkbox or Lookup List field.
- Record View has some limitations. In Record View, **exit:** events only run in Text, Numeric and Currency fields, and **select:** events only run in selection fields such as Yes/No checkboxes, Popup Lists and Lookup Lists. There is no scripting event that is guaranteed to run to allow branching in Record View. Therefore, Layout View or Field View are preferred when using branching scripts.
- A **select:** event will not run if the handheld user does not make a selection.
  In Field View, an **exit:** event is therefore more failsafe because it will run whether or not the user makes a selection. In Layout View an **exitscreen:** event is more failsafe than a select: event. In Record View, there is no way to branch from a selection field if the handheld user does not make a selection.
- The **goto** statement is used to branch from one field to another. The goto statement can only be used in **select:** , **exit:** (in Field View only), **exitscreen:** (in Layout View only) , **click:** and **scan:** events.
- The **hide** and **show** statements are used to hide fields which the user does not need to fill in, and to display fields which the user does need to fill in. A field can be Hidden (see page 143) during the form design process in the Form Designer, and then the **show** or **show from...to** statements can be used to display fields as needed.

Branching Example 1: Branching from a Yes/No Checkbox in Layout View

In a Yes/No checkbox, there are three possible answers: Y for Yes, N for No, or null if the field is left blank. A branching script has to contain instructions for all possible answers. A blank response can be treated the same as answering No, if that is appropriate.

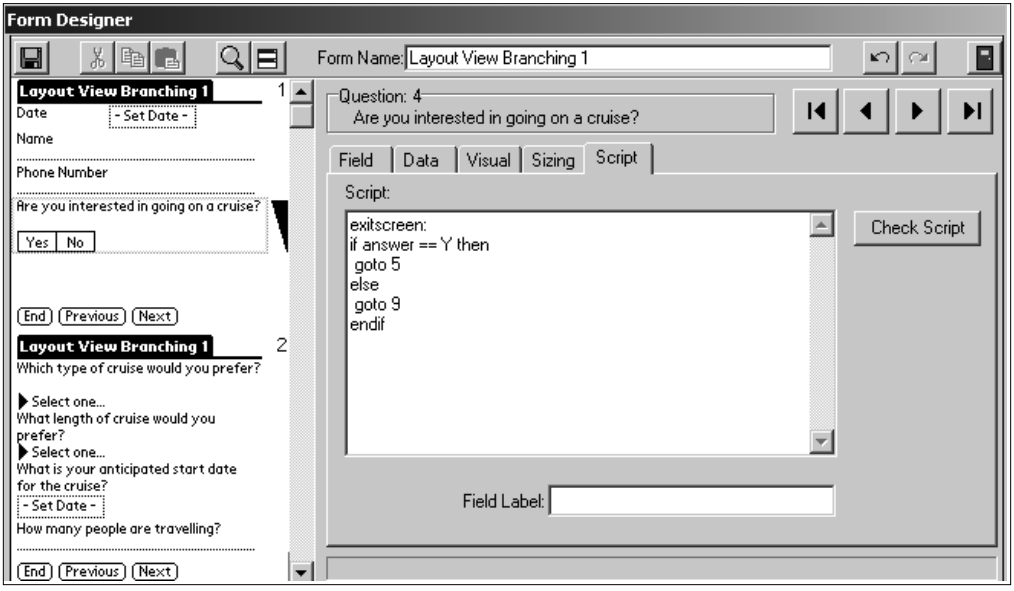
A **select:** event will run the script as the user makes a selection in the field. However, if the user leaves the field blank, a select: script will not run. An **exitscreen:** event runs when the user taps the Next button to move to the next screen, so an exitscreen: script will run even if the Yes/No field is left blank.

On the form below, field 4 asks a Yes/No question. If the user answers Yes, then upon exiting the screen, the user will branch to field 5, which starts on the second screen of the form. If the user answers No, or leaves the Yes/No field blank, then he/she will skip all the questions on the second screen of the form, and will instead branch to field 9.

The **exitscreen:** event in field 4 runs when the user taps the Next button to move to the next screen. The if...then...else...endif statement sets up the branching conditions.
The statement

```
if answer == Y then
  goto 5
```

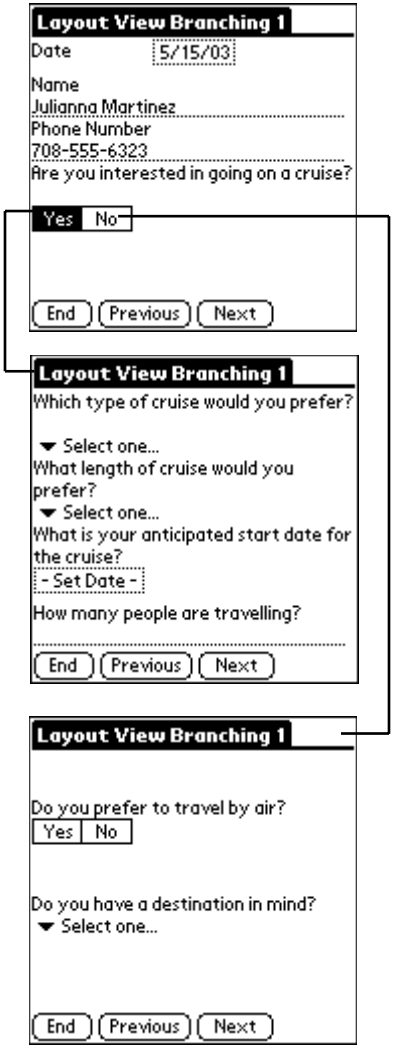
means that if the answer in field 4 is Yes, the form will advance to display field 5.



The **else** component of the if...then...else...endif statement covers what happens if the answer is not Yes, that is, if the answer is No or null.

```
else
 goto 9
endif
```

means that if the first condition (answer == Y) is not met, the form will branch to field 9.



On the handheld, selecting Yes in field 4 jumps the user to the next screen (field 5) when the Next button is tapped and the exitscreen: event runs.

Selecting No in field 4, or leaving field 4 blank causes the user to skip all the questions on the second screen, and jump ahead to field 9 on the third screen.

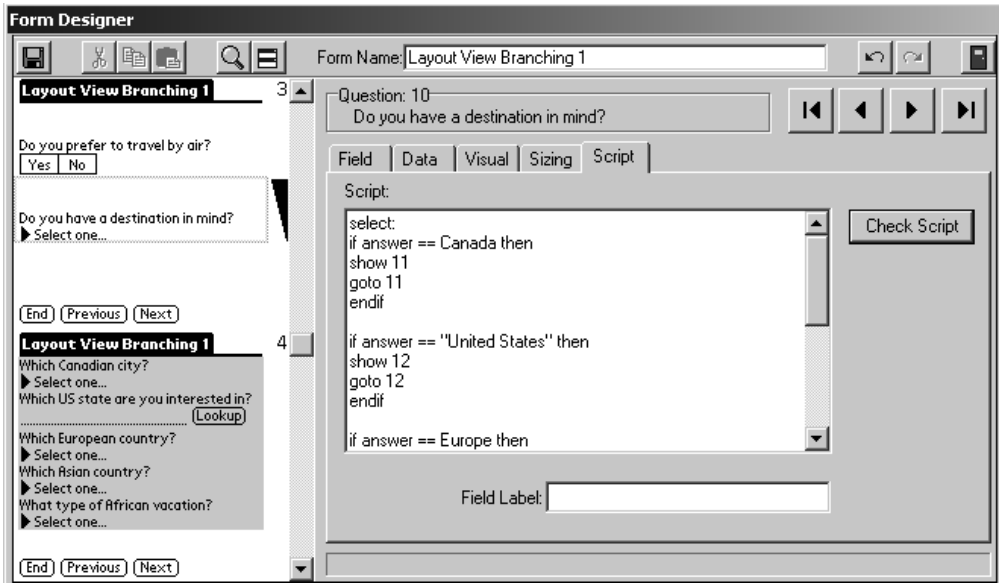
If the user jumps ahead to field 9, but then taps the Previous button, the screen with the skipped questions will be visible.

Branching Example 2: Branching from a Popup or Lookup List in Layout View

If you want to branch based on a selection in a Popup or Lookup List, your script must account for every possible selection that the user can make from the list.

A **select:** event can be used, but the user has to make a selection for the script to run. If the user leaves the field blank, the script will never run. You can use an **exitscreen:** event if you want the script to run when the user leaves the current screen, whether or not a selection has been made.

In the form shown below, field 10 is a Popup List with a list of travel destinations. Depending on the user's selection, a question relating to that destination will be displayed, and the form will advance to that question. The extra questions are hidden in advance by checking the Hidden checkbox on the Visual tab of the Form Designer window, and the script will unhide the relevant question.



The **select:** event script has to contain instructions for each possible selection that the user can make in the Popup List.

```
select:
 if answer == Canada then
  show 11
  goto 11
 endif
```

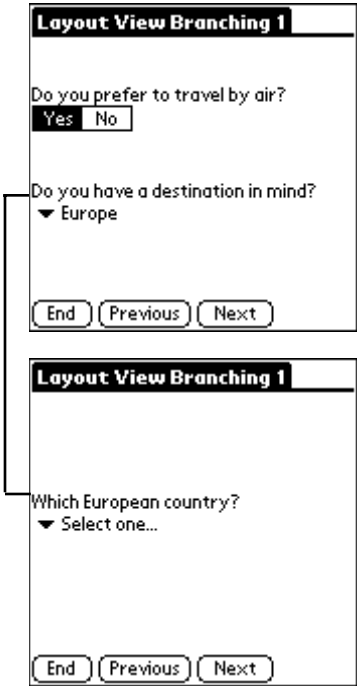
means that if the user selects Canada in the list, field 11 will be unhidden and then the form will jump to field 11. The goto statement breaks out of the script, so the rest of the script does not run.

However, if the user did not select Canada, the form will not go to field 11, and the script continues.

```
 if answer == "United States" then
  show 12
  goto 12
 endif
```

Since the phrase United States contains a space, it has to be written in double quotation marks as "United States". If this option is selected, the script will display field 12 and jump to that field. The goto 12 statement ends the script as the user goes to field 12.

The remainder of the script covers the actions to take based on each of the remaining options in the Pouup List: Europe, Asia, Africa.

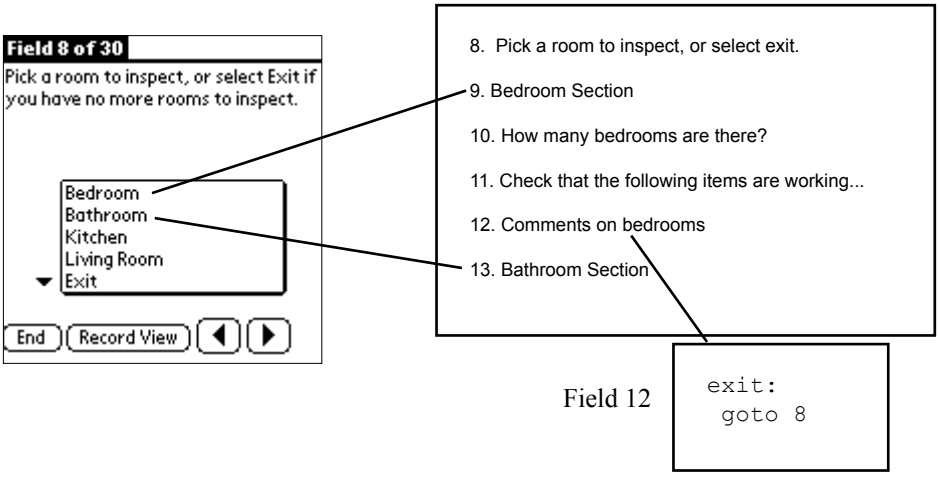


On the handheld, selecting a travel destination in field 10 jumps the user to a screen that displays the question pertaining to the option selected.

Branching Example 3: Using a Goto statement with a Jump to Section field

A Jump to Section field contains some built-in branching capability that automatically allows you to jump to Section fields on your form. (See page 79 on Section fields and page 82 on Jump to Section fields.) If you want the handheld user to branch back to the Jump Popup field after completing a section of a form, you can use a **goto** statement in the last field of that section.

In the following form, Field 8 is a Jump to Section field that allows the handheld user to jump to a section on the form. After the user has gone through the fields in a section, you may want the user to branch back to the Jump to Section field to be able to select another section.

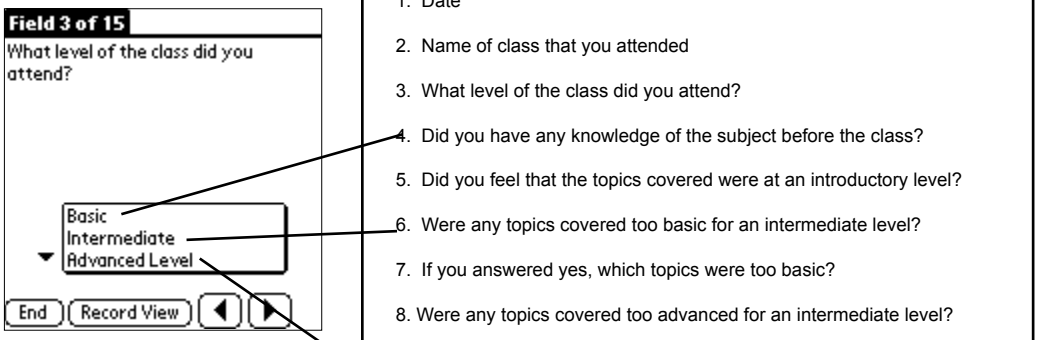


When the handheld user exits the last field in a section, the form branches back to Field 8, the Jump Popup field. The Exit section is the only section which does not branch back to Field 8, so if the user selects the Exit option, he/she jumps to the final field(s) on the form and can end the record.

In the example above, an **exit:** event is used because the form is displayed in Field View (one field per screen). If Layout View was being used (several fields per screen), an **exitscreen:** event would have to be used instead, as exit: events do not run in Layout View.

Branching Example 4: **Branching from a Popup or Lookup List in Field View**

In the following form, the handheld user sees a Popup List in Field 3. The user's selection determines the next fields that will be displayed.



Field 3

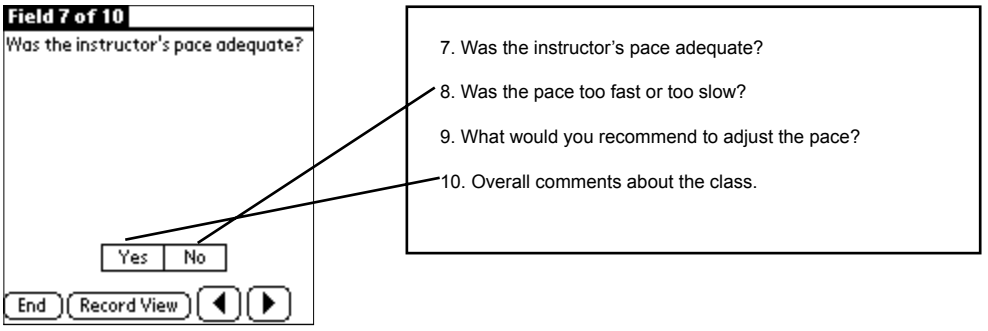
```
exit:
 hide from 4 to 10

 if answer == Basic then
  show from 4 to 5
  goto 4
 endif

 if answer == Intermediate then
  show from 6 to 9
  goto 6
 endif

 if answer == "Advanced Level"
then
  show 10
  goto 10
 endif

 goto 11
```

The **exit:** script runs in Field View as the user leaves Field 3. Fields 4 to 10 are hidden, and then depending on the user's selection of Basic, Intermediate or Advanced Level, specific questions are displayed and a **goto** statement moves the user to the specified field.

The phrase Advanced Level is included in double quotes because there is a space in between the two words.

A goto statement is recommended at the end of all the If...Then...Endif statements, to force an action in the case where the user does not make a selection.

Branching Example 5: **Branching from a Yes/No Checkbox in Field View**



Field 7

```
exit:

 if answer == Y then
  hide from 8 to 9
  goto 10
 else
  goto 8
 endif
```

In Field View, an **exit:** script is run when the user leaves the field containing the exit: script.

Yes/No responses are stored internally as Y if an answer is Yes, and N if an answer is No.

If the user selects Yes, Fields 8 and 9 are hidden and the form moves directly to Field 10.

If the answer is either No, or if the user leaves the field blank, the form moves to Field 8.

One way to handle leaving a field blank is to have a default value which forces the field to either Y or N. See Advanced Field Properties, Default Value, page 158.

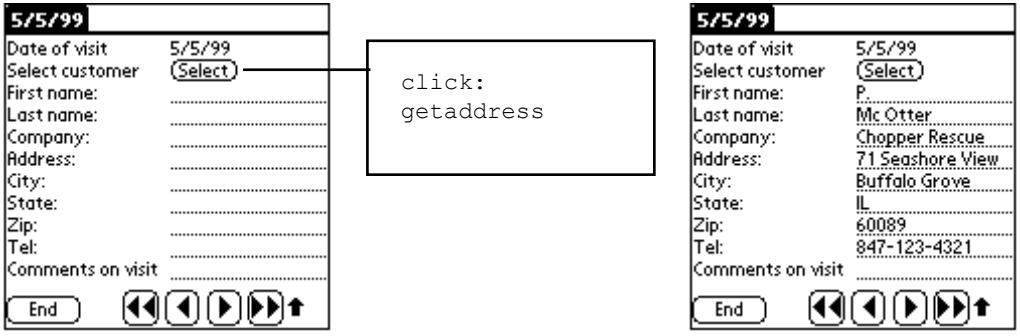
Using Scripts in Button Fields

Scripts are used to carry out actions when the handheld user taps on a button in a Button field.

- The label on a button is set by typing in a Default value (up to 11 characters) on the Data tab of the Button field in the Form Designer window(see page 115).
- The **click:** event is used to activate what happens when a button is tapped. A click: script runs whenever the button is tapped, in Layout View, Field View or Record View.
- The label on a button can be changed in a click: script with the assignment statement answer = "*Name-of-label*"

Button script Example 1: GetAddress button

A **click:** event with the getaddress statement allows the user to perform a Lookup to the handheld AddressBook, and select a name to paste into the Pendragon form.



The getaddress statement only copies fields from the AddressBook if there are fields with corresponding names on the Pendragon Form. The fields which can be copied are:

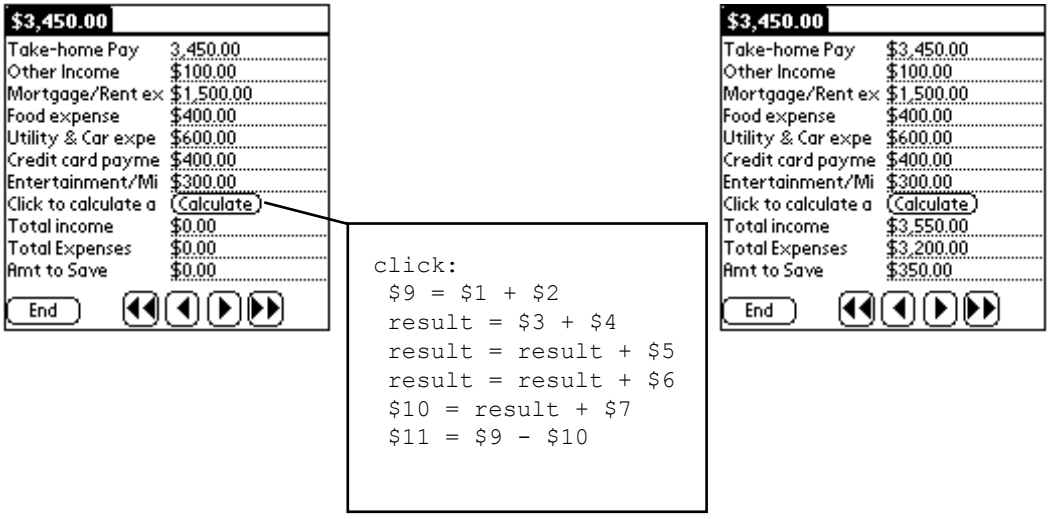
First name:	Address:	Country:
Last name:	City:	Tel:
Title:	State:	Email:
Company:	Zip:	Custom:

The colon character (:) has to be included in the field name on the form.

Tel: is the Work phone number, and Custom is the Custom 4 field in the AddressBook.

Button script Example 2: Calculate button

Calculate: scripts run whenever a field is updated. This is processor intensive, and may also cause calculations to be performed before the handheld user is ready. An alternative is to use a button to give the handheld user control of when the calculation is performed.



In the form above, the last three fields on the form (Fields 9, 10 and 11) are not calculated until the user taps the Calculate button.

The advantage of using a button for calculations is that the user does not see intermediate results on screen before all the necessary data is input.

IMPORTANT: The disadvantage to using a button for calculations is that if the user changes a field, the calculated results do not change until the button is tapped again.

Other Button scripts
Button fields with **click:** event scripts can be used for:

- Calculating a total across all subform records for a given parent record, and placing the result in the parent record. See page 305 for an example.
- Printing directly from the handheld - see page 327.
- Beaming records from one handheld to another - see page 358.
- Attaching image files to a record - see page 340.

Using a Script in a MultiSelection field

MultiSelection fields are stored internally as a binary number, with each option in the MultiSelection List being represented by a bit position in the binary number.

For example, the Multi-Selection List shown here uses the following bit positions:

64	32	16	8	4	2	1
Dessert	Vegetarian	Fish	Meat	Salad	Soup	Appetizer

Each checked box in the list sets the corresponding bit position as 1. Internally, the choice of Appetizer, Salad, Vegetarian and Dessert is stored as the binary number 1100101.

For a script to react to the selections in a Multi-Selection list, the binary **AND** operator can be used to check whether a given bit position has been set. In the script shown at right, the answer in the Multi-Selection field is compared to each bit position in turn. If the bit is set, the result of the AND operation is equal to the value of the bit position. If the bit is not set, the result is 0.

For example, the statement `result = answer and 4` compares the answer in the Multi-Selection field with the bit position 4, to test if the "Salad" checkbox has been checked. Depending on the options checked in the field, various hidden fields are displayed using the Show statement.

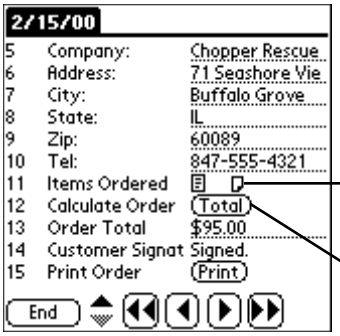
```
exit:

result = answer and 1
if result = 1 then
show 4
endif

result = answer and 2
if result = 2 then
show 5
endif

result = answer and 4
if result = 4 then
show 6
endif

result = answer and 8
if result = 8 then
show from 7 to 8
endif

result = answer and 16
if result = 16 then
show 9
endif

result = answer and 32
if result = 32 then
show 10
endif

result = answer and 64
if result = 64 then
show 11
endif

goto 4
```

A **goto** statement is needed at the end of an **exit:** script to decide which field is displayed next. If a field is hidden, the goto statement will go to the next visible field on the form.

Using Scripts with Parent forms and Subforms

A parent form and a subform are not really linked on the handheld - they only appear to be connected. Some scripts can be used to further enhance the appearance of a connection between the parent form and subform.

Example: Adding a field across subform records, and placing the result on the parent form



The **subformsum** statement can be used to add up the values in a given field on a subform, and place the calculated result in the Result variable.

In the parent form shown at left, Field 11 is a Subform field that jumps to a subform used to enter items being ordered.

Field 12 is a Button field, that the user taps to run the following script:

```
click:
 subformsum "Items Ordered" 8
 $13 = result
```

The statement `subformsum "Items Ordered" 8` adds up the values in Field 8 of all the subform records that match the parent record. (In this example, field 8 on the subform contains the total for one item being ordered.) "Items Ordered" is the name of the subform. The result of the calculation is placed in the Result variable.

The statement `$13 = result` then places the calculated result in Field 13 of the parent form.

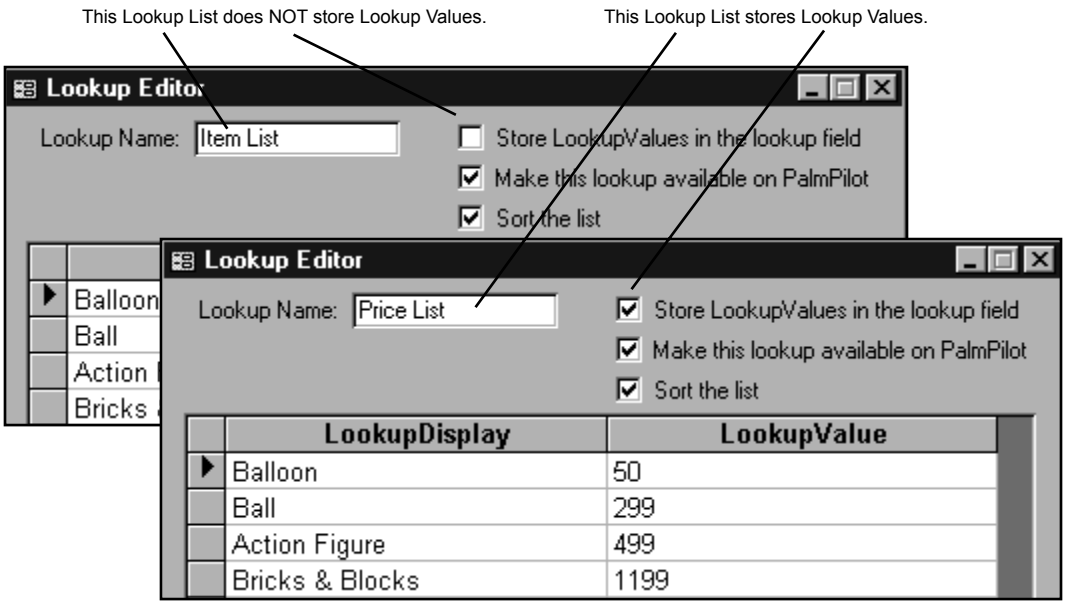
Note that if the handheld user enters more subform records after the Order Total button has been tapped, the user will need to tap the button again to update the parent form with the new total.

Using a Lookup...Within Script

Lookup Lists allow you to select an item from a list and place either a Lookup Display entry or a Lookup Value entry into a field, but not both. A Lookup...Within script makes it possible to place both the Lookup Display entry and the Lookup value into a form, based on one selection.

- For the script to work, it is necessary to create two Lookup Lists, one which stores Lookup Display entries, the other which stores Lookup Values.

NOTE: As an alternative to maintaining two Lookup Lists, you can choose to do a Lookup to Another Form - see page 94.



When an item is selected from the list, both the item and the price are filled in on the form.

To achieve the result of filling in both the item and the price, a lookup...within script is used.

The Item 1 field (Field 3) is a regular Lookup List field which performs a Lookup to the lookup list "Item List". Since this lookup list does not store Lookup Values, the name of the selected item is placed into the Item 1 field.

```
select:
 lookup answer within "Price List"
 $4 = result
```

Field 3 also contains a script which takes the answer in Field 3, and does a lookup to the Price List lookup list. Since the Price List lookup is set to store lookup values, what actually gets stored in the Item 1 Price field is the price.

Additional pairs of fields can be used in this way. For instance, the Item 2 field (Field 5) above is a Lookup List field, and contains another script:

```
select:
 lookup answer within "Price List"
 $6 = result
```

Alternative Use of Lookup...Within

Instead of referencing a Lookup List, a Lookup...Within script can be used to reference another form. For an example, see page 320.

15. Using Bar Codes

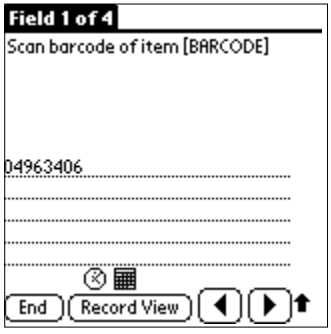
Bar Code Scanners

Pendragon Forms supports the following types of bar code readers for the handheld:

- Symbol Technologies: SPT 1550, SPT 1800 series handheld devices, and the CSM 150 Springboard module for the HandSpring Visor. (See www.symbol.com)

The SPT 1550 and SPT 1800 are PalmOS devices with a built-in bar code scanner.
The CSM 150 Springboard module plugs into any Handspring Visor.

SPT 1550 / SPT 1800 / CSM 150 - Creating a field for receiving bar code input



With an SPT 1500 or SPT 1700 series device or a CSM 150 module:

- The default behavior is that any Text field can receive bar code input in Layout View, Field View or Record View.
- If bar codes are scanned in Field View, then adding the code [BARCODE] to the end of the field name makes it possible to automatically jump to the next field if AutoNavigate is switched on. Having [BARCODE] in the field name also causes subsequent scans in the same field to replace the contents of the field.
- Alternatively, a **scan:** event script can be added to any field to control bar code input at any time. A scan: event is an alternative to using [BARCODE] in the field name.
- To scan a field, press one of the green scan buttons on the SPT 1550/1800 device.
  On a CSM 150 module, the module's software allows you to select which handheld button will be used to initiate a scan. The bar code scanner will beep when the scan is successful.

Serial Port Bar Code Scanners - Creating a field for receiving bar code input

Any bar code reader that is self-powered and can transmit data at 9600-N-8-1 can be attached to the handheld serial port. The bar code data should be terminated by a carriage return in order to automatically power down the handheld serial port and jump to the next field on the form.

With bar code scanners that connect to the handheld serial port, the following items apply:

- Bar codes can be scanned into any Text field on a form.
- In order to automatically activate the serial port, it is necessary to add the code [BARCODE] to the end of a field name.
- You must be in Field View (viewing one field at a time) in order to activate the serial port and scan the bar code. The bar code reader will beep when the data has successfully been scanned.

- The serial port will deactivate after 45 seconds in order to save the handheld's battery. If you remain in the bar code field, a message (shown at left) will ask whether you want to reactivate the serial port or switch the serial port off.
- To reactivate the serial port, tap the handheld Menu button, and select the Acquire Barcode option on the Edit menu. A shortcut for this procedure is / **B**.
- You can also use the shortcut / **B** to:
  - Make a Text field which does not have the [BARCODE] code, capable of receiving bar code input.
  - Scan a bar code into a Text field in Record View.
- The automatic activation of the serial port by the [BARCODE] code only happens when the field is null.

Controlling which Bar Codes can be scanned

There are various bar code standards, also called bar code symbologies. For instance, bar codes on grocery products often use a 10-character UPCA symbology.

If you are using a specific bar code symbology, you can allow only that symbology to be scanned.

The easiest way to control which bar code symbologies are accepted is via the bar code scanner hardware.

- On the SPT 1550 / SPT 1800 series, tap the Applications button and then tap the Diag icon (for Diagnostics). On the Diagnostics screen, tap the Bar Code Scanner option, and page down to page 2 of the Bar Code Scanner program. On the second screen of the Bar Code Scanner you can check a box for each bar code symbology that you want to allow.
- On the Symbol CSM 150 module, tap the Symbol CSM icon, then tap the Test Scan button. Tap the Configure button on the Scanner Test screen to select which bar code symbologies you want to allow.
- You can also reject unwanted symbologies with a script (see below).

Using Scripts with SPT 1550 / SPT 1800 / CSM 150

Scripts can perform several functions on an SPT 1550, SPT 1800 series or CSM 150 device.

- A script can be used to set the scanner options to determine which bar code symbology can be scanned. This is equivalent to going into the Diagnostics application on the device and setting scanner options there. An **open:** event, **enterscreen:** (in Layout View) or **enter:** (in Field View) event script can be used to set up the allowed bar code symbology.
- A **scan:** event script can be used to take action when a bar code has been scanned.
- When you use a **scan:** event script, bar code data no longer goes into the current Text field automatically. Instead, the bar code value is placed into the **scandata** function, and the script can place the value in scandata into any Text field on the form.
  For example, the script:

```
scan:
 $4 = scandata
```

  places the scanned barcode into field 4 on the form.
- The **scantype** function stores the bar code symbology of the most recently scanned bar code. This is useful if you need to place one type of bar code into one field and another type of bar code into a different field.
- Scripts can be used to omit the display of leading/prefix and trailing/suffix bar code digits in certain bar code symbologies.
- See Chapter 13, *Scripting Reference*, page 209 for a complete list of scripting statements.

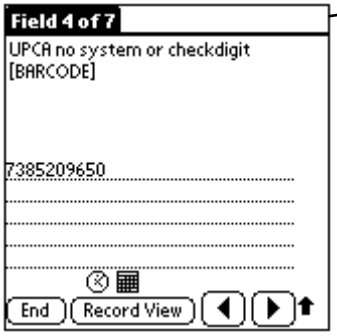
Sample Scripts for Controlling Bar Code Symbologies


```
open:
 scanner disable all
 scanner enable UPCA
```

The **open:** event here means that when any record on the form is opened (a newly created record or an existing record), the scanner will be set to disable all symbologies except for UPCA.

The **open:** event is triggered when entering the form in Layout View, Field View or Record View.

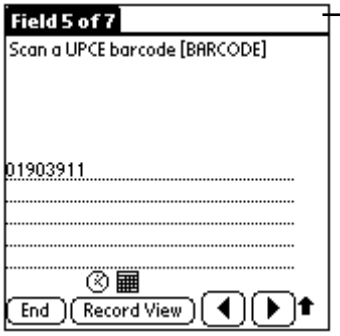
The **scanner disable/enable** scripting statement is described in detail on page 264.




```
open:
 scanner no_preamble UPCA
 scanner no_checkdigit UPCA
```

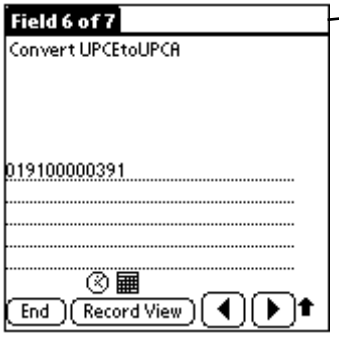
The script here sets the scanner to omit the prefix and suffix characters of the bar code. Once set, these settings apply to all fields and to all records, unless another script changes these settings.

The **scanner no_preamble / no_checkdigit** scripting statement is described in detail on page 265.




```
open:
 scanner disable all
 scanner enable UPCE
```

This script enables only UPCE bar codes to be scanned.




```
enter:
 scanner UPCETOUPCA enable

exit:
 scanner UPCETOUPCA disable
```

The **enter:** event of this script enables conversion from the shorter UPCE code to a longer UPCA format. (See page 263 for a description of the bar code conversion scripting statement.)

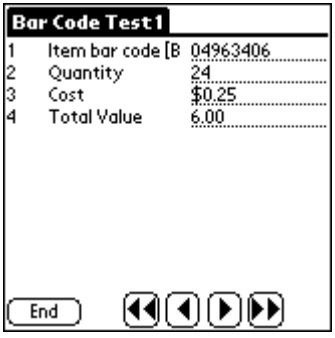
As with all bar code settings, once a conversion is switched on, it applies globally to all fields, all records, all applications.

To switch off the conversion of UPCE to UPCA, so that it does apply to other fields on the form, an exit: event is used.

This script is designed for use in Field View. In Layout View, an **enterscreen:** event and an **exitscreen:** event would be used instead of an enter: and exit: event.

Scanning from any field on a form

The default behavior of Pendragon Forms is that you can scan a bar code into a Text field only if the cursor is present in the Text field.



When a new record is created in Layout View or Record View, the cursor is automatically placed in the first Text, Numeric or Currency field on the form.

If the bar code field is the first field on the form, as shown at left, then when the handheld user creates a new record, a bar code can be scanned without the user having to position the cursor.

An alternative to making a bar code field the first field on the form is to use a **scan:** event script. When a scan: event script is used, the scanned barcode is placed in the **scandata** function, not in any particular field. The value of **scandata** can then be assigned to any Text field on the form by the **scan:** event script.
A scanned bar code can be up to a maximum of 255 characters by default, or up to 2000 characters if you set the Max Length (see page 161) of the Text field to 2000 before you freeze the form.

In the example shown at left, the bar code field is in Field 2. The following script is used in Field 2 to control what happens when the handheld user scans a bar code:

```
scan:
 $2 = scandata
```

The **scan:** event overrides the default behavior of Pendragon Forms, which would have been to place the scanned bar code in Field 1, where the cursor is.

Instead, the scan: event stores the bar code in the scandata function, and the statement `$2 = scandata` then places the bar code into Field 2. With this scan: event script, the handheld user can perform a scan from any field on the form, and the bar code will be placed in Field 2.

Repeating Forms

Bar code applications are useful for capturing large quantities of data quickly. Scanning a bar code is ergonomically more efficient than writing a text string. In the case of inventory applications, the goal is to minimize the number of pen taps that the handheld user has to enter. This includes copying data from one record to another if appropriate, and eliminating the need to tap the End button between records.

If most of the data on a form is the same for many records at a time, the **clone** statement can be used in a **scan:** event script to create a new record based on the existing record. Clone ends the current record, then creates a new record with the same values as the previous record. Fields that are not the same from one record to the next can be set to null on the new record.

Bar Code Clone Example 1:

The form at left is used for taking inventory. Once the handheld user has entered the date, building location and room number, these values do not need to change until all the items in a given room have been scanned.

The script in Field 4 is:

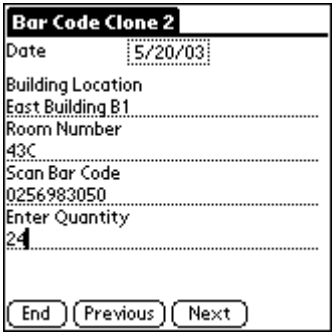
```
scan:
 if answer = null then
  answer = scandata
 else
  clone
  beep
  answer = scandata
 endif
```

On the very first record that the handheld user enters, the user fills in fields 1, 2 and 3 and then scans the bar code. Since Field 4 is initially blank (null), the first part of the If...Then...Else statement is true, and the scanned bar code is placed in Field 4.

If the handheld user then scans another bar code, Field 4 of the current record is not null. Therefore, the 'Else' part of the If...Then...Else...Endif statement runs. The **clone** statement ends the current record and makes an exact copy of the record, so that Fields 1, 2, and 3 are retained on the new record. The remainder of the script after the Clone statement runs on the new record, so that Field 4 of the new record is assigned the value of the second bar code. The beep statement is added to alert the handheld user to the fact that a new record has been created.

The handheld user can continue creating new records each time a bar code is scanned. Tapping the End button after a scan will allow the user to exit the form.

Bar Code Clone Example 2:




```
scan:
 if $1 = null then
  msgbox "Missing Date"
  return
 endif

 if $2 = null then
  msgbox "Missing Building location"
  return
 endif

 if $3 = null then
  msgbox "Missing Room number"
  return
 endif

 if $4 = null then
  $4 = scandata
  goto 5
 endif

 if $5 = null then
  $4 = scandata
  msgbox "You re-scanned into same
         record. Enter a quantity before
         you scan again."
  return
 else
  clone
  beep
  $4 = scandata
  $5 = null
 endif
```

When the handheld user first scans a bar code, a check is made to see if Fields 1, 2 and 3 have been filled in. If any of these fields is empty, a message is displayed and the **return** statement ends the script.

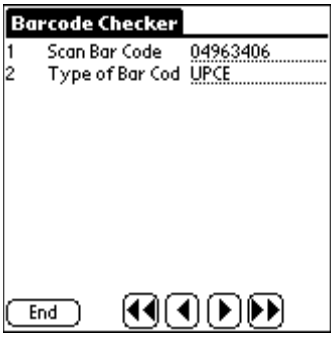
If Fields 1, 2 and 3 have been filled, a check is made to see if Field 4 already contains a bar code. If Field 4 is empty, the bar code is placed into Field 4, and the handheld user can then enter a Quantity in Field 5.

If the handheld user scans again, a check is made to see if a quantity has been entered into Field 5. If Field 5 is empty, it is assumed that the handheld user wants to stay on the same record, and have the current bar code replace the previously scanned bar code. The user might want to scan into the same record if an incorrect bar code was scanned.

If Field 5 contains a Quantity, the next scan will clone the current record, and place the newly scanned bar code into Field 4 of the new record. Field 5 of the new record is cleared to receive the new quantity. The user can keep scanning to create new records, or tap End to end the form.

Checking the Type of Bar Code Scanned

The **scantype** function stores the bar code symbology of the most recently scanned bar code. This can be used to check the type of bar code that you are scanning.



In the example shown at left, scanning a bar code in any field places the bar code into Field 1, and displays the bar code symbology in Field 2.

The script in Field 1 is:

```
scan:
 answer = scandata
 $2 = scantype
```

Valid bar code symbologies that the Scantype function can receive are:

CODE39	I2OF5	MSI_PLESSEY
UPCA	CODABAR	UPCE1
UPCE	CODE128	
EAN13	CODE93	BOOKLAND_EAN
EAN8	TRIOPTIC39	ISBT128
D25	UCC_EAN128	COUPON


```
open:
 scanner disable all
 scanner enable UPCA
 scanner enable BOOKLAND_EAN

scan:
 result = scantype
 if result = UPCA then
  answer = scandata
 else
  $2 = scandata
 endif
```

In the form shown above, an **open:** script in Field 1 configures the laser scanner to accept only UPCA and Bookland EAN symbologies. The handheld user can scan into any field, and if the bar code is a UPCA code, the scan: event script places the bar code in Field 1. If the bar code is Bookland EAN, the script places the bar code in Field 2.

Performing Reference Lookups

In some inventory applications, you may already have a list of inventory items on the PC, and you need to place these records on the handheld for the user to verify whether the listed inventories match the actual quantities in the warehouse.

There are two approaches that can be used with Pendragon Forms:

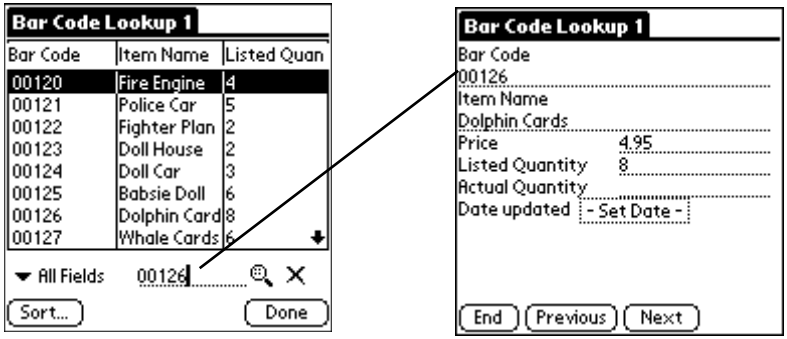
a) You can put the records in a form on the handheld, and the user can select a record to update it.

b) You can put the records in a reference form on the handheld, and the user can use another form to perform a lookup to the reference form and copy data from the reference form into the current form. The reference form can be just another form, or it can be a read-only reference form if you have more than 2000 records.

Example 1: Looking up Records within a single form

If you have a small enough number of items, you can create and freeze a Pendragon Form, then import the inventory data into the Forms Manager database table that has been created to store records associated with that form. (See page 206 for importing data.) When the records are sent to the handheld, the user can tap the name of the form and then tap the Review button to see the list of records.

Tapping on the name of the form and then tapping the Review button will display the records on the Review screen. Scanning a bar code on the Review screen will display the corresponding record, assuming that all the bar codes are unique. The user can update the record.



If more than one record matches the bar code (that is, if the bar codes are not unique), then the user will see a list of matching records and can select one.

If the bar code scanner is not working, the user can write in the field at the bottom of the Review screen, and tap the magnifying glass icon to perform the filter to find the matching record(s).

Example 2: Looking up Records from a Reference form

Another approach to sending records to the handheld is to use two forms: one form acts as a reference form and contains, for example, a record for each inventory item. The second form is the form that the user fills in. When the user scans a bar code, a matching record in the reference form is copied into the current form.

There are two types of reference form that you can create:

- A regular form that is acting as a reference form.
- A read-only reference form. Typically you would use a read-only reference form if you have a lot of records (for instance, more than 2000 records). A read-only reference has more restrictions than a regular form (e.g: only Text and Numeric fields are allowed, and Text fields have to be set to the smallest possible Maximum Length), but can be fast for doing lookups. See page 98 for details on how to create a read-only reference form.

Since two forms are being used to perform the lookup, there are two steps involved: Step 1 is to create the reference form, and Step 2 is to create the form that is doing the lookup.

Step 1: Create the reference form

First create the reference form that will store all the inventory records. As mentioned above, the form can be a regular form or it can be a read-only reference form.

Here the reference form contains three fields:
Item Bar Code (the primary key field)
Item Name
Quantity in Stock.

The reference form can be frozen, and then populated with records. You can either import data into the database table from an ASCII file (see page 206), or you can click on the name of the form in the Forms Manager, then click the Edit/View button, and manually enter the records.

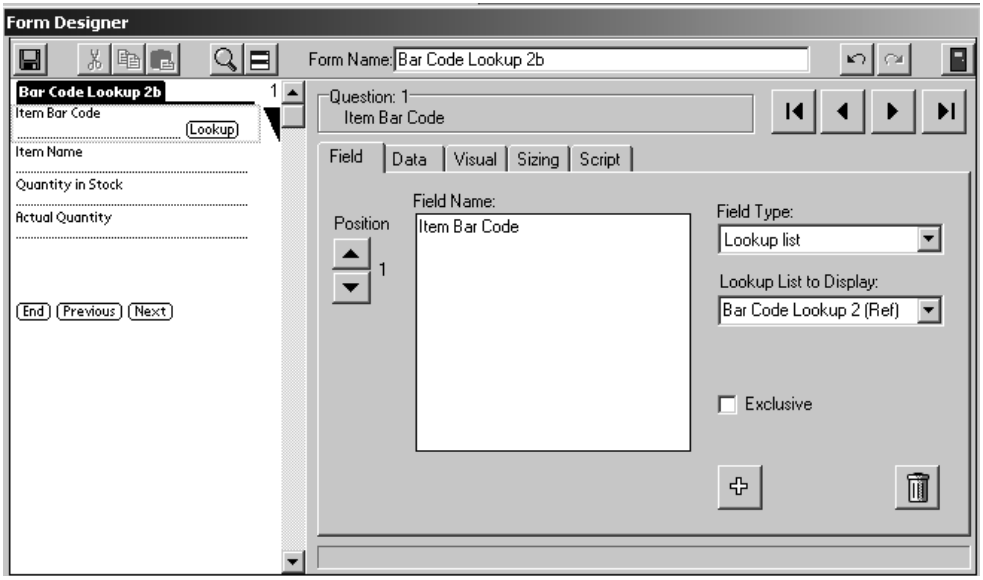
Step 2: Create the form to do the lookup to the reference form

The form that is going to perform the lookup to the reference form can be set up to do the lookup in two ways: programatically, when the user scans a bar code, and manually if the bar code scanner is not working.

For fields to copy from the reference form into the current form, the field names and field types have to be identical. The one exception is that a Text field on the reference form can copy into a Lookup List field on the current form, and this is how the manual lookup is made possible.

In the form shown below, the Item Bar Code field is a Lookup List field. In the Lookup List to Display field, instead of picking a Lookup List, type the name of the reference form.

If the bar code scanner is not working, the user can tap the Lookup button and see a list of records in the reference form. Selecting a record copies all the matching fields from the reference form to the current form. In this example, the matching fields are Item Bar Code, Item Name and Quantity in Stock, which match the reference form created on the previous page.



To make it possible to automatically perform the lookup to the reference form when the user scans a bar code, a **scan:** event script is added to field 1, the Item Bar Code field.

A **lookup...within** statement performs the lookup to the named reference form. The default is that a lookup...within statement does the lookup based on the **Display Key** field of the reference form. The default Display Key field is the first field on the form. If you do not want to perform the lookup based on the Display key field, use the **keycolumn** statement to select which column of the reference form should be used for the lookup.

```
scan:
 if $1 = null then
  $1 = scandata
  lookup $1 within "Bar Code Lookup 2 (Ref)"
  goto 4
 endif

 if $4 = null then
  $1 = scandata
  $2 = null
  $3 = null
  lookup $1 within "Bar Code Lookup 2 (Ref)"
  msgbox "You re-scanned into same record.
     Enter a quantity before you scan again."
  return
 else
  clone
  $1 = scandata
  $2 = null
  $3 = null
  $4 = null
  lookup $1 within "Bar Code Lookup 2 (Ref)"
 endif
```

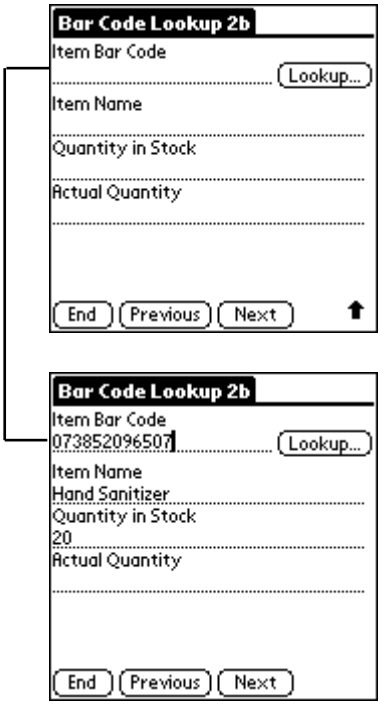
The above script is in field 1of the form that is doing the lookup to the reference form. When the handheld user creates the first record, field 1 (the Bar Code field) is null. The script therefore places the bar code into field 1. The statement

`lookup $1 within "Bar Code Lookup 2 (Ref)"`

performs the lookup to the reference form named Bar Code Lookup 2 (Ref), and copies all fields that match from the reference form into the current form. This fills in the Item Name (field 2) and Quantity in Stock (field 3) for the corresponding Item Bar Code. The handheld user can then fill in field 4, the Actual Quantity in Stock.

If the user does not fill in field 4, and instead scans another bar code, it is assumed that the user wants to overwrite the same record. If the user does fill in field 4 and then scans another bar code, it is assumed that the user wants to create a new record. The **clone** statement creates the new record, and another lookup...within statement looks up the new bar code against the reference form.

If the handheld user scans a bar code that in not in the reference form, the lookup...within statement will not find a match, and fields 2 and 3 will remain blank. The user can then enter this information manually.



With the bar code scanner, the user can repeatedly scan a bar code, find a match and update the actual quantity. Scanning again automatically creates a new record.

If the bar code scanner is not working, the user has to do a manual lookup. After finding a match and updating the actual quantity, the user has to manually tap the End button to end the record, and then tap the New button to create a new record to select again.

NOTE:
In this example, the user never updates the Quantity in Stock on the reference form. All the updates are being entered in the form that is doing the lookup. In this scenario, it is the responsibility of the administrator for the Forms program to update the reference form before the next inventory audit.

It is possible to programatically update the data in a reference form (but NOT a read-only reference form). See page 376 for an example.

Scanning Multiple Bar Codes into the Same Record

Here is a simple example of a form that places three different bar codes into three different fields. The first scanned bar code goes into field 3, the next into field 4, etc.
This example has no error checking to ensure that the correct bar code is scanned first. If different bar code symbologies were used, the **scantype** function could be used to verify that the correct bar code is placed in the correct field (see page 316).


```
scan:
 if $3 = null then
  answer = scandata
  return
 endif

 if $4 = null then
  $4 = scandata
  return
 endif

 if $5 = null then
  $5 = scandata
  return
 endif
```

Troubleshooting Bar Codes

Check the following if you are not having success with scanning a barcode:

With the SPT 1550 / SPT 1800 series, check the following:

- Verify that the scanner is enabled and the bar code that you are scanning is enabled in the Diagnostics program. (Tap the Applications button, then tap the Diag icon.)
  On a CSM 150 module, tap the Symbol CSM icon, then tap Test Scan, then tap Configure.
- Check that the handheld has sufficient battery power. If the battery is too low, the scanner will not work.
- Is there a script on your form that is altering how the scanned bar code is displayed? Remember that bar code scanner settings are global, and once set in a specific way in one field, will apply to all fields unless another script changes the settings.
- Is the scanner being held too close to the bar code? Sometimes if you move the handheld further away from the bar code, the scanner beam widens and can read the bar code.
- Is the surface material of the bar code shiny? If yes, you may have to hold the handheld at an angle to the bar code surface for the scan to register.

16. Printing from the Handheld

You can print via the handheld serial port to a serial printer, or print via the infrared port to a printer with infrared capability.

Serial Port Printing

The capability exists to print to a serial RS-232 printer, including the Monarch 6015 printer, which is designed for use with the Palm III and Symbol Technologies SPT family of handheld devices.

Pendragon Forms defaults to serial communications parameters of 9600-N-8-1,
meaning 9600 baud, No parity, 8 data bits and 1 stop bit.

If your serial printer uses different serial communications settings - (for example, the Monarch 6015 uses 19200-N-8-1) - then you can either use additional printer driver software on the handheld, or you can send data to the printer via a Transmit Serial scripting statement.

Infrared Printing

Printing via the handheld's infrared port requires additional printer driver software on the handheld (see below). You can print to most infrared-capable printers.

Printer Driver Software

Pendragon Forms supports two printer driver products for the Palm OS:

- PrintBoy software from www.bachmannsoftware.com
- PalmPrint™ software from www.stevenscreek.com

If you want to print via infrared, you will need to use one of these products on the handheld. Both Bachmann Software and Stevens Creek Software offer demo versions of their printer driver software, that you can download from their respective Web sites.

Refer to the printer driver documentation for installation instructions.

Using Scripts to Control Printer Output

Pendragon Forms uses scripts to allow you to control how a form prints directly from the handheld.

All the scripting event procedures, statements and functions that are mentioned in this chapter are described in detail in Chapter 13, Scripting Reference, starting on page 209.

Creating scripts for printing is a two-stage process:

1. Create **report:** event scripts to specify what the printer output will look like. If you are printing from a parent form and a subform, you may also need **report2:** event scripts.
2. Create a Button field with a **click:** event script with a **printreport** statement to trigger when the printing occurs.

It is best to add a button field to your form design, to allow the handheld user to control printing by tapping a button. That way the handheld user can check that the printer is switched on and has sufficient paper before attempting to print. (There is alternatively a Menu option for printing if you are in Record View, but this option does not work with the PalmPrint printer driver.)

Step 1: Create report: and report2: event scripts

A **report:** event script specifies the layout of the printer output from the handheld.

Pendragon Forms controls printer output by appending lines of characters to a file in the handheld's memory. Every line is composed of characters with fixed width. Most letter-sized printers - (printing on 8.5" x 11" paper) - will use a Courier font that provides 80 characters per line (also called an 80-column format), and 54 lines per page. Other printers, such as receipt printers, may provide fewer characters per line but have no specific number of lines if the paper is dispensed from a roll. You will need to refer to your printer specifications to know exactly how many characters you can use per line, and whether there is a specific number of lines per page.

If you imagine the paper of your report as a grid that is 80 columns wide and 54 rows (lines) long, the purpose of **report:** events is to start from the first column of the first line, and to specify what characters to print on each line, starting at what column location.

report: events run in sequence, meaning that a report: event in field 1 of your form will run first, followed by a report: event in field 2, etc. Since each script cannot exceed more than 2000 characters, it is a good idea to break up the layout of the report into several **report:** events.

If you are printing a report for a parent form and a subform, all the **report:** events on the parent form will run, followed by all the **report:** events on each of the subform records that is associated with the parent record. If there is additional information on the parent form that you want to print after printing the subform records, use **report2:** events instead of **report:** events on the remainder of the parent record.

Several scripting statements are used in **report:** events and **report2:** events to enable you to specify the report layout. These statements are described in detail in Chapter 13, *Scripting Reference*, which starts on page 209.

printleft *value column* — Prints left-justified text in the value specified, starting in the column specified.

printright *value column* — Prints right-justified text in the value specified, ending at the specified column.

printline — Sends the current line to the end of the current report in the handheld's memory. A **printline** statement is needed to actually print a line of text. To create a blank line, use two printline statements in a row.

printmemo *value* **"***startcolumn***:***endcolumn***:***maxlines***"** — Used to word wrap a block of text in a Text field, in the case where a Text field contains more than one line.

printnewpage — Sends the current page to the printer, then begins a new page. To know when to begin a new page, use the **pagenum** and **linenum** functions (see page 218).

format *value* **{date | time | datetime | currency | fixed}** — Date, Time and Date & Time fields are all stored internally as the number of seconds since 1/1/1904. Currency fields are stored as a number of cents. In order to print these types of fields, they need to be formatted first. The format command stores the formatted value in the **result** variable.

The examples that follow in this chapter will illustrate the use of these scripting statements.

Step 2: Create a Button field with a printreport statement

To run the **report:** and **report2:** scripting events, your form will need a Button field with a **printreport** statement.

printreport *name* {**serial | IR**}

Triggers report: and report2: events.
The *name* specified is placed in the reportname function, and can be used in an if...then...else...endif statementin the report: script, to print different types of reports. If you only have one report t print, you can use the word VIA as the report *name*.
serial means printing via the handheld serial port, and **IR** means printing via the handheld infrared port.

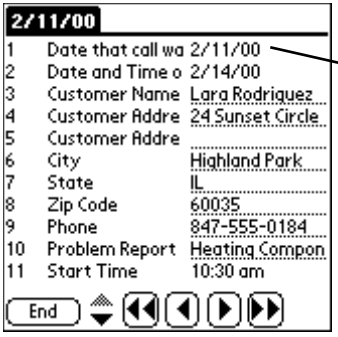
The script in the Button field might look like:

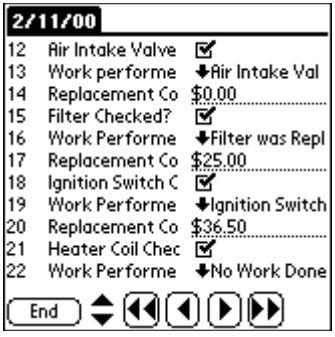
```
click:
 printreport via IR
```

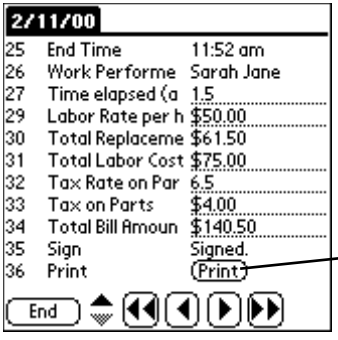
The examples that follow in this chapter will illustrate click: event scripts and printreport statements.

Printing a Single Form

Here is an example of an invoice form that can be printed directly from the handheld. Three **report:** events in Fields 1, 2 and 3 are used to control the printer output. The script that actually initiates the printing is in a **click:** event in the last field on the form - a Print button. See page 329 for a sample of the printer output.







This is the script in Field 1:

```
report:
printleft "SuperQuick Maintenance" 30
printline
printleft "22 Cherry Street, Mytown, IL 60048" 20
printline
printline
printline
printleft "Date of Customer Work Request:" 1
format $1 date
printleft result 35
printline
printleft "Customer Name:" 1
printleft $3 20
printline
printleft "Customer Address:" 1
printleft $4 20
printline
if $5 <> null then
printleft $5 20
printline
endif
printleft $6 20
printline
printleft $7 20
printleft $8 24
printline
printleft $9 20
printline
printline
printline
printleft "Problem Reported:" 1
printline
printleft $10 10
printline
printline
```

The script in the Button field to trigger the report events is:

```
click:
printreport via IR
```

This is the script in Field 2:

```
report:
printleft "Date of Technician's Visit:" 1
format $2 datetime
printleft result 30
printline
printline
printline
printleft "Item" 1
printleft "Checked?" 20
printleft "Work Performed" 30
printright "Replacement Cost" 80
printline
printline
printleft "Air Intake Valve" 1
printleft $12 24
printleft $13 30
format $14 fixed
printright result 80
printline
printline
printleft "Filter" 1
printleft $15 24
printleft $16 30
format $17 fixed
printright result 80
printline
printline
printleft "Ignition Switch" 1
printleft $18 24
printleft $19 30
format $20 fixed
printright result 80
printline
printline
printleft "Heater Coil" 1
printleft $21 24
printleft $22 30
format $23 fixed
printright result 80
printline
printline
printleft "Technician's Comments:" 1
printline
printleft $24 10
printline
printline
```

This is the script in Field 3:

```
report:
printline
printline
printleft "Technician Name:" 1
printleft $26 18
printleft "Hours Worked:" 38
printleft $27 53
printleft "Labor Cost:" 57
format $31 currency
printright result 80
printline
printline
printleft "Total Replacement Parts Cost" 39
format $30 currency
printright result 80
printline
printleft "Tax rate " 39
printleft $32 48
printleft "% on Parts" 53
format $33 currency
printright result 80
printline
printline
printleft "Total Amount to Pay:" 39
format $34 currency
printright result 80
printline
printline
printleft "Customer Signature: _____"
20
printline
```

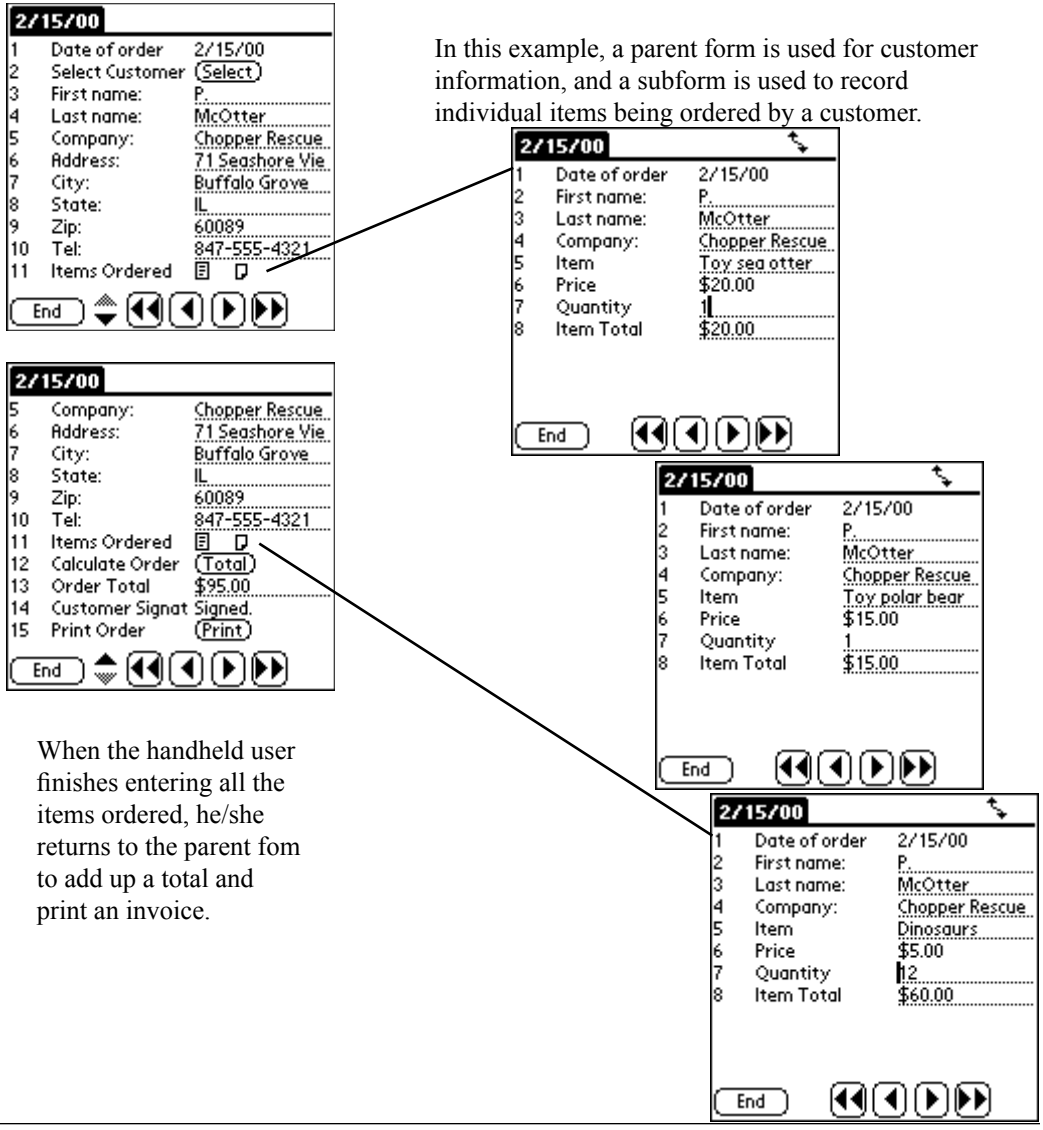
Note: Signature fields do not print out the signature that the customer enters on the handheld. Instead, you can print text on a report to add a place on the report where the customer can sign on paper in addition to signing on the handheld.

Here is a sample printout:

```
                          SuperQuick Maintenance
                   22 Cherry Street, Mytown, IL 60048


Date of Customer Work Request:     2/11/00
Customer Name:     Lara Rodriguez
Customer Address:  24 Sunset Circle
                   Highland Park
                   IL 60035
                   847-555-0184


Problem Reported:
         Heating Component seems broken. Hearing a loud noise and no heat.

Date of Technician's Visit:  2/14/00


Item                Checked?   Work Performed                    Replacement Cost

Air Intake Valve        Y      Air Intake Valve Cleaned                      0.00

Filter                  Y      Filter was Replaced                          25.00

Ignition Switch         Y      Ignition Switch Replaced                     36.50

Heater Coil             Y      No Work Done - Heater Coil OK                 0.00

Technician's Comments:
        Left unit in working condition. All replaced parts under warranty.


Technician Name: Sarah Jane          Hours Worked:  1.5 Labor Cost:        $75.00

                                     Total Replacement Parts Cost:         $61.50
                                     Tax rate 6.5  % on Parts               $4.00

                                     Total Amount to Pay:                 $140.50

                   Customer Signature: _____________________________
```

Printing a Parent and Subform

If you are using a parent form and a subform, a **printreport** statement on the parent will trigger all the **report:** events on the parent to run, followed by all the **report:** events on the subform. (The parent form must have a Subform field for this to work.) If you have additional information that you want to print from the parent after the subform records have printed, you can use a **report2:** event on the parent.



```
report:
printline
printleft "Amazing Stuff" 35
printline
printleft "9400 W. Deerfield Rd., Suite 15, Libertyville IL 60048" 20
printline
printleft "847-555-4567" 35
printline
printline
printline
printleft "Order Date:" 1
format $1 date
printleft result 12
printline
printleft "Customer Name:" 1
result = $3 & " "
result = result & $4
printleft result 16
printline
printleft "Company:" 1
printleft $5 16
printline
printleft "Address:" 1
printleft $6 16
printline
printleft $7 16
printline
printleft $8 16
printleft $9 28
printline
printleft "Phone:" 1
printleft $10 8
printline
printline
printline
printleft "Item Ordered" 1
printleft "Qty" 20
printleft "Price" 25
printright "Total" 50
printline
printline
```

A **report:** event script in field 1 of the form design is used to set up the 'header' of the printed report.

After the 'header' is printed, all of the subform records are printed using a **report:** event on the subform, as shown on the next page.

```
report:
if linenum >= 48 then
printline
printline
result = "Page " & pagenum
printleft result 1
printline
printnewpage
format $1 date
printleft result 1
printline
printleft "Customer Name:" 1
result = $2 & " "
result = result & $3
printleft result 16
printline
printleft "Company:" 1
printleft $4 16
printline
printline
printleft "Item Ordered" 1
printleft "Qty" 20
printleft "Price" 25
printright "Total" 50
printline
printline
endif

printleft $5 1
printleft $7 20
format $6 fixed
printright result 30
format $8 fixed
printright result 50
printright pagenum 59
printright linenum 69
printline
printline
```

This is the **report:** event in field 1 of the subform.

The `if linenum >= 48` then statement checks whether the printed report has passed line 48. If yes, then the page number is printed at the bottom of the page.

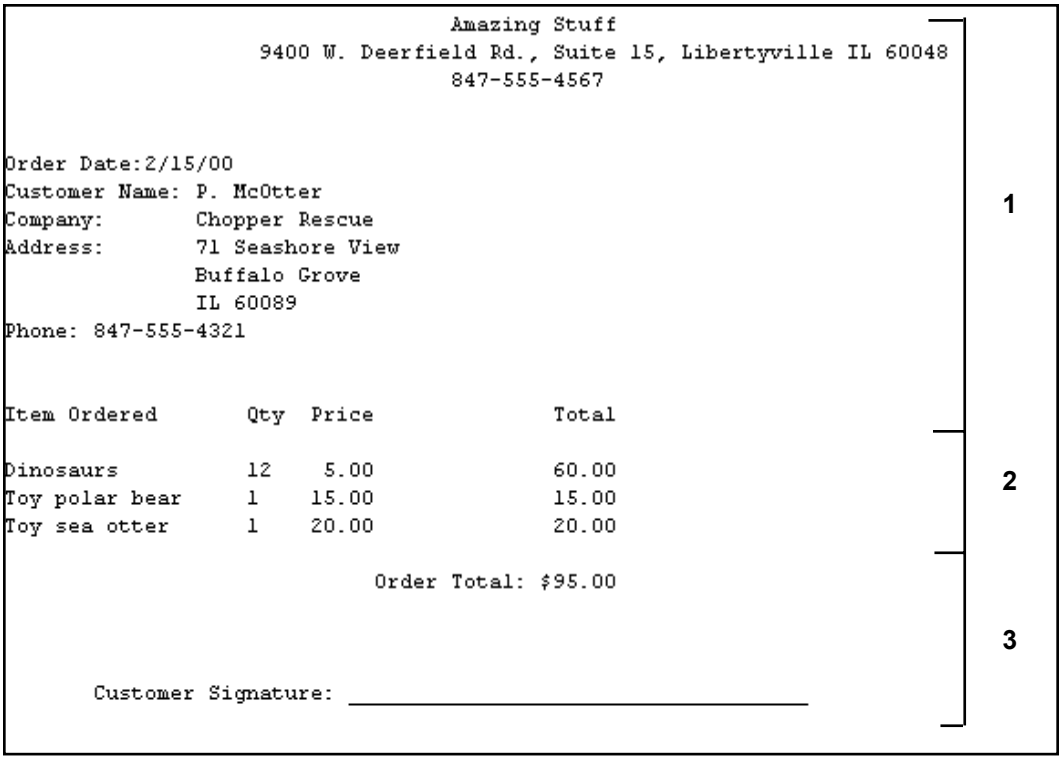
The `printnewpage` statement then starts a new page, and some header information such as the Customer Name and Company name are repeated at the top of the new page. The headers for the columns Item Ordered, Qty, Price and Total are also repeated on the new page.

This section is the main part of of the printed report for the subform. It prints the actual Item, Quantity, Price and Total from individual subform records.

To print the 'footer' of the report after all the subform records have been printed, a **report2:** event is used in field 2 of the parent form. The **report2:** event only runs after all the **report:** events on the subform records have been run.

```
report2:
printline
printleft "Order Total:" 30
format $13 currency
printright result 50
printline
printline
printline
printline
printleft "Customer Signature: _____"
8
printline
```

Here is what the printed report looks like:



```
                              Amazing Stuff
                  9400 W. Deerfield Rd., Suite 15, Libertyville IL 60048
                              847-555-4567


Order Date:2/15/00
Customer Name: P. McOtter                                                  1
Company:       Chopper Rescue
Address:       71 Seashore View
               Buffalo Grove
               IL 60089
Phone: 847-555-4321


Item Ordered       Qty  Price              Total

Dinosaurs          12    5.00              60.00                           2
Toy polar bear     1    15.00              15.00
Toy sea otter      1    20.00              20.00

                              Order Total: $95.00

                                                                           3
      Customer Signature: _____________________________________
```

Section 1 was printed with the **report:** event in Field 1 of the parent form.

Section 2 was printed with the **report:** event in Field 1 of the subform.

Section 3 was printed with the **report2:** event in Field 2 of the parent form.

Printing a Block of Text

A Text field can contain up to 255 characters, and can be set to contain up to 2000 characters. By default, printing a Text field will only fill the current line, and will then truncate the remainder of the field. In order to accomodate printing the full contents of a Text field, you can use the **printmemo** statement in a **report:** event.

Here is what the printmemo statement might look like:

```
report:
printline
printleft "Problem Reported:" 1
printline
printmemo $10 "10:70:3"
printline
printline
```

The format of the **printmemo** statement is:

```
printmemo value "startcolumn:endcolumn:maxlines"
```

In the sample script shown above, the statement

```
printmemo $10 "10:70:3"
```

prints Field 10, starting in column 10 and ending in column 70, for a maximum of 3 lines.

Sample report output is shown below.

```
Problem Reported:
          Customer is hearing a rattling sound and the heater comes on
          too hot, and then switches off for too long a time.
```

Printing a Multi-Selection List Field

Multi-Selection fields are a special case in Pendragon Forms, because internally these fields are not stored as text, they are stored as a binary number, with each bit representing one of the possible selections in the list.

In this field, there are 6 options in a Multi-Selection list, and so six bits are used to store the value of each checkbox in the list:

Bit position: 32 16 8 4 2 1
Option: Orange Purple Green Yellow Blue Red

If Blue, Green and Purple are selected, the internal number is stored in binary as: 011010.

The AND operator can be used in a script to identify if a bit in a Multi-Selection field is set. For example, in the field shown above (Field 2), the option Purple is in bit position 16. If the AND operator is used to combine the value in Field 2 is combined with the number 16, the result will be 16 if the bit is set. For example:

```
result = $2 and 16
```

will contain the value 16 if bit position 16 is set, and will contain the value 0 if bit position 16 is not set.

If you need to print output similar to this, a sample script is shown on the next page:

```
Pick the colors that you like:
Red [ ]  Blue [X]   Yellow [ ]   Green [X]   Purple [X]   Orange [ ]
```

```
report:
printleft "Pick the colors that you like:" 1
printline

printleft "Red [" 1
result = $2 and 1
if result = 1 then
printleft "X]" 6
else
printleft " ]" 6
endif

printleft "Blue [" 10
result = $2 and 2
if result = 2 then
printleft "X]" 16
else
printleft " ]" 16
endif

printleft "Yellow [" 22
result = $2 and 4
if result = 4 then
printleft "X]" 30
else
printleft " ]" 30
endif

printleft "Green [" 35
result = $2 and 8
if result = 8 then
printleft "X]" 42
else
printleft " ]" 42
endif

printleft "Purple [" 48
result = $2 and 16
if result = 16 then
printleft "X]" 56
else
printleft " ]" 56
endif
printleft "Orange [" 62
result = $2 and 32
if result = 32 then
printleft "X]" 70
else
printleft " ]" 70
endif

printline
```

Here is the script in field 1, which is triggered by a **printreport** statement in a Button field elsewhere on the form.

In the report, the text `Red [` is printed first.

The statement
`result = $2 and 1`
does a bitwise comparison with bit position 1 to see if the checkbox for Red has been selected.

If the result = 1, then Red is selected, and the text `X]` is printed to place an X in the box for Red.

If the result is not equal to 1, then a blank space and the closing bracket `]` is printed.

`Red [X]` will be printed if Red has been selected.
`Red [ ]` will be printed if Red has not been selected.

Similarly, tests are done to see if:
Blue in bit position 2,
Yellow in bit position 4,
Green in bit position 8,
Purple in bit position 16 and
Orange in bit position 32
have been selected.

The **printline** statement at the end sends the entire line to be printed.

The script in the Button field that triggers the report: event to run looks like:

```
click:
 printreport via IR
```

17. Working with Images

New in Forms 4.0. Pendragon Forms 4.0 supports the use of images in two ways:

- **Decorative (Static) Images**
  Decorative images are part of a form design, and are used to illustrate type of questions on a screen, or used to create a custom main menu. For example, an image of a person can be used to show that the current screen contains information about a customer. Decorative images are also called static images, because the image is the same no matter what record the user is on.
- **Attached (Dynamic) Images**
  Attached images are different for every record. These images are not part of the form design, they are part of each record. For example, a form with a list of employees might have a picture of each employee. Attached images are also called dynamic images, because typically no two records have the same image.

Decorative (Static) Images

Since a decorative or static image is part of a form design, you select the image in the Form Designer window as you design the form.

Section fields are typically used for placing static images on a form design. Section fields do not store data, so the handheld user will not need to write anything into the field. You do not have to use Section fields, however: a decorative image can be added to any type of field.

Images that you use as static images in a form must not exceed 320 x 192 pixels in size, and must be .BMP (bitmap) or .JPG (JPEG) file types. The image file should not be more than 256 colors; image files that have more colors will be shrunk to 256 colors to fit on the handheld.

For detailed instructions on placing a static image into a Section field, see page 138.

Attached (Dynamic) Images

Attached (or dynamic) images are image files that are attached to records within Pendragon Forms.

Important: Only handheld devices that have an external storage media card can support attached images. This is because the image files are not stored in RAM on the handheld, they are stored on the external media card. Storage media cards include SD cards, MMC cards and SONY Memory Stick cards.

Your form design must contain an **Image field** in order to attach images to records. See page 122 for information on how to create an Image field on a form.

Only image files within these limitations will be visible from within Pendragon Forms:

Image File Type	.BMP (Windows bitmap file)
Maximum number of colors	256 colors (8-bit color depth)
Maximum Image dimensions for Low Resolution devices	160 x 128 pixels
Maximum Image dimensions for Hi Resolution devices	320 x 192 pixels
Maximum file size	60KB

If you want to use images that are .BMP, .GIF or .JPG file types, or are larger than the maximums listed above, you can use Pendragon Forms in conjunction with a third party application called AcidImage (version 2.5 or higher), which is an image viewing program for the PalmOS from a company called RedMercury LLC. The images would not be visible within Pendragon Forms, but tapping on a button in the Image field will run the AcidImage program to display the image. An evaluation version of AcidImage can be downloaded from Red Mercury at http://www.red-mercury.com.

Attaching Images to Records on the PC

In many instances, you may have all the images that you need on the PC already. For instance, if you are creating a form that contains pictures of employees, you may have all the employee pictures on your PC already.

If this is the case, you can create records in the Forms Manager on the PC, and import your image files into each record. See page 126 for more information on how to do this.

Attaching Images to Records on the Handheld

In some circumstances, you may be using a camera on the handheld itself to create the image file that you want to attach to a record. An example might be a home inspection form in which you want to take a picture of the house and attach that picture to the record you are filling in on the handheld.

Note: Handheld cameras typically take pictures that exceed the size and file type limits for being viewable from within Pendragon Forms. Therefore, you may need to use third party AcidImage software from http://www.red-mercury.com. You can jump from Pendragon Forms to view an image in AcidImage version 2.5 or higher, and exit AcidImage to return to Pendragon Forms.

There are two options for attaching an image file on an external storage media card to a Pendragon Forms record on the handheld:

1. Take the pictures and store them as .JPG files on the external media card. Then allow the handheld user to go into a Forms record and from there, pick a file on the card to attach to an Image field on the current record.
2. Use a Custom Control to allow the user to go into a Pendragon Forms record and take a picture while still in the record. A script in the Custom Control field attaches the image to the Image field of the record. Pendragon Forms 4.0 ships with a Zire 71 Camera Custom Control.

The approach that you use will depend on the hardware (handheld device) that you are using, and whether a Custom Control exists for that device. If a Custom Control does not exist for a device, use option 1. The two options listed above will be described on the pages that follow.

Before you create a form that uses images on an external storage media card, you will need to be familiar with how to take pictures with the handheld and store the pictures on the card in .JPG file format. For more information, refer to the documentation that comes with your handheld.

Option 1: Select a file on a card to attach to a record

To allow handheld users to select an image file on a card to attach to a Forms record, your form design will need two things:

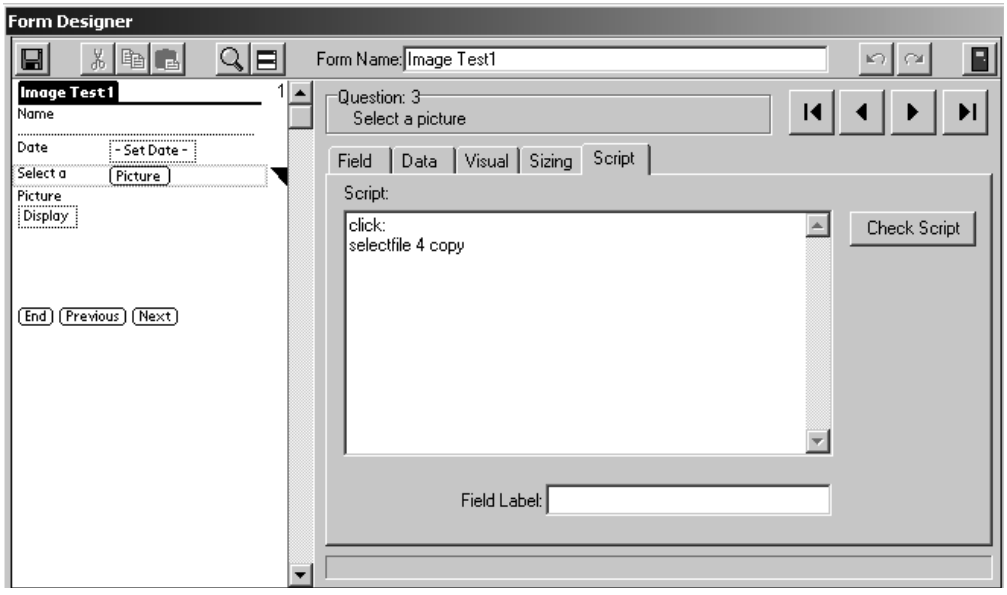
1. A Button field with a script that lets the user view the files on the external media card, and select a file to attach to the record.
2. An Image field for storing the filename of the file to attach.

The **selectfile** scripting statement (see page 271) allows the user to view the files on the media card, and select and attach the file to the Forms record.

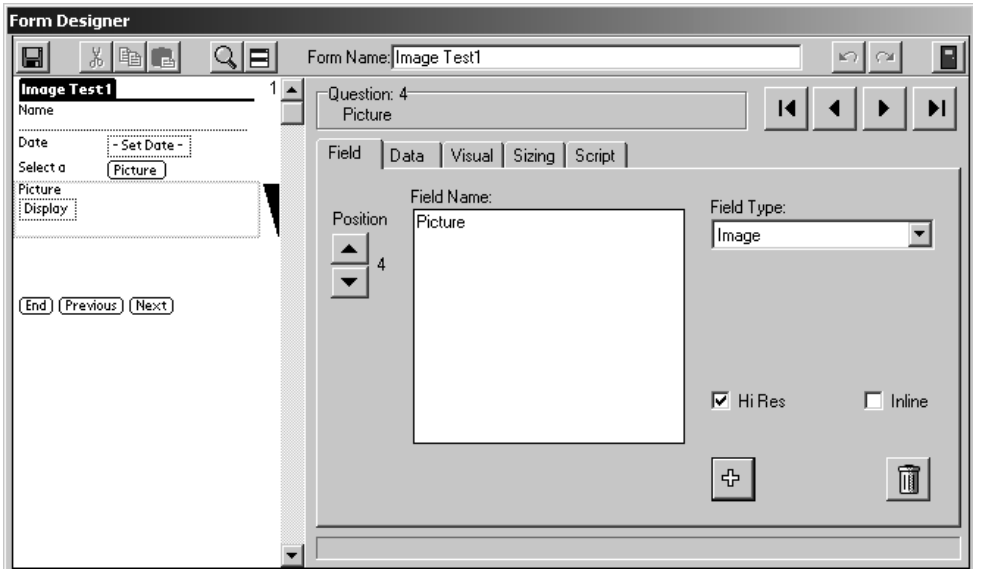
In the script shown below, field 3 is a Button field with a script, and field 4 is the Image field for storing the name of the attached file. The script in field 3 (the Button field) is:

```
click:
  selectfile 4 copy
```

The number after the word selectfile is the field number of the Image field. In this case, field 4 is the Image field. The **copy** parameter means that a copy of the image file is placed into a FORMS4 folder on the media card, and the original image file remains in its original folder on the card. This is the safest option to use, because it means that Pendragon Forms is not removing your original image file. There is also a **selectfile** *fieldnumber* **move** option, which moves the original image file to the FORMS4 folder on the media card, renames the file to the convention used by Forms, and deletes the original image file. This option uses less space on the card, but is not as redundant as **selectfile** *fieldnumber* **copy** because the original image file is deleted.



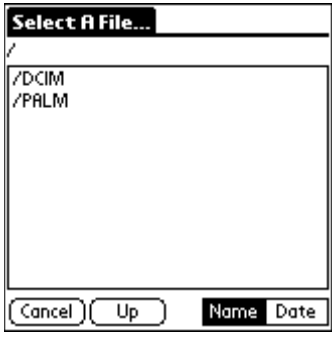
Since the image file type on the card is typically a .JPG file, the image willl not be viewable within Penrdragon Forms. Therefore, on the Image field in the Form Designer, do not check the Inline checkbox, as the image cannot be seen in the Forms record.

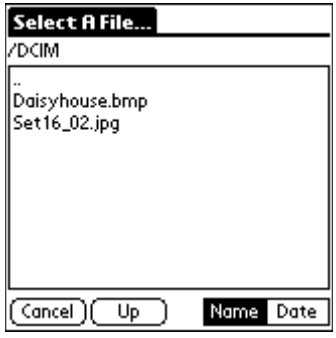


Selecting an Image on the Handheld

On the handheld, the user can tap the button (labeled Picture in this example) to bring up a list of folders on the card.

Typically, the DCIM folder contains camera images. Tap the DCIM folder to view its contents. Tap the name of an image to select it.





After an image file has been selected, the user returns to the Pendragon Forms record. Tapping on the Image/Object button displays an Image Detail screen. If the image is a small enough bitmap, it would be visible on this screen. In all other cases, if the AcidImage program is installed on the handheld, tapping the Viewer button runs AcidImage and displays the picture, as shown below. The Clear button erases the image from the record.

Option 2: Using the Zire 71 Camera Custom Control

Pendragon Forms 4.0 ships with a Custom Control that enables you to create a form in which the user can take a picture with the Zire 71 camera from within a Pendragon Forms record, and attach that picture to an Image field on the record. The Zire 71 must have a storage media card.

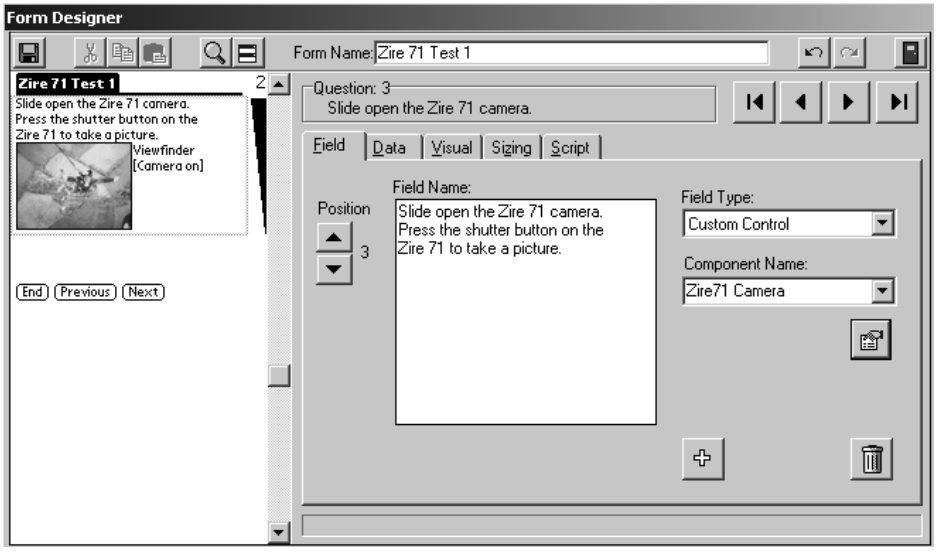
A Custom Control requires an extra program to be installed on the handheld in order for the Custom Control field to work. The name of the Zire 71 Camera Custom Control is FORMSZIRE71.PRC and is typically in the C:\Program Files\Forms3 folder on the PC.

For detailed information on using the Zire 71 Camera Custom Control, refer to the documentation for this custom control. To access the documentation, see page 130.

To allow Zire 71 handheld users to take pictures from within Pendragon Forms, your form design will need three things:

1. A Custom Control field that lets the user take a picture with the Zire 71 camera.
2. A script in the Custom Control field that lets the user attach the image file to an Image field on the form.
3. An Image field for storing the filename of the file to attach.

In the Form Designer window, create a Custom Control field. For the Component Name, select Zire71 Camera as the type of Custom Control to be used. The name of the field should typically give the user instructions to open the Zire71 camera, and to press the camera shutter when ready to take the picture. The picture will take several seconds to save, but the user can move the device once the image in the viewfinder is frozen. Only 1/4 of the image displays while saving.

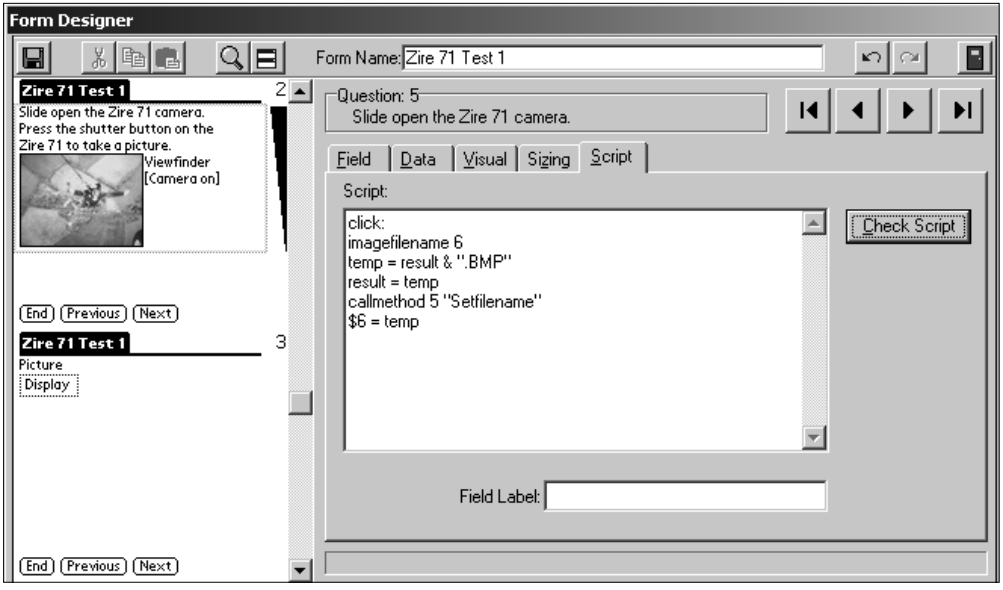


After the user has taken a picture, the Zire 71 Camera Custom Control stores the image file on the external storage media card in a /FORMS4 folder on the card, in a file named PFTEMP.BMP.
The file is always a bitmap file. The file name is always the same, and the file is **not** attached to the Forms record. A script in the Custom Control field is required to rename the file so that it can be attached to the record. (Image files require special file names to work in Forms - see page 128.)

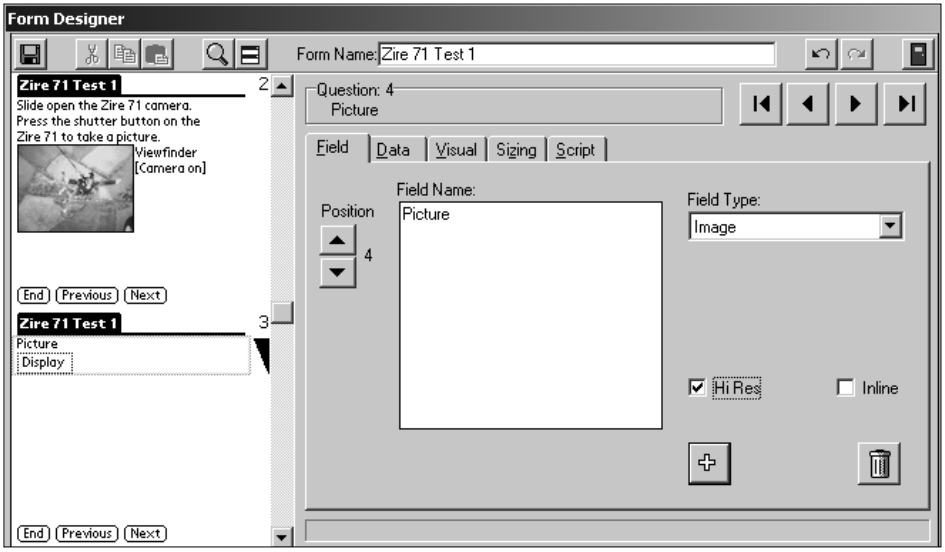
In the example below, field 5 is the Zire 71 Camera Custom Control field, and field 6 is the Image field for storing the name of the attached Image file. The script is written in field 5.

```
click:
 imagefilename 6
 temp = result & ".bmp"
 result = temp
 callmethod 5 "setfilename"
 $6 = temp
```

The statement **imagefilename 6** determines the corresponding file name (without a file extension) for field 6. The file name is placed in the **result** variable.
Since the file name has no extension, the statement **temp = result & ".bmp"** adds a **.bmp** file extension to the file name. **result = temp** places the correct file name with extension back into the **result** variable, so that it can be passed to the Setfilename method in the next line of the script.
callmethod 5 "setfilename" calls the Custom Control in field 5 and asks it to perform the method called "setfilename". This method renames the PFTEMP.BMP image file to the name in the result variable, which is the correct file name for being stored in field 6. See the documentation for the Zire 71 Camera Custom Control for information about the Setfilename method.
The statement **$6 = temp** actually attaches the image whose name is in temp, to field 6 of the current record.



Since the image file created by the Zire 71 camera is too large to be viewed directly from within Pendragon Forms, the Image Field that you create should have the Inline checkbox unchecked.



To be able to jump from Pendragon Forms to a view of the image, to confirm that the image looks correct, the user will need an additional third-party application called AcidImage, from a company called Red Mercury LLC. The Web site for downloading an evaluation version of AcidImage is www.red-mercury.com.

Synchronization Issues with Image Files

Image files are stored separately from Forms records. Forms records are stored in RAM on the handheld, and image files are stored on an external storage media card.

A Forms record with 20 fields might take up 10-20 KB. In contrast, a single attached image file might be on the order of 100-150KB. Image files are therefore much bigger than Forms records, and during synchronization, this means that a much larger amount of data has to be downloaded to the handheld if you are using image files. This causes synchronization to be slower.

One way to reduce synchronization time is to minimize the number of records with images that you keep on the handheld. Set a Data Persistence option (see page 165) that removes unnecessary records from the handheld during synchronization.

If images originate on the PC and they do not change frequently, there is an Advanced Form Property to Synchronize Only When Distributed. This works for forms such as a list of employees, with new employees being added only once a week or once a month. In this case, you can switch off synchronizing the form to shorten the synchronization time, and only switch on synchronization when a new record is added on the PC and the form is re-distributed. See page 188.

Important: Due to the large size of images, it is not recommended that you use images on devices that are synchronizing via a serial port, or on devices that synchronize via modems with speeds of less than 100Kbps (kilobits per second).

Saving Images out of the Forms Manager Database

After synchronization, if you are storing data in the Pendragon Forms Manager database, there are two ways to save the image files as separate files outside of the Forms Manager database.

Option 1: Saving from the Edit/View window

When you click on the name of a form in the Forms Manager and then click the Edit/View button to view the data, Image fields will contain the phrase Long Binary Data.

If the original image was a .BMP file or a .JPG file, then double-clicking the file will open the Windows Paint program (MSPaint.exe). The file will be displayed in Windows Paint with the file name PFTEMP2.BMP. Choose to save the file under a different name. Also, if the file was originally a .JPG file, then when you save the file, make sure to save as file type .JPG and not .BMP.

Note: Versions of Windows prior to Windows 2000 may not be able to open .JPG files in Windows Paint. If you experience this problem, use option 2 on the next page.

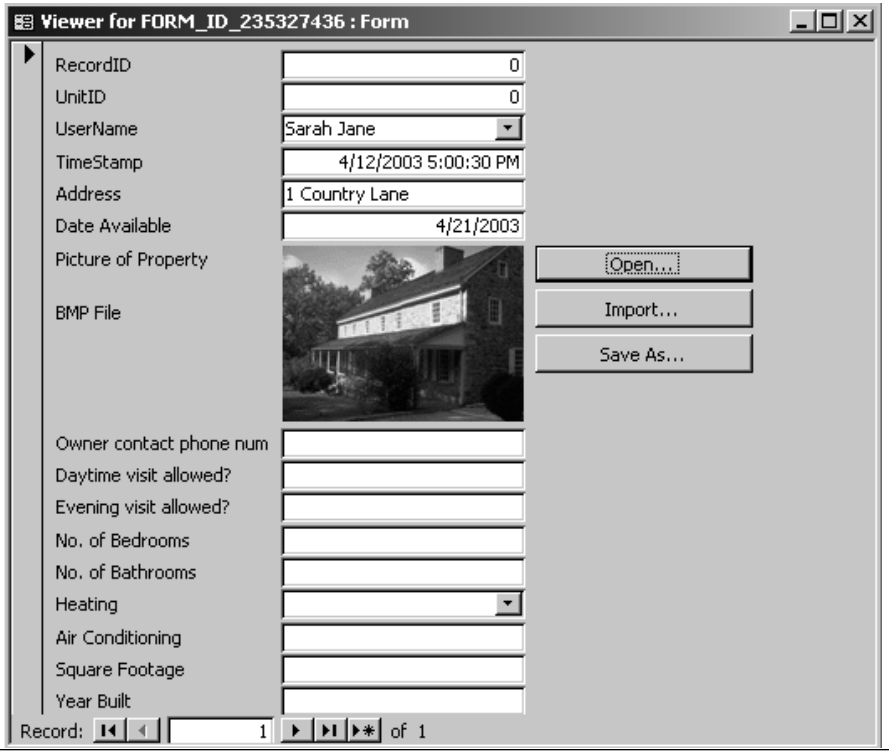
Option 2: Saving from the Ctrl + Edit/View window

Another option for saving images is to click on the name of a form in the Forms Manager and then hold down the CTRL button and click the Edit/View button. This displays records one at a time.

Bitmap files (.BMP) files will be visible in the record. .JPG files will not be visible in the record.

Clicking the Open button behaves like Option 1 on the previous page. The file will open the Windows Paint program (MSPaint.exe). The file will be displayed in Windows Paint with the file name PFTEMP2.BMP. Choose to save the file under a different name. Also, if the file was originally a .JPG file, then when you save the file, make sure to save as file type .JPG and not .BMP.

If you have a version of Windows that cannot open .JPG files in Windows Paint, click the Save As button instead of the Open button. Save the file with any file name and the appropriate file extension. For instance, if the original file was a .JPG file, save as a .JPG file. Once the file has been saved, you can use your own image-viewing software that you use for viewing .JPG images. (If you do not have image-viewing software, double-clicking on a .JPG file typically runs Internet Explorer, and you can view the .JPG image in your Web browser.)



18. Internet and Serial Communications

Various Palm OS devices offer ways to connect to the Internet wirelessly. If you want to synchronize multiple records at a time across the Internet, there is a separate product, Pendragon SyncServer, that you can use to synchronize Pendragon Forms.

If you need to submit one record at a time to do live querying of a Web database, Pendragon Forms contains several scripting commands that allow you to send data wirelessly to a Web URL, or via e-mail. Pendragon Forms also allows you to send and receive data from devices that are attached to the serial port of the Palm device. A Button field with a **click:** event script gives the handheld user control over wireless or serial transmission of records.

Sending individual records wirelessly is not a substitute for synchronizing the handheld device. Pendragon Forms is designed to use the HotSync data transfer mechanism to place records from the handheld into a database table in the Forms database on the PC. Sending a record wirelessly via e-mail or to a Web URL will not place the data in the Forms database. However, if you have your own Web database application, you can use Pendragon Forms to look up or store data in your Web database.

Wireless / Serial Scripting Statements

The following scripting statements can be used in a **click:** event to control the transmission or receipt of wireless or serial data. These scripting statements are described in detail in Chapter 13 *Scripting Reference*, which starts on page 209.

transmit multimail *"E-mail address"*

Used in conjunction with additional VersaMail e-mail software from www.palm.com. Creates a text version of the current record and adds it to the e-mail Outbox to be sent to the specified recipient when next the handheld user sends e-mail.

transmit imessenger *"E-mail address"*

Used in conjunction with Palm i705 devices. Places a text version of the current record into the Palm i705 iMessenger Outbox. When the handheld user sends iMessenger e-mail, the record will be sent.

transmit palmnet *"address"*

Used in conjunction with Palm i705. The **transmit palmnet** statement asks the Palm i705 Web clipping application to display the Web page at the specified URL address. **Warning:** This option can only transfer small amounts of data, typically less than 500 bytes of data.

transmit web *"URL"*

Used in conjunction with Palm devices that have a TCP/IP connection, such as a Palm Tungsten C with WiFi connection, or a Handspring Treo 300 with high speed data service, or a Kyocera 7135. (Note that the Palm i705 does not use TCP/IP through its built-in radio.)

extract "*entity***" from** *value*

Extracts XML formatted data from the specified value. When the **transmit web** statement is used, data returned from a Web server is stored in the **webdata** function. The extract...from statement can be used to extract XML from Webdata. Extracted data is placed into the **result** variable. See page 350 for an example.

transmit serial *value*

Uses the **result** variable to specify communications parameters for communicating via the serial port of the handheld device. The specified *value* is the data string that is sent to the serial device. See page 276 for details.

acquire "*settings*" "*startpattern*" "*stoppattern*"

Opens the handheld serial port to acquire data from an attached device, and places the collected data in the **result** variable. The attached device could be a GPS (Global Positioning System) receiver with a serial data port. Note: Forms 4.0 has a GPS Custom Control that should be used before trying a script.

E-Mailing a Record

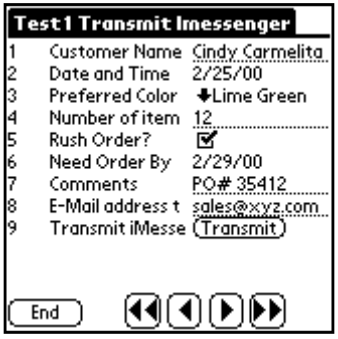
Pendragon Forms offers two ways to e-mail a record directly from the handheld:

- If you have a Palm i705, you can send a text version of a record via the **transmit imessenger** scripting statement.
- If you have a handheld device with a TCP/IP connection, such as a Palm Tungsten C with WiFi connection, or a Handspring Treo 300 with high speed data service, or a Kyocera 7135, you can use the **transmit multimail** scripting statement in conjunction with VersaMail e-mail software from www.palm.com.
  (Note that the Palm i705 does not use TCP/IP through its built-in radio.)

A **transmit imessenger** or **transmit multimail** statement is typically used in a **click:** event in a Button field, so that the handheld user can choose when a record is ready to be e-mailed. A text version of the record, including field names and responses in each field is placed in the iMessenger or VersaMail Outbox, waiting to be sent the next time the handheld user checks e-mail on the handheld.

All fields on the form are included in the e-mail, except Signature, Sketch and Image fields, and any fields that have the Advanced Field Property of *Non-Printing* set. (See page 163.)

Sending an e-mail is useful for allowing the handheld user a quick way to send data back to the office. However, e-mailing a record is not a substitute for performing a HotSync data transfer. A text record received at the office would might need to be re-typed into a database, which is not as efficient as the handheld user synchronizing to send data to the database.



In this example, the handheld user fills in the form, then taps the Transmit button to e-mail the record to the e-mail address in Field 8. The script in the Button field (Field 9) is:

```
click:
 transmit imessenger $8
```

Using Palm i705 Web Clipping

With a Palm i705 organizer, it is possible to create a Transmit button for sending the current record of a form to a Web site that has been created to receive such data. See page 274 for details on the **transmit palmnet** statement.

Warning: You can only transfer small amounts of data, typically less than 500 bytes.

In this example, a form is used to check the quantity of an item in stock. The salesperson fills in the form and then taps the In Stock button.

```
click:
 transmit palmnet
            "http://www.mycorp.com/cgi-bin/inventory.cgi?partnum=$4$&qty=$5$"
```

Pendragon Forms uses a field number between $ signs to refer to the value of a field on the form. With the example script above, partnum=4 means that the partnum parameter of the CGI script is set to the value in Field 4, and qty=5 means that the qty parameter in the CGI script is set to the value in Field 5. The actual URL that would be sent to the Web server in the form shown above is:

http://www.mycorp.com/cgi-bin/inventory.cgi?partnum=239914&qty=12

The page that the Web server sends back to be displayed on the Palm i705 depends on the way that the inventory.cgi script handles the parameters it receives. For example, the Web page that is displayed could show the quantity of this item remaining in stock, or an order confirmation number.

Note that at present the response received from the Web server is just to inform the handheld user. The response is not placed into any fields on the form.

Communicating with a Web Server

Handheld devices using TCP/IP can send data from a Pendragon form to a Web server, and receive XML formatted data in response.

Devices that support TCP/IP include a Palm Tungsten C with WiFi connection, or a Handspring Treo 300 with high speed data service, or a Kyocera 7135. (Note that the Palm i705 does not use TCP/IP through its built-in radio.)

The Transmit Web scripting statement is used to send data to a Web server, and the response from the server is accessed via the Webdata function. Webdata captures data returned from the server between <PFDATA> and </PFDATA> tags. The Extract statement can be used to extract XML data from the Webdata function.

In this example, entering or scanning a part number and then tapping a button sends a request to a Web server. The response from the server is used to populate fields on the form.

The script in the Button field might look like:

```
click:
if $1 <> null then
transmit web "http://www.mysite.com/cgi-bin/inventory.cgi?part=$1$"

  extract "DESCRIPTION" from webdata
  $3 = result

  extract "QTY" from webdata
  $4 = result

  extract "REORDERDATE" from webdata
  $5 = result
 endif
```

In the Transmit Web statement, the parameter 1 refers to the value in Field 1. Sample HTML that the Web server might return is shown on the next page.

If the Web server returns the following HTML, the Extract statement in the script can extract data to be placed in various fields on the form.

```
<HTML>
<PFDATA>
       <DESCRIPTION>Polarizing Sunglasses</DESCRIPTION>
       <QTY>18</QTY>
       <REORDERDATE>March 2, 2000</REORDERDATE>
</PFDATA>
```

Note that if the **extract** statement is to return a date, the easiest thing is to put that date in a Text field on the form. If the Reorder date on the sample form had been a Date field, the Web server would need to return a number of seconds since 01/01/1904. Similarly, if the Web server needs to return a Currency value, it should be placed in a Text or Numeric field on the form, since Currency fields on the handheld are stored internally as a number of cents. Alternatively, a currency amount can be extracted to a hidden field on the form, and then a script can be used to format the currency and place it into a Currency field.

19. Beaming Records

New in Forms 4.0 is the ability to beam records from one handheld to another.

Beaming can be allowed on a form by form basis. Before you allow a form to be beamed, you need to consider whether it is appropriate for records to be shared.

If two users have the same record on their handhelds, and they both modify that record, then when the users synchronize, the last handheld to synchronize will overwrite the first handheld, even if the first handheld has the more recent data.

Beaming is only appropriate if:

- The second handheld does not modify the beamed record.

OR

- The second handheld fills out different fields from the first handheld, and the Advanced Form Property to Merge Changes is switched on, so that during synchronization, data from both handhelds is merged into the same record in the database on the PC.

Beaming records is not a substitute for backing up data to the PC during synchronization.

For beaming to take place, the following conditions are necessary:

1) Both handhelds must already have both the Pendragon Forms application and the identical form design (same Form ID#) present on the handheld. Only records can be beamed, not the Forms application nor the form design.
2) The receiving handheld must be configured to allow receiving of beamed data.
3) Typically, you will need to select a primary key field or fields when you design the form.
4) The form design must have a Button field with a script that selects records to be beamed. The script also initiates the beaming.
5) An appropriate Advanced Form Property Beaming Rule must be selected.
6) The Advanced Form Property to Mark Received Records as modified should be set appropriately.
7) Switch on the Advanced Form Property to Disable Record Overwrite Protection.
8) Recommended: the Advanced Form Property of Merge Changes should be switched on.

These issues are discussed in this chapter.

Issue 1: Software required to beam records

The Pendragon Forms application itself and the form design cannot be beamed. This means that before you can beam records from one handheld to another, the Forms application must be installed on both handhelds, and the identical form design (same Form ID #) must be on both handhelds.

When you create a form in the Forms Manager, the form design is assigned a unique Form ID number. The Form ID number must be the same on both handhelds to allow beaming.

To check the Form ID number of a form design on the handheld, tap the Forms icon, then tap the name of the form to highlight it.

Tap the handheld Menu button (the drop-down menu icon below the House icon on the handheld), and tap the Help menu. Choose the Form Info menu option.

The Form ID number is the first item displayed in the Form Information dialog. This ID number must be identical on both handhelds for records for this form to be beamed.

Issue 2: Receiving handheld must allow beam receiving

Switching on and off the ability to receive beamed records is done within the Preferences application on the handheld. This is separate from Pendragon Forms.

On the handheld, tap the Applications button (the House icon) and then tap the Prefs icon (for Preferences). On some handhelds, the Preferences application has an arrow button in the upper right corner of the screen. Select the General option, and check that the Beam Receive option is switched ON.

On devices running PalmOS 5 and higher, the Prefs application contains sections on the screen. In the General section, tap the Power option. On the Power screen, chec that Beam Receive is switched ON.

Issue 3: Select primary key field(s) in your form design

You will generally need to select a primary key field or fields if allowing beaming.

The default primary key in Pendragon Forms includes three internally generated fields: Username, creation TimeStamp and UnitID. If a record is created on a handheld, the Username field is assigned the username of that handheld device. If that record is then placed on another handheld, and the second user modifies the record, the Username field is updated with the second user's handheld username. This causes duplicate records to be sent to the database on the PC - one record for each user, since there are two different usernames.

If you want users to share records, then to avoid the problem of duplicate records, you will need to choose your own primary key - one or more fields that in combination are unique for every record. See page 155 for information on creating a primary key in Pendragon Forms. The field or fields that make up the primary key have to be selected before the form is frozen, because the database table that is created when a form is frozen must contain information on which fields are the primary key fields.

To allow users to share records, you will need to delete the default Advanced Form Property of **Additional Download Criteria** that causes only those records that match the handheld username to be sent to a given handheld. See page 181 for information on Additional Download Criteria.

Issue 4: Create a Button field containing a beaming script

In order to beam records, a form needs a Button field with a script that controls the beaming.

All scripting events and scripting statements related to beaming are listed in Chapter 13, *Scripting Reference*, which starts on page 209.

A **click:** event script in a Button field runs when the handheld user taps the button.
A **select** statement lets you control which records are selected. Select statements include **select all**, **select current**, **select where**, and **select matching**.
A **queue** statement queues all selected records to be beamed. You can choose to queue all selected records or queue only the changed records from among the selected records. A changed record is a new or a modified record.
You can have several combinations of select and queue statements in one script.
A **beam** statement actually beams the queued records. You can beam via infrared or Bluetooth.

Examples of beaming scripts are shown on the pages that follow.

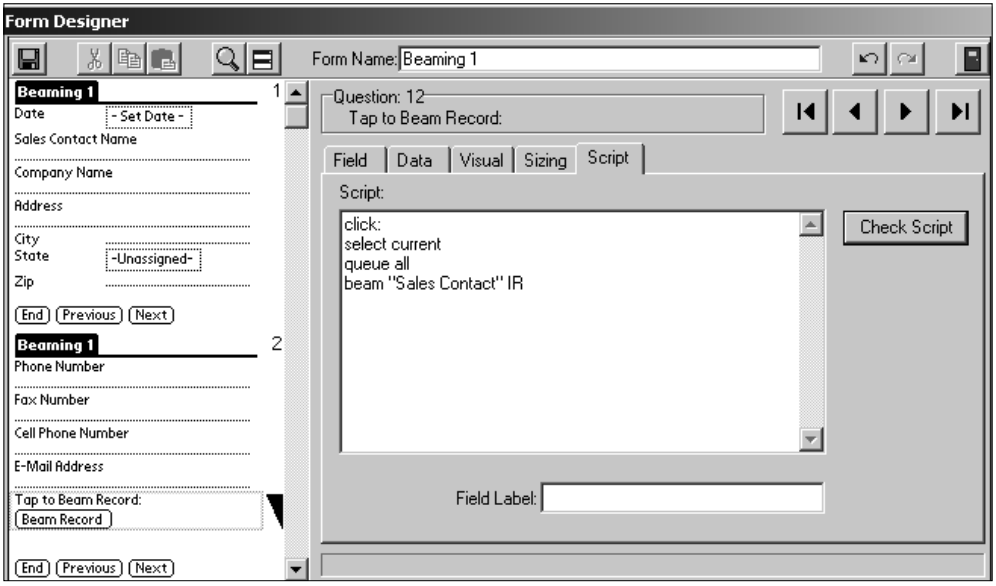
Beaming Example 1: Beaming the Current Record

In the form shown below, the handheld user can fill in the form, and then on the last field tap a button to beam the current record to another handheld that has this form design.

Field 12 in this example is a Button field with a **click:** event script that runs when the button is tapped:

```
click:
  select current
  queue all
  beam "Sales Contact" IR
```

The **select current** statement selects the current record.
The **queue all** statement means that the record will be queued for beaming, whether the record is new, changed (modified), or just an existing unchanged record. If the statement **queue changed** had been used, the record would only be queued for beaming if it was a new or changed record.
The **beam "Sales Contact" IR** statement will beam via the infrared port on the handheld. The phrase Sales Contacts is the phrase that the receiving handheld will display when it prompts the user if the records should be accepted.



Beaming Example 2: Using criteria to select which records to beam

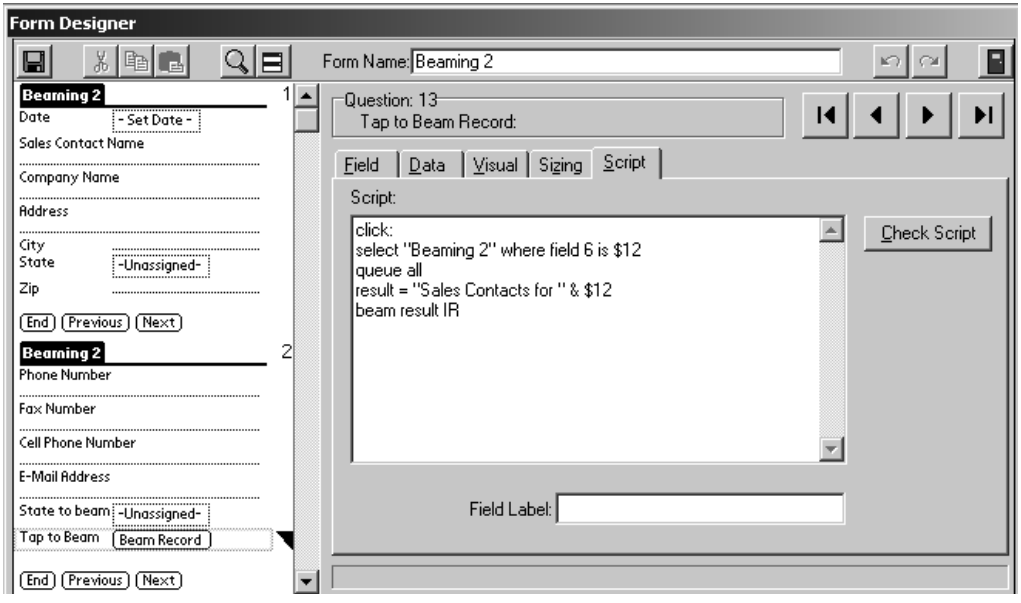
In the form shown below, a **select where** statement is used choose which records are selected to be beamed. See page 269 for more information on select where statements.

Field 6 on the form shown below is the State part of an address. Field 12 also lets the user pick a state. When the user picks a state in field 12 and then taps the button to beam, all the records that match the selected state will be beamed.

```
select "Beaming 2" where field 6 is $12
```
means that in the form called "Beaming 2", all records in which the State field (field 6) matches the current field 12, will be selected.

The **queue all** statement means that all the selected records will be queued for beaming.
If **queue changed** was used instead, only new and changed records would be queued.

For an added touch, the statement
```
result = "Sales Contacts for " & $12
```
concatenates the phrase "Sales Contacts for " with the value in field 12, which is the selected state. If the selected state is NY, the value in the result variable will be "Sales Contacts for NY".
The statement **beam result IR** beams the selected records. The receiving handheld will see a message *Do you want to accept "Sales Contacts for NY" into Forms 4.0?*



Beaming Example 3: Beaming records from both a parent form and a subform

The form shown in this example is a parent form. Field 7 is a subform field that allows the user to jump to a subform to fill out subform records. Field 8 on the parent form is a Button field with a **click:** event that allows the user to beam records from both the parent form and the subform.

```
select all "BeamingTest3 Parent"
queue changed
```

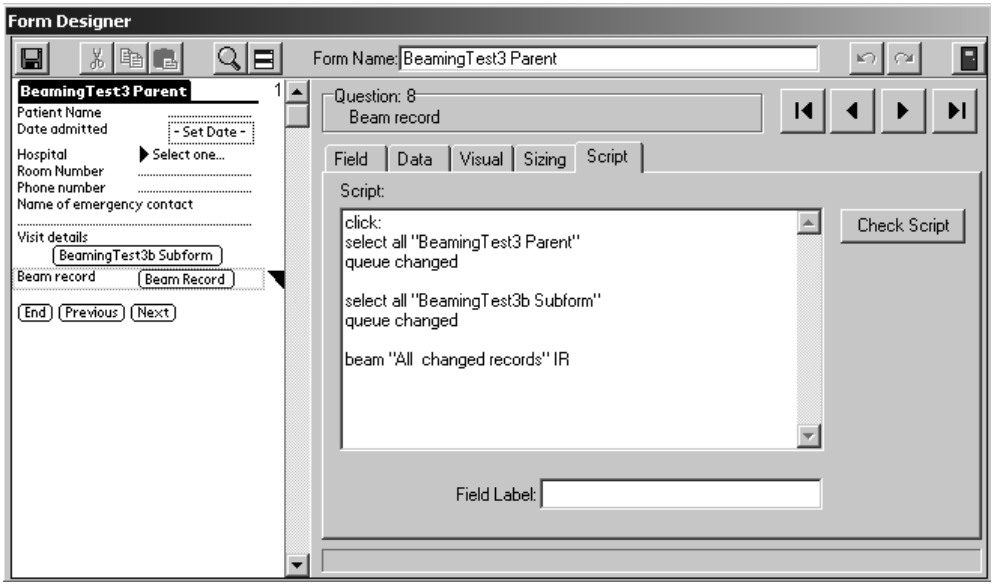
selects all records from the parent form whose name is "BeamingTest3 Parent", and queues only the changed records to be beamed. A changed record is a new record or a modified record.

```
select all "BeamingTest3b Subform"
queue changed
```

then selects all the records from the subform whose name is "BeamingTest3b Subform", and queues only the changed subform records to be beamed.

```
beam "All changed records" IR
```

beams the selected records from both parent form and subform. The receiving handheld see the message: *Do you want to accept "All changed records" into Forms 4.0?*



Issue 5: Beaming Rules

Beaming Rules are an Advanced Form Property that allow you to decide under what circumstances the receiving handheld will accept beamed records.

See page 191 for information on how to set a beaming rule. The available options are:

Beaming Rule	Meaning
Do not accept any beamed records, conflicting or otherwise	Beaming is not allowed.
Accept records. Merge data in records with matching keys	Beaming is allowed. If both handheld users have updated **different fields** of the same record, the changes from the handheld that is doing the beaming will be merged with the changes that are on the receiving handheld. If both handheld users have updated the **same field** of the same record, the handheld that is doing the beaming will overwrite the record on the receiving handheld. This applies if a record is marked as new on both handhelds (perhaps due to prior beaming). In this case, the beaming handheld will also overwrite the receiving handheld's record with no merging of data. NOTE: With this option, the receiving handheld ends up with a complete record of the changes, but the beaming handheld does not have all the changes.
Accept Records. Overwrite existing records that have matching keys	Beaming is allowed. The handheld that is doing the beaming will overwrite any changes that the receiving handheld has made on the same records. NOTE: With this option, both handhelds end up with the same version of the record, namely the version that was on the beaming handheld.
Accept Records, but reject those with matching keys	Beaming is allowed. If the receiving handheld already has a record, that record will not be beamed.

Issue 6:
Choose whether to mark received records as modified

When the handheld user beams records, any new or changed records on the beaming handheld will also be marked as changed on the receiving handheld. This guarantees that the records will be backed up to the PC if the receiving handheld synchronizes first.

The Mark Received Records as Modified option is an Advanced Form Property that lets you control whether existing unchanged records that are beamed should also be marked as changed records on the receiving handheld. If the unchanged records are marked as changed on the receiving handheld, the records will be uploaded to the PC when the receiving handheld synchronizes.

By default, Mark Received Records as Modified is switched on. See page 192 for information on how to switch this option off if necessary.

Issue 7: Disable Record Overwrite Protection

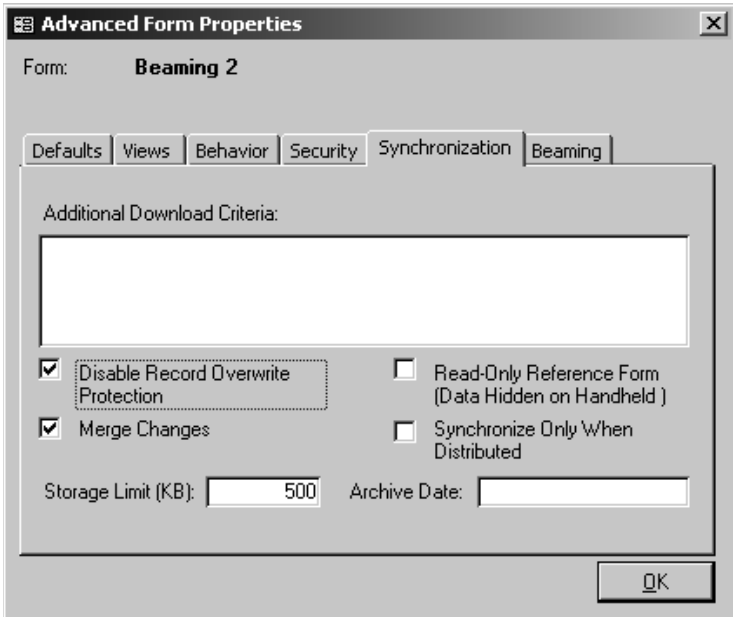
You will need to switch on the Advanced Form Property of Disable Record Overwrite Protection if you are going to allow users to beam records.

Disable Record Overwrite Protection is switched off by default. This option prevents a record that already exists in the database from being overwritten by a new record on the handheld with the same primary key. Primary keys are supposed to be unique, and generally, if an existing record already has a particular primary key, then no other record should have that primary key. If a new record on a handheld has that primary key, Pendragon Forms flags the record as having a conflict with an existing record.

Beaming records is an exception to the rule. If a record is created on a handheld, the record is marked as new on that handheld. If the record is then beamed to another handheld, the record is also marked as new on the second handheld. The first of the two devices to synchronize will send the record to the database on the PC. When the second device synchronizes, there will be a conflict of primary keys, because a seemingly new record on the handheld will match an existing record in the database. Since the record is actually the same record, it may be acceptable to allow the record on the handheld to overwrite the record in the database. To avoid a Pendragon Forms conduit error message warning about the conflict, switch on Disable Record Overwrite Protection.

See the next page and also page 186 for information on switching on Disable Record Overwrite Protection.

Disable Record Overwrite Protection is on the Synchronization tab of the Advanced Form Properties window. To access Advanced Form Properties, click the name of the form in the Forms Manager, then click the Properties button to view the Properties window, then click the Advanced Properties button. Merge Changes, the next item discussed, is on the Synchronization tab also.



Issue 8: Switch on Merge Changes

If you are allowing records to be beamed in order to permit one user to start filling in a form and another user to finish filling in different fields on the form, you will need to switch on the Advanced Form Property of Merge Changes.

If Merge Changes is switched off, which is the default setting, then the second handheld to synchronize will overwrite the entire record of the first handheld to synchronize. The overwriting would occur even if the first handheld to synchronize has more up-to-date information.

If users are filling in different fields of the form, then switching on Merge Changes will allow fields changed by the second handheld to synchronize, to merge into the existing record that the first handheld synchronized. If one user is filling in fields 1-5 on a form, and another user is filling in fields 6-10, it would not matter which user synchronizes first as long as Merge Changes is switched on.

The above picture shows the Merge Changes checkbox. See also page 187.

Memory Requirements when Beaming Records

If you are allowing records to be beamed, the handheld that is doing the beaming needs to have sufficient free memory in order to perform the beaming, and the receiving handheld has to have enough free memory to receive the records.

When the queue statement is used in a beaming script, the queued records are copied into memory, waiting to be beamed. This means that if, for example, you queue 500 KB of records to be beamed, your handheld has to have at least 500KB of free memory, in addition to the space that Pendragon Forms and the records are already using.

20. Working with Multiple Forms

Depending on the application that you are trying to build, you may need more than one form on the handheld to implement your solution. Pendragon Forms supports the following:

- *Parent and Subform*
  A parent form and a subform (or child form) are used if for every parent record, you need to be able to create many child records. Visiting the same customer or patient more than once, or taking several readings from the same piece of equipment may require you to create a parent form for the information that stays constant (e.g. the customer's name or the equipment serial number), and create a subform for the information that changes (e.g. the details of a customer visit, or the equipment reading on a particular day).
  Details on creating a parent form and subform start on page 103.
- *Lookup to Another Form*
  If you want to maintain a reference list, such as inventory item numbers and prices, or employee names and addresses, and you want to select from the list and copy the data into a form, then you need to maintain two forms and do a Lookup to Another Form.
  Details on creating a form that can do a lookup to another form are on page 94.
- *Lookup to a Read-Only Reference Form*
  If you have more than 500 records in a reference form, you can create a Read-Only Reference form instead of a regular form. The advantage is that on the handheld, a Read-Only Reference form has a fast lookup mechanism for finding a record. The disadvantages are that the fields in the Read-Only Reference form can only be Text or Numeric fields, and the Text fields must have the smallest possible fixed size. Another disadvantage is that the handheld user cannot see the individual records in the Read-Only Reference Form - he or she can only access records by performing a lookup to the Read-Only Reference form.
  Details on creating a Read-Only Reference Form are on page 98.

This chapter illustrates some examples of working with multiple forms. All scripting events and scripting statements mentioned in this chapter are explained in detail in Chapter 13, *Scripting Reference*, starting on page 209.

Example: Taking Orders on the Handheld

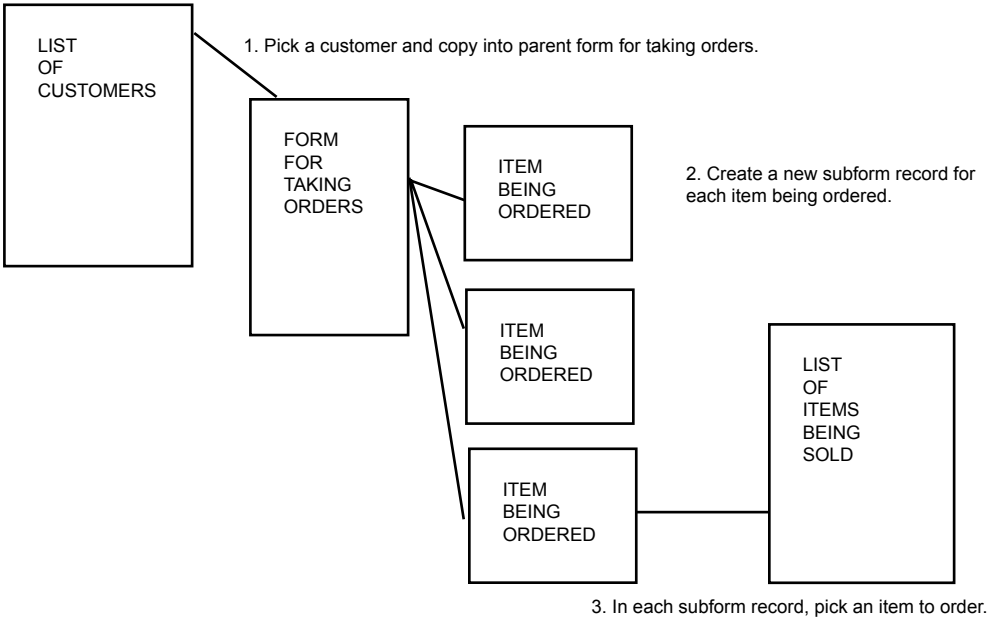
Creating an application to allow handheld users to take customer orders is an example that requires multiple forms.

To start with, you will need a form for taking orders. However, since you cannot predict whether a given order will be for one item or for several items, you may want to split the order-taking form into two: a parent form for the customer information, and a subform for the line items being ordered. A new subform record is created for each item being ordered.

If you have a list of customers, you may want the user to pick from a list to select a customer. To achieve this, you can do a lookup to a customer form from the order-taking parent form.

If you have a list of items for sale, you may want the handheld user to pick from the list to select an item being ordered. To achieve this, you can do a lookup from the subform to the list of items form.

The forms needed for this application and their relationship to each other is shown in the diagram below. Further details are on the pages that follow.



To perform a lookup from the parent form to the reference form:

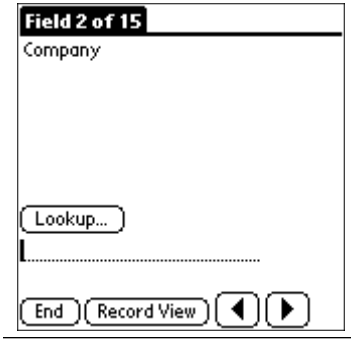
- Fields that you want to copy from the reference form have to have the same field name and same field type as on the parent form. The only exception is that a Text field on the reference form can copy into a Lookup List field on the parent form - but not more than 50 characters.
- To display the list of records in the reference form, one field on the parent form must be a **Lookup List field**. Instead of referencing a Lookup List, reference the name of the reference form.

This is the Reference Form.

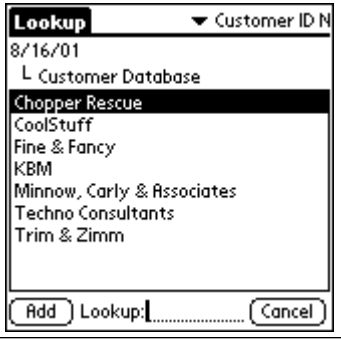
To allow the handheld user to perform a lookup to the reference form based on Company name, the Company field on the parent form is a **Lookup List field** that references the name of the reference form.

This is the Parent Form.

In Field View, the Company field on the Parent form looks like a Lookup List.



Tapping in the Company field in Record View, or tapping the Lookup button in Field View or Layout View displays the list of records from the reference form.



When a record is selected, all fields that are named the same and have the same field type on both the reference form and the parent form will copy into the parent form.

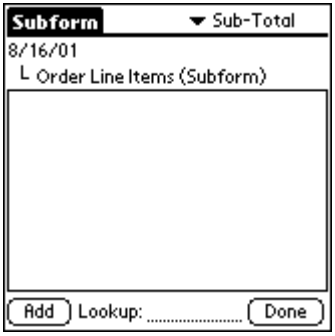
Once a customer has been selected from the reference form and copied into the order-taking parent form, a subform is used to select each item being ordered.

To create a parent and subform relationship between two form designs:

- One or more fields within the first 10 fields have to match in field name and field type on both the parent form and the subform. These fields will copy from parent to subform when a new subform record is created. Never change the values of the matching fields on the subform, or you will lose the link to the parent form.
- To jump from the parent form to the subform, the parent form must have a Subform List field that references the name of the subform.

This is the Parent Form.

Here the Items Ordered field on the parent is a Subform List field that references the name of the subform.



Tapping the subform icons in this field displays a list of existing subform records. If there are no matching subform records, the list is blank.

Tap the Add button to create a new subform record. Tap an existing subform record to review it.

This is the Child Form or Subform.

When a new subform record is created, all matching fields within the first 10 fields of the parent copy into the subform record.

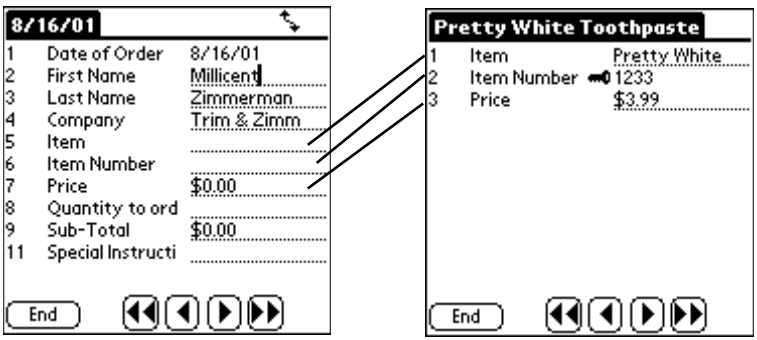
In this example, the first four fields of the parent form are copied into the subform.

To perform a lookup from the subform to a reference form of items in stock:

- Since this is a lookup from one form to another, fields that have to be copied must have the same field name and field type on the reference form and on the subform.
- One field on the Subform has to be a **Lookup List field** that specifies the name of the reference form.

This is the subform.

This is the reference form of items in stock.



To perform the lookup, the Item field on the subform is a Lookup List field that references the Items in Stock form.

Tapping in the Item field displays the list of items in the reference form.

Selecting an Item name on the subform is copies the Item Number and Price from the reference form to the subform.

Once the item details have been copied into the subform, the handheld user can enter the quantity of items being ordered. To calculate the sub-total for this line item of the order, a script is added in Field 9 of the subform:

```
calculate:
 if $8 > 0 then
  answer = $7 * $8
 endif
```

Advanced Scripting

There are some advanced scripting statements that are designed for working with multiple forms.

Some of the advanced scripting statements include:
also
column *number*
delete
gotosubform *formname* **{ new | review | normal }**
insert into *formname*
keycolumn *number*
lookup *value* **within** *formname*
select all *formname*
select matching *formname*
select *formname* **where field** *field-number* **is** *expression*
update field *number* **=** *expression*

For details about these scripting statements, refer to Chapter 13, *Scripting Reference*, which starts on page 209.

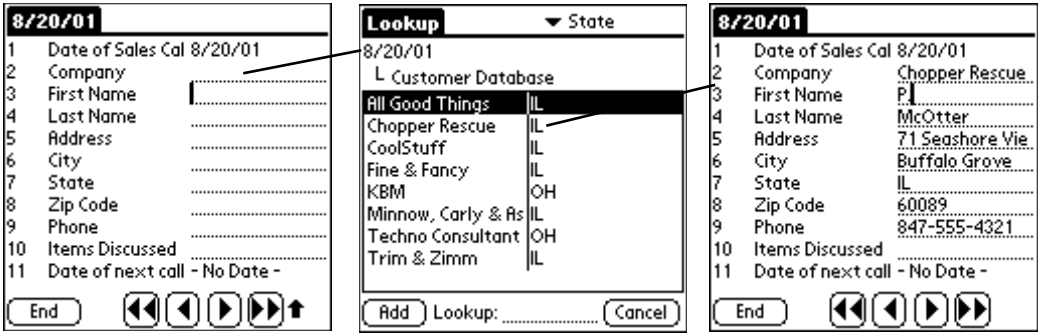
Examples of forms that use some of these advanced scripting features are shown on the pages that follow.

Performing a Cascading Lookup to Another Form

In a regular lookup to another form, when the handheld user taps in the Lookup List field that specifies the reference form, all the records from the reference form are displayed.

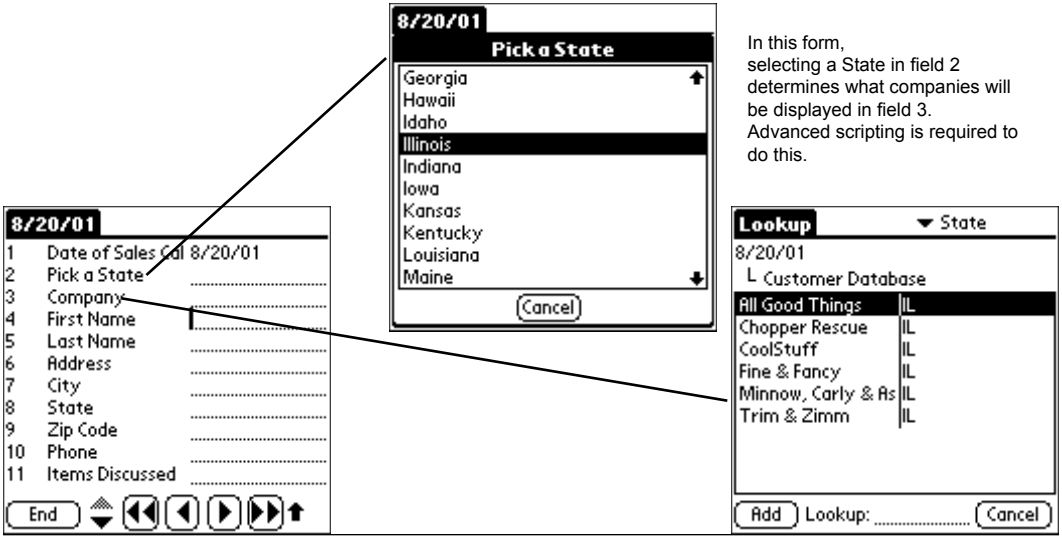
Here the Company field is a Lookup List field that references another form. Tapping in the Company field shows a list of all companies.

Tapping on a company to select it copies all the commonly named fields from the reference form into the current form.

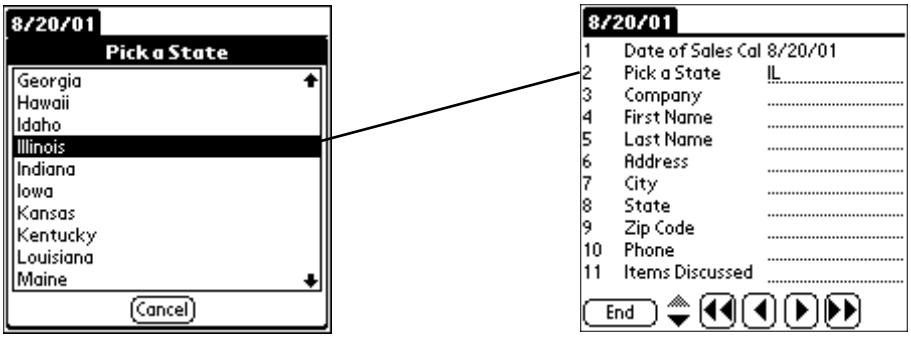


If you do not want the handheld user to see a list of all the records in the reference form, you can use advanced scripting and re-design your form to allow for a cascading lookup to another form. A cascading lookup uses selection criteria to select only certain records from the reference form.
Important: A read-only reference form cannot be used in a cascading lookup.

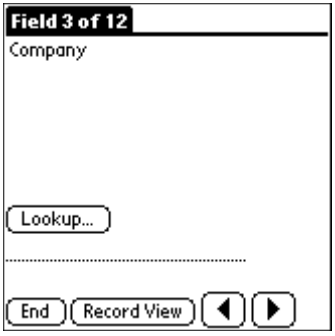
In this form, selecting a State in field 2 determines what companies will be displayed in field 3. Advanced scripting is required to do this.



To achieve the cascading lookup to another form, an extra field has to be added to allow the user to specify the selection criteria. In this example, field 2 is a regular Lookup List containing a list of all states. The state that the user selects will be the selection criteria.



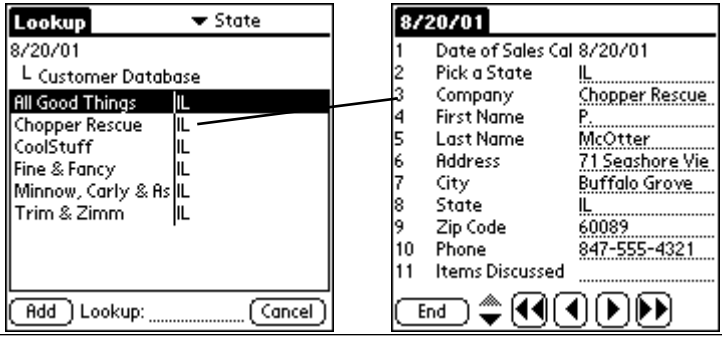
To perform the selection of records from the reference form, field 3, the Company field, is a **Lookup List field** that references the name of a reference form, "Customer Database".
In addition, a click: event script is added to field 3. The click: event runs when the handheld user taps in the Company field, and the **select** statement in the script does the record selection.




```
click:
select "Customer Database" where field 7 is $2
```

The script selects all the records in the Customer Database form, where field 7 of the Customer Database form matches field 2 of the current form.
In the Customer Database form, field 7 is State, so the select script is choosing all records where the State field is IL in this example.

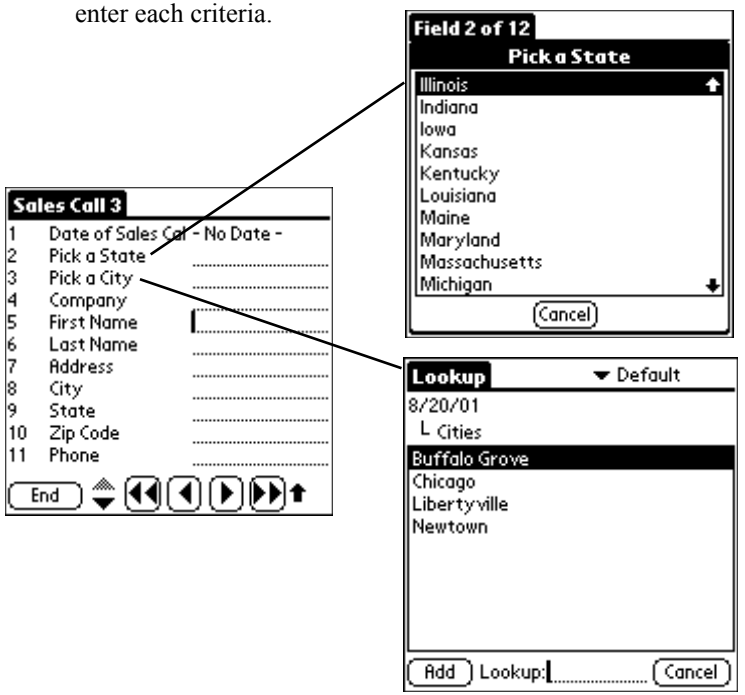
Once a record is selected, all the fields in the reference form that are named the same as fields on the current form are copied from the reference form to the current form.



Performing a Double Cascading Lookup

A double cascading lookup enables you to use two selection criteria to choose which records from a reference form are displayed when doing a lookup to another form.

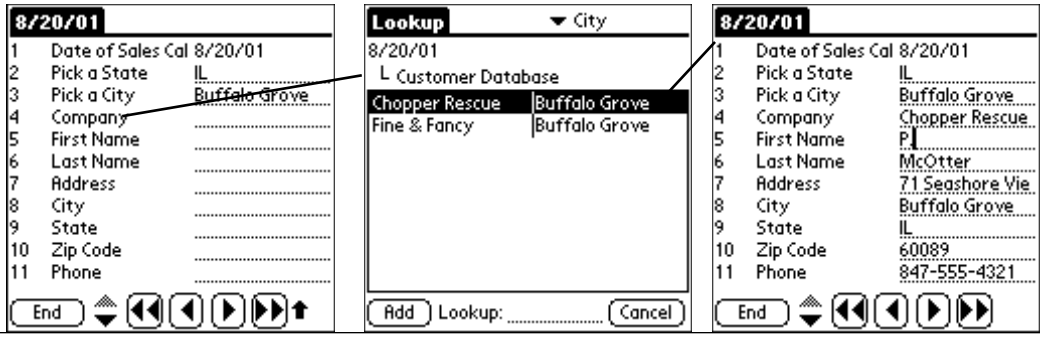
- Two reference forms are needed for a double cascading lookup.
  Important: The reference forms cannot be read-only reference forms.
- Since two criteria are being used, two fields are reserved to allow the handheld user to enter each criteria.



In this example, selecting a State in field 2 determines which cities are displayed in field 3. One reference form is used to lookup the City.

Selecting a city in field 3 determines which companies are displayed in field 4. A second reference form is used to lookup the Company. Only records that match on State and City are displayed.

Selecting a Company copies all the commonly named fields from the company reference form into the current form.



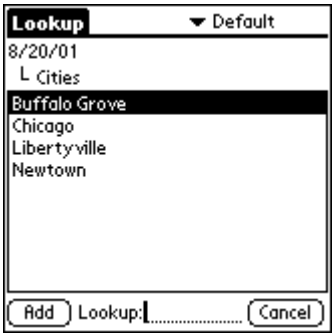
Here is how the double cascading lookup from the previous page is achieved:

Step 1:
To allow the handheld user to select a State, field 2, which is called "Pick a State" is a regular Lookup List field that contains a Lookup List of all the states. If necessary, this could have been made a lookup to another form, but in this case a regular Lookup List is sufficient.

Step 2:
To perform a lookup of cities, a reference form is created with two fields, one field for the city and one field for the corresponding state. There must be a record in this form for every city that the user might need to select.

Since the main form has a field called "Pick a City", this reference form also has a field called "Pick a City". This will allow the selected city to be copied into field 3 of the main form.

If you do not want to copy the state from this reference form into the main form (because the user has already selected a state in field 2), then name the state field something different from the main form. In this example, the state field is called "State for City" instead of being called "Pick a State" or "State" as in fields 2 and 9 of the main form.



Step 3:
To display only the cities within the state that the user selects, field 3, "Pick a City" on the main form is a **Lookup List field** that references the name of the "Cities" reference form. The following script is added to field 3 of the main form:

```
click:
 select "Cities" where field 2 is $2
```

Continued on next page...

Step 4:
To perform a lookup of companies, a reference form is created with fields for all the data that is to be copied into the main form.

To copy the company name into the main form, field 2 on the reference form is called "Company", to match the field name of field 4 on the main form. Other fields to be copied such as Address, City, State, Zip Code and Phone must be named the same and have the same field type on the reference form as on the main form.

Step 5:
To perform the lookup of companies that match both the City and State, field 4 on the main form is called "Company" and is a **Lookup List field** that references the name of the reference form, which is called "Customer Database" in this example.

To select only those records that match the City and State, the following script is added to field 4 of the main form:

```
click:
select "Customer Database" where field 7 is $2
also
select "Customer Database" where field 6 is $3
```

Field 7 of the "Customer Database" reference form is State, and field 2 of the current form is "Pick a State", so the first **select** statement selects only the records that match on state.

The **also** statement means that the selected records are to be used when the next select statement in the script is run.

The second **select** statement picks only the records where field 6 ("City") in the "Customer Database" reference form matches field 3 of the current form, which is "Pick a City". Since this statement only runs on the records that have already been selected on state, the effect is that only records matching the selected city and state are displayed.

Updating Records in a Reference Form

You may want to maintain records in a reference form, and use another form as the means by which the handheld user can update the reference form. An example might be a list of inventory items that you want the handheld user to update only if the quantity in stock needs to be modified, or if the item is not in the list.
Note: A Read-Only Reference form cannot be updated since it is read-only.

For example, the picture to the left shows an inventory reference form. Field 1, the Barcode number, is made a primary key field to guarantee that each item has a unique barcode number.

A second form, called Barcode Inventory Checker and shown below, is used to scan inventory bar codes and compare the listed quantity in stock with the actual quantity on the shelf. If the quantity on the shelf is different, the handheld user can update the inventory reference form.

Step 1: Scanning a bar code into field 1 runs a scan: event script that selects the record from the reference form that matches the barcode number.

Step 2: The item description and quantity in stock are copied from the reference form into the current form. If the quantity is correct, the handheld user can simply scan another item bar code.

Step 3: If the handheld user sees that the quantity on the shelf is different from the listed quantity, he/she can check the checkbox in field 4 to flag the difference and fill in the correct shelf quantity. Tapping the Update button updates the reference form.

Continued on next page...

Here is how updating the reference form is achieved:

Step 1:
The Barcode Inventory Checker form has seven fields. Fields 5 and 6 are Hidden (see page 143), so that the handheld user does not see these fields unless the user selects Yes in field 4 to indicate that the shelf quantity is different.

Step 2:
A **scan:** event script in field 1 runs when a barcode is scanned. This is the script in field 1:

```
scan:

 answer = scandata
 $7 = now

 select "Barcode Inventory List" where field 1 is $1
 if result =  0 then
  $2 = null
  $3 = null
  msgbox
    "Item not found. Enter item description and shelf quantity."
  hide from 3 to 4
  show from 5 to 6
  goto 2
 else
  show from 3 to 4
  $2 = column 2
  $3 = column 3
 endif
```

The statement
`answer = scandata`
puts the barcode into the current field, namely field 1.

The statement
`$7 = now`
puts the current date into field 7.

The statement
`select "Barcode Inventory List" where field 1 is $1`
selects from the reference form called "Barcode Inventory List" the record whose bar code number matches that in field 1 of the current form.

When a select statement is performed, the **result** variable will contain the number of records that were matched. If the Result variable is zero, it means that a matching record has not been found in the reference form. The remainder of the script is an **if...then...else...endif** statement that will allow the user to create a new record if a match is not found, or will copy a matching record into the current form if a match is found.

`if result = 0 then`
If a matching record in the reference form is not found, fields 2 and 3 are set to null to wipe out any existing values from previous scans.

A message box is displayed to alert the user to the fact the the item has not been found in the inventory reference form, and to notify the user that he/she will have to enter the item description and shelf quantity manually.

Fields 3 and 4 are hidden since they are not needed, and fields 5 and 6 are displayed.

`else`
On the other hand, if the **result** variable is not zero, then a matching record has been found in the reference form. (Note that since the bar code number field in the reference form is a primary key, each record has a unique bar code number and so we do not need to be concerned about multiple records matching on the same bar code.)

If a matching record is found, fields 3 and 4 are made visible, and columns 2 and 3 of the reference form record are copied into fields 2 and 3 of the current form form. This copies the Item Description and Quantity in Stock from the reference form into the current form.

Step 3:
If a matching record from the reference form is copied into the current form, the handheld user can compare the listed Quantity in Stock (field 3) with the actual quantity of the item on the shelf. If the quantity on the shelf is the same, the user can simply scan a different item.

However, if the quantity on the shelf is different from the listed Quantity in Stock, the handheld user can check the checkbox in field 4, Shelf Count Different. Field 4 has a Default Value set to N for No. Selecting Yes in this field runs a script to display fields 5 and 6, which are needed to update the reference form.

The script in field 4 is:

```
select:
 if answer == Y then
  show from 5 to 6
  goto 5
 endif
```

Step 4:
After the handheld user enters the correct shelf count in field 5, he/she must tap the Update button in field 6 for the changes to be copied to the reference form.

If there was no matching record in the reference form, a **click:** event script in field 6 will insert a new record into the reference form.

This is the click: event script in field 6 that runs when the user taps the Update button:

```
click:
 select "Barcode Inventory List" where field 1 is $1
 if result = 0 then
  insert into "Barcode Inventory List"
  update field 1 = $1
  update field 2 = $2
  update field 3 = $5
  update field 4 = $7
  show from 3 to 4
 else
  update field 3 = $5
  update field 4 = $7
 endif
 $1 = null
 $2 = null
 $3 = null
 $4 = N
 $5 = null
 hide from 5 to 6
```

The **select** statement selects the record in the "Barcode Inventory List" form that matches the bar code number in field 1. After the select statement is run, the **result** variable contains the number of matching records.

The **if...then...else...endif** statement performs different actions depending on two possibilities: if there is no matching record (if result = 0 then), then a new record is inserted into the reference form and fields 1, 2, 3 and 4 of the reference form record are updated with information from fields 1, 2, 5 and 7 of the current form. On the other hand, if a matching record is found, then only fields 3 and 4 of the reference form are updated from the current form.

The remainder of the script after the if...then...else...endif statement nulls out the values in the current field to give the handheld user the impression that tapping the Update button performs the update and then re-starts a blank form to scan the next inventory item. In reality a new record is not being created, the same record on the Barcode Inventory Checker form is being re-used.

Troubleshooting Problems when working with Multiple Forms

Refer to Appendix B, *Troubleshooting*, page 446, for troubleshooting information related to working with multiple forms.

21. Creating a Custom Main Menu

New in Forms 4.0 is the ability to create a form that acts as a Main Menu and replaces the standard Pendragon Forms main menu screen that shows the list of form designs.

Standard Forms Main Menu

Custom Main Menu Form

Features of a Custom Main Menu Form

A Custom Main Menu form is a Pendragon form with two special attributes:

1. The form is launched as soon as the user runs Pendragon Forms, by setting the Advanced Form Property of Auto-Execute.
2. The name of the form must include the word MENU in uppercase. No more than one record will be created for the form.

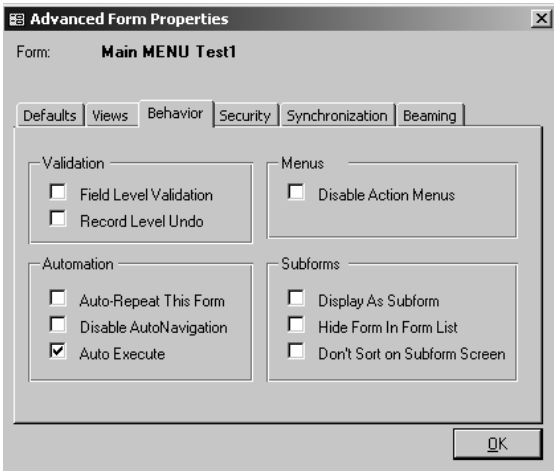
Typically, Custom Main Menu Forms feature Button fields or Section fields (typically with pictures) that are used to direct the user to different forms.

These items are discussed in this chapter.

Item 1: Set the Custom Main Menu form to Auto-Execute

In order to make a Custom Main Menu form run when the user taps the Forms icon on the handheld, the Advanced Form Property of Auto-Execute must be switched on.

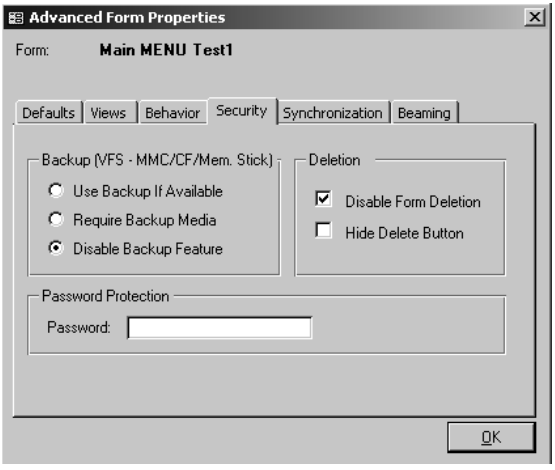
To access the Advanced Form Properties screen, click the name of the form in the Forms Manager, then click the Properties button, then click the Advanced Properties button.



On the Behavior tab of the Advanced Form Properties window, check the Auto-Execute checkbox.

Only one form can have the Auto-Execute form property switched on.

Other Advanced Form Properties to set



If you are allowing users to delete records from the handheld, it is a good idea to disable deletion of the Custom Main Menu form and all the other forms that you are using.

On the Security tab of the Advanced Form Properties window, check the Disable Form Deletion checkbox. Repeat for each form design that is being sent to the handheld.

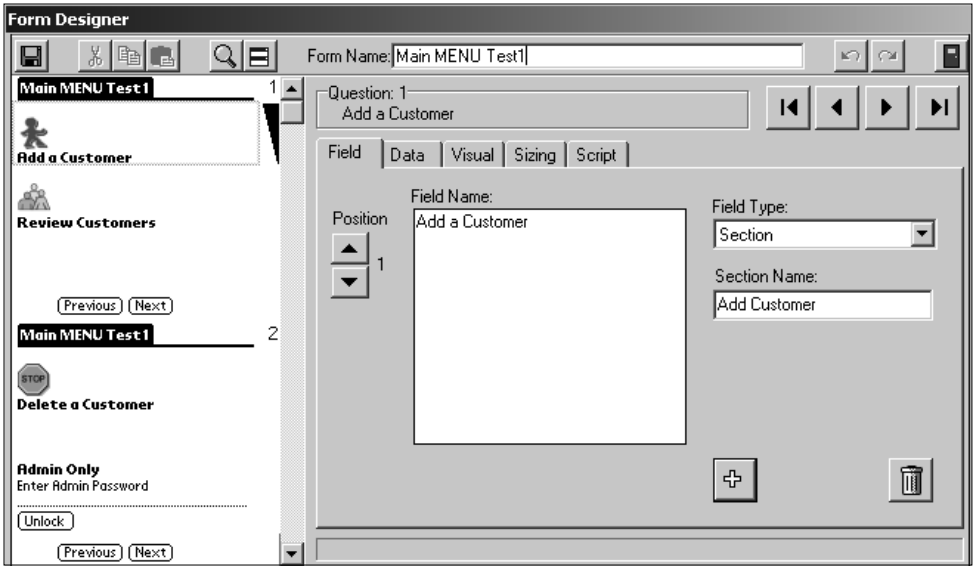
Another Advanced Form Property that you can set is on the Views tab: you can hide the End button of the Custom Main Menu form.

Item 2: The form name must include the word MENU

Only one form can be a Custom Main Menu form. To identify this form, the form name must include the word MENU in uppercase letters.

The word MENU in the name of an auto-executing form causes two things to occur:

- Only one record will be created for the form. This allows the user to 'enter' the Custom Main Menu form without generating a new record every time the menu is accessed.
- The Custom Main Menu form is displayed before the standard Pendragon Forms main menu, so the user never sees the list of forms, just the Custom Main Menu form.



Using Section fields to create Custom Menu Options

For each option on the Custom Main Menu, create a Section field. You can add a picture to the Section field - see page 138.

The activities that users will typically need to access from a custom menu are:

- Add a new record to a form.
- Review existing records for the form.
- Optionally, the ability to delete records from the handheld.
- In an emergency, have a way to access the standard Pendragon Forms main menu screen.

You will need to create a Section field to serve as the menu option for each of these activities.

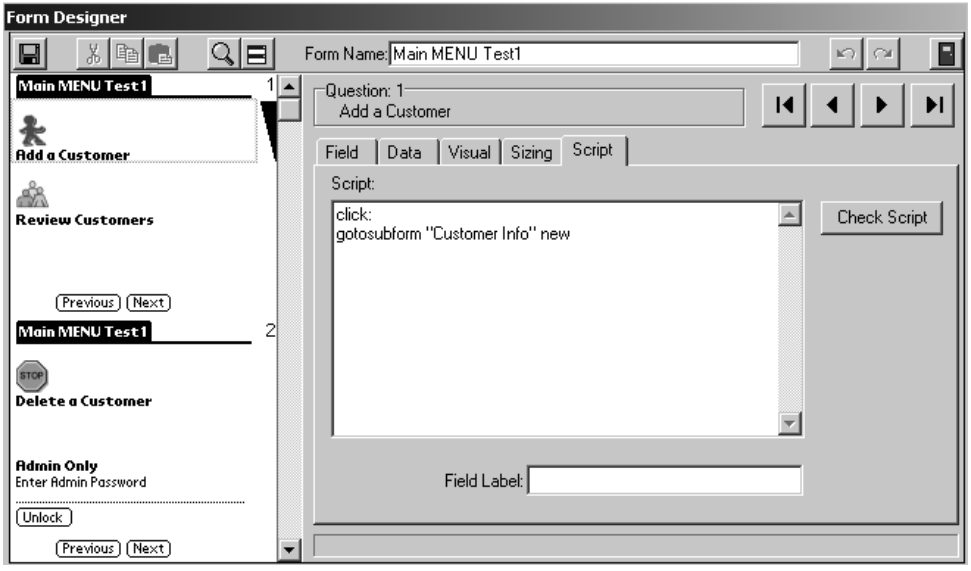
Click: event scripts in each Section field allow the activities to be performed.

Creating a Menu Option to add a New record to a form

The **gotosubform "***formname***" new** statement jumps the user to the specified form, and creates a new record for that form.
The following script is in field 1 of the form shown below (the 'Add a Customer' menu option):

```
click:
  gotosubform "Customer Info" new
```

means that when the user taps in the 'Add a Customer' Section field, the script will go to the form named "Customer Info" and create a new record.



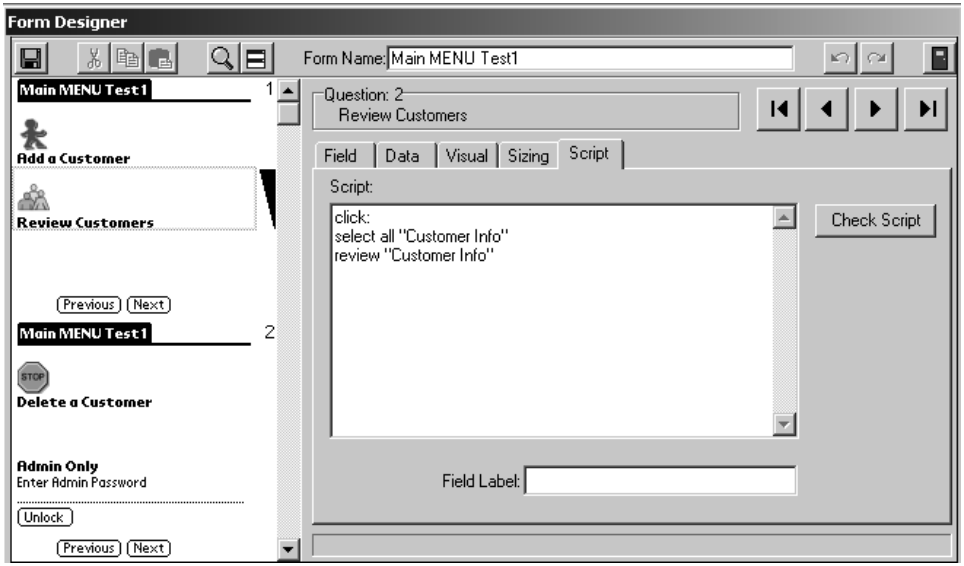
Creating a Menu Option to Review existing records on a form

The **select all "***formname***"** statement selects all the records of the specified form.
The **review "***formname***"** statement lets the user review the selected records for the specified form.

The following script is in field 2 of the form shown below (the 'Review Customers' menu option):

```
click:
  select all "Customer Info"
  review "Customer Info"
```

means that when the user taps in the 'Review Customers' Section field, the script will select all the records of the form named "Customer Info" and display a Review screen. The user can tap on a record on the Review screen to go to that record.



Creating a Menu Option to Delete records from a form

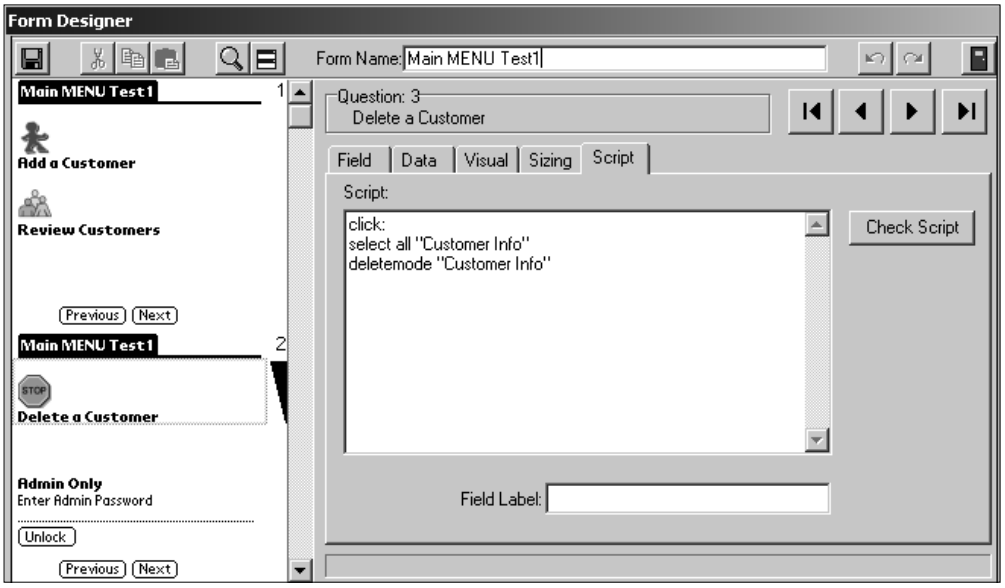
The **select all "***formname***"** statement selects all the records of the specified form.
The **deletemode "***formname***"** statement lets the user access a Delete screen to delete records.

The following script is in field 3 of the form shown below (the 'Delete a Customer' menu option):

```
click:
  select all "Customer Info"
  deletemode "Customer Info"
```

means that when the user taps in the 'Delete a Customer' Section field, the script will select all the records of the form named "Customer Info" and display a Delete screen. The user can tap on a record on the Review screen to go to that record.

WARNING: The Delete screen allows users to delete form designs as well as records. To prevent users from accidently deleting form designs, set the Advanced Form Property of **Disable Form Deletion** for each form that the handheld user is using, including the Custom Main Menu form itself. See page 179 for information on setting the Disable Form Deletion option.



Creating a way to access the standard Pendragon Forms main menu

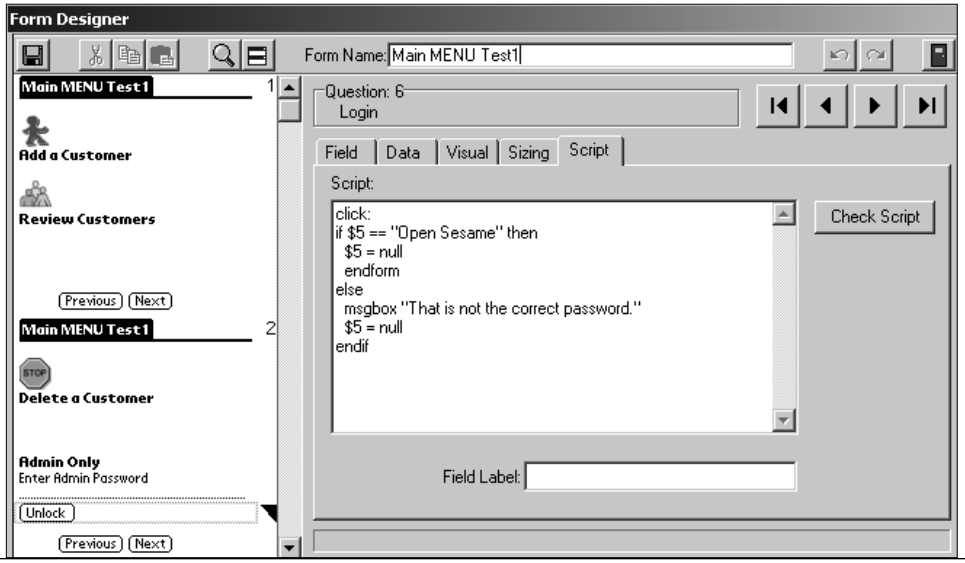
With a Custom Main Menu form, the handheld user has no way to access the standard Pendragon Forms main menu screen that shows the list of forms.

It is strongly recommended that you add to your Custom Main Menu form a way to access the standard Pendragon Forms main menu. That way, if there is a problem on the handheld, you can direct the user to revert to the standard Pendragon Forms main menu to troubleshoot things like verifying how many form designs are on the handheld, verifying what the form ID numbers are, and accessing VFS Backup features to perform a restore of data from an external media card.

A simple way to allow limited access to the standard Pendragon Forms main menu is to use two fields: a Text field to store a password, and a Button field to validate the password.
In the form shown below, the script in field 6, the Button field, is as follows:

```
click:
  if $5 == "Open Sesame" then
    $5 = null
    endform
  else
    msgbox "That is not the correct password."
    $5 = null
  endif
```

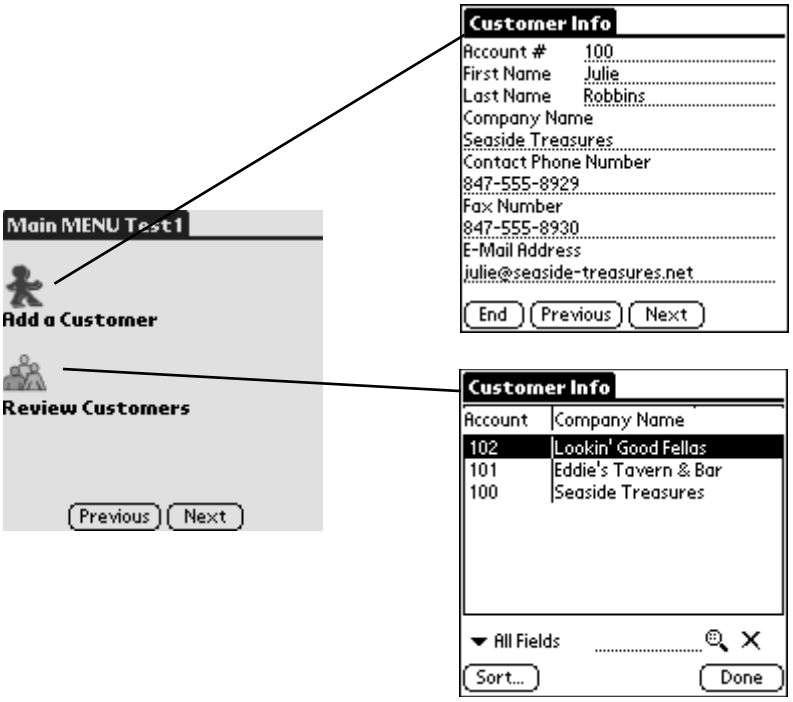
If field 5 (the password field) is equal to the phrase "Open Sesame", the field is set to null to erase the password, and the **endform** statement ends the current form, which is the Custom Main Menu form. The user reverts to the standard Pendragon Forms main menu. If the password is not correct, a message is displayed. **Note:** Please use a more complex password than "Open Sesame"!



Using a Custom Main Menu form on the Handheld

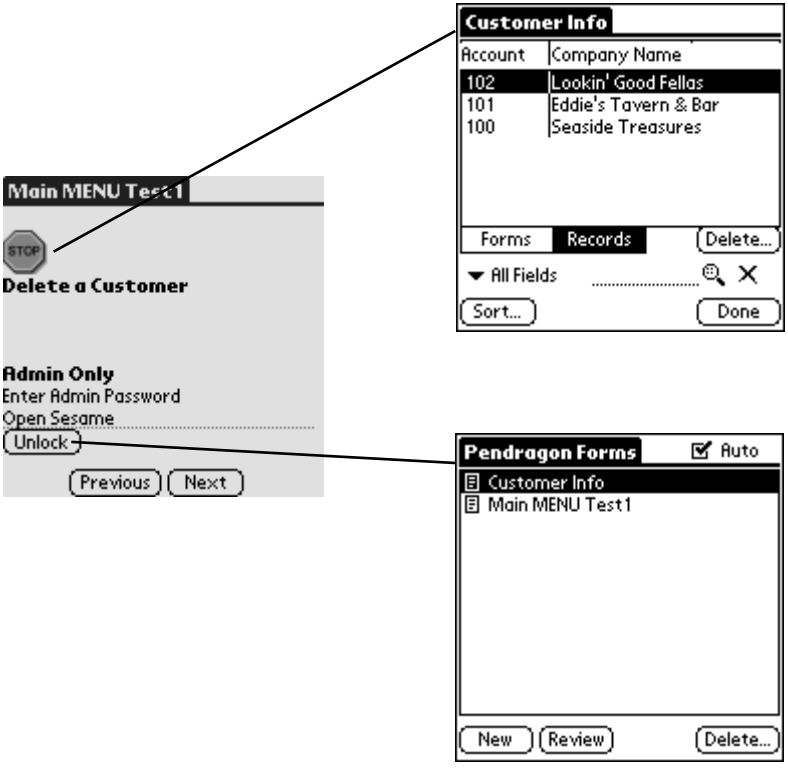
On the handheld, when the user taps the Forms icon, the Custom Main Menu form will be displayed.

Tapping an option to add a new record will jump to a form and create a new records to fill in. Tapping an option to review records displays a review screen of existing records.



If deletion is allowed, tapping an option to delete a record will jump to a Delete screen to select a record to delete.

Note that the Delete screen also permits the deletion of form designs, which is why it is recommended that you set the Advanced Form Property of Disable Form Deletion on the Custom Main Menu form, as well as on all other forms that you are installing on the handheld.
(See page 179.)



If you have set up an administrative password to access the standard Pendragon Forms main menu, then entering the password and tapping the button to unlock the Custom Main Menu form will end the Custom Main Menu form and revert to the standard Pendragon Forms main menu that shows the list of forms on the handheld.

Using a Custom Main Menu form to Filter Records

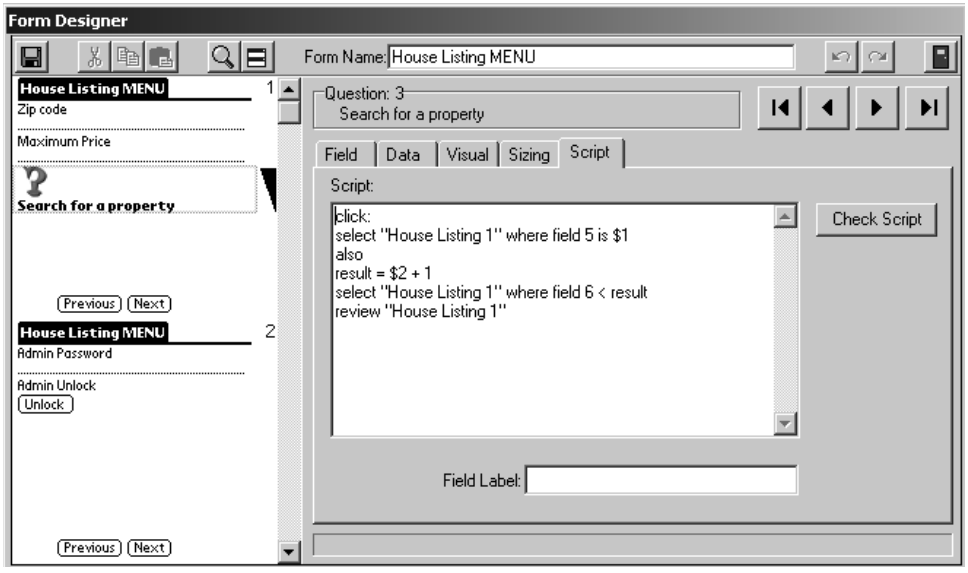
If records of a form are pre-loaded onto the handheld, a Custom Main Menu form can be set up as a way to filter the records. That is, the Custom Main Menu form acts as a place to enter selection criteria.

The **review** statement preserves any **select** statement filters that have been set by a script.
The **also** statement is used to combine select statements.

In the form below, field 1 stores a Zip code, and field 2 stores a Maximum Price that a potential customer wants to pay for a house. Field 3 is a Section field with a **click:** event that lets the user view records based on the criteria set up in fields 1 and 2. The script in field 3 is:

```
click:
  select "House Listing 1" where field 5 is $1
  also
  result = $2 + 1
  select "House Listing 1" where field 6 < result
  review "House Listing 1"
```

In this script, "House Listing 1" is the name of a form that contains one record per house on sale. Field 5 of "House Listing 1" is a Zip code, and field 6 is the Asking Price of the seller.
The first **select** statement in the script selects all records in "House Listing 1" that match the zip code entered on the Custom Main Menu form. The **also** statement saves the currently selected records, and applies the next select statement on top of the existing selected records.

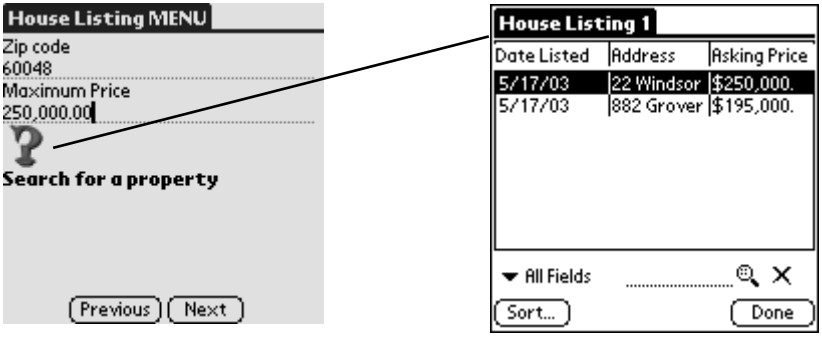


The Custom Main Menu form refers to a Maximum Price of the buyer, and so to include the maximum price in the search, the result = $2 + 1 statement sets the **result** variable to $1 more than the maximum.

The second **select** statement then applies a filter in which records are selected if the seller's Asking Price is less then the result **variable**.

The **review** statement then displays the selected records, that is, all records within a certain Zip code and where the seller's asking price is less than the buyer's maximum price.

On the handheld, when the user enters a Zip code and a maximum buyer's price and then taps the Section field to perform a search, a list of available houses that meet the criteria are displayed. The user can tap on a record to select it and view details.



22. Linking to an External Access Database

With Pendragon Forms it is possible to link to an external Microsoft Access 97, Access 2000, or Access 2002 (Access XP) database instead of the Pendragon Forms database. This feature is particularly useful if you have your own existing Access database and you want to send data from your database to the handheld.

Here are some important issues to consider when linking to your own Access database:

Does my database table have a primary key?

A primary key is a field or combination of fields that uniquely identify a record.
No two records can have the same value for the primary key.

Pendragon Forms uses a primary key to tell if a record on the handheld is new or if the record already exists in the external Access database. If the primary key field(s) of a record are not in the database, then the record on the handheld is new and should be added to the database during synchronization. If the primary key field(s) of a record are in the Access database already, then the record on the handheld is not new, and during synchronization the existing record in the database should be updated.

Warning: If the database table in your existing Access database does not have a primary key, you will not be able to update any records on the handheld. Refer to your Microsoft Access documentation on how to select a primary key for a database table.

Whatever primary key you use in your database table, the same primary key must be used in the corresponding Pendragon Form. The primary key can be one field such as a Customer ID#, or a combination of fields such as a Customer Account Number and a Date of Visit.

- To prevent primary keys from accidently being corrupted by the handheld user, any existing records which are sent from the PC to the handheld will have the primary key field(s) set to being read-only on the handheld.

Will the handheld users be allowed to create new records?

If the user can create new records, the uniqueness of primary keys has to be protected, so that new records on the handheld do not overwrite existing records on the PC.

- The Pendragon Forms conduit compares new records on the handheld to existing records in the database during the HotSync data transfer. If a new record has a primary key which is the same as an existing primary key, the new record will not be sent to the database, and will be flagged on the handheld. The user can then change the record on the handheld to have a unique primary key.

How will you limit the number of records which get sent to the handheld?

Since the handheld has limited memory compared to a PC, there must be a mechanism for removing records from the handheld, or for determining which handheld receives which record.

- The Advanced Form Properties screen allows you to specify the Additional Download criteria that will determine which records from the database are sent to the handheld. You will need to specify the Additional Download Criteria before you link the Pendragon form to your external database table.

When linking to a parent form and a subform, the parent form must be created first.

If you have referential integrity rules in your Access database, whereby a child record cannot be created before a parent record, you will need to take care with the order in which you create a parent form and subform in Pendragon Forms.

When you create a form design, the Form ID# that is associated with the form is based on the creation date and time of the form. During synchronization, the Pendragon Forms conduit synchronizes forms in the order in which they were created, that is, starting with the smallest Form ID#. If you create a subform before a parent form, the Forms conduit will attempt to synchronize the subform first. If you are linking to an external Access database with referential integrity rules, this is equivalent to creating a child record before the parent record, and Access will give an error during synchronization.

The solution in this case is simply to create your parent form in Pendragon Forms before you create the subform. If you have already created the subform first, make a copy of the subform. The copied subform will have a later creation date than the parent form, and will therefore synchronize after the parent form. In the Subform List field of the parent form, you will need to make sure that you are referencing the copied subform and not the original.

Which Pendragon Forms field types can link to which Microsoft Access field types?

Although the Pendragon Forms Manager is an Access database itself, there are more field types in Pendragon Forms than there are in Microsoft Access. This gives you more flexibility when entering data on the handheld. However, if you want to link your Pendragon form to an external Access database, you will need to make sure that the fields on your Pendragon form are linking to an appropriate Access field type in your database table.

Here are the Access field types and their compatible Pendragon Forms field types:

Access Field Type	Compatible Pendragon Forms Field Type
Text (up to 255 characters)	Text (up to Max Length 255 characters) Popup List Lookup List Exclusive Lookup List Option 1 to 5 Yes/No Checkbox Completion Checkbox Custom Control
Memo	Text (with Max Length 2000 characters) Custom Control
Number: Byte	Numeric (with Min = 0, Max = 255, Integer = checked) Slider (within the range above)
Number: Integer	Numeric (with Min = -16384, Max = 16383, Integer = checked) Slider (within the range above)
Number: Long Integer	Numeric (with Min = -2147483648, Max = 2147483647, Integer = checked) Slider (within the range above)

Access Field Type	Compatible Pendragon Forms Field Type
Number: Single Precision	Numeric or Slider with a specific range. Slider with a specific range. (must have Integer = checked) Not recommended if you are creating an Access table from scratch, because the handheld has more precision than a single-precision field in Access. Double precision is preferred.
Number: Double Precision	Numeric Slider (must have Integer = checked)
Yes/No	Yes/No Checkbox (with a default value of Y or N, according to the convention used in your external database table) A default value is required because Access does not accept a null value in a Yes/No field, whereas in Pendragon Forms on the handheld the user can leave a Yes/No checkbox blank.
Currency	Currency
Date/Time	Date Only Date & Time Time Time Checkbox
AutoNumber	Numeric
OLE Object	Signature (150x50 monochrome pixels) Sketch Image

Sample existing Access database

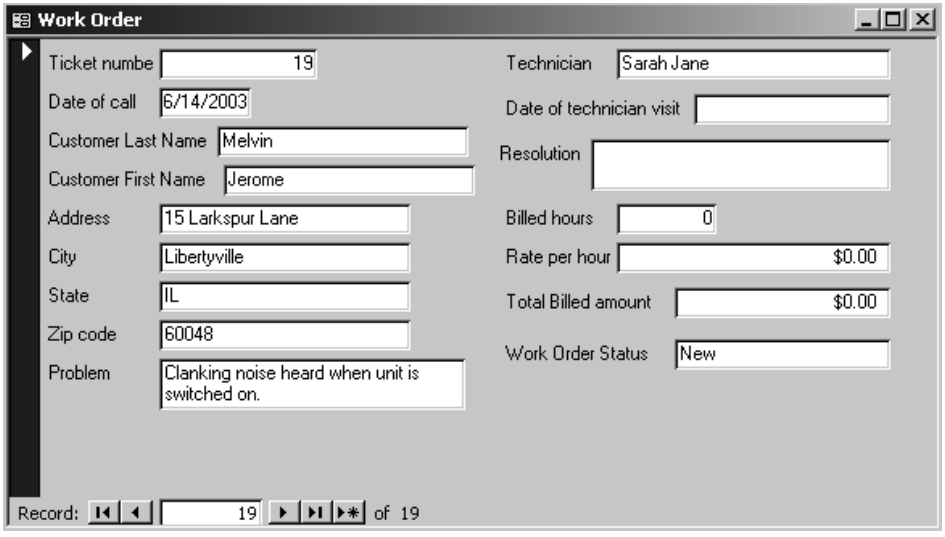
In order to illustrate linking Pendragon Forms to an existing Access database, we will consider putting the following simple work order database on the handheld:

Work Order : Table

Field Name	Data Type
Ticket number	AutoNumber
Date of call	Date/Time
Customer Last Name	Text
Customer First Name	Text
Address	Text
City	Text
State	Text
Zip code	Text
Problem	Text
Technician	Text
Date of technician visit	Date/Time
Resolution	Text
Billed hours	Number
Rate per hour	Currency
Total Billed amount	Currency
Work Order Status	Text

In this database, the Ticket Number field is the primary key and is an Autonumber field. This allows each work order to have a unique number.

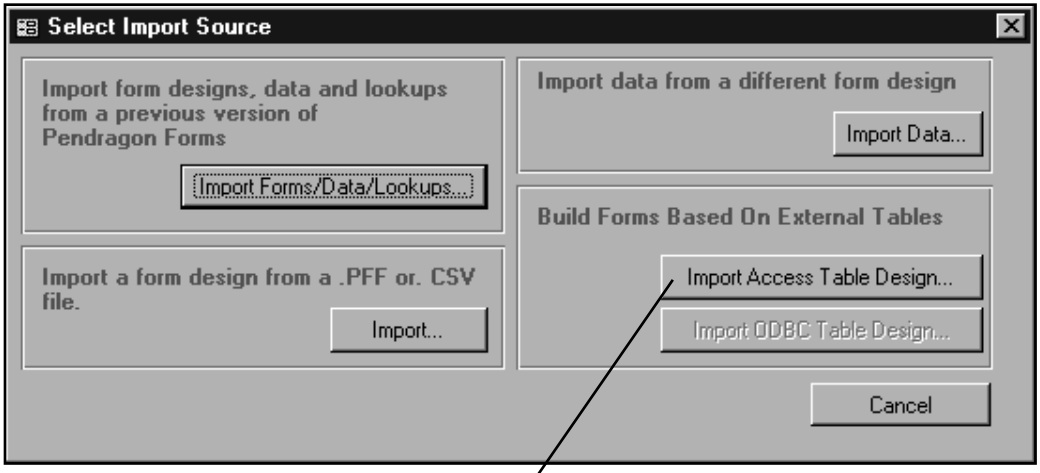
In Microsoft Access, a form has been created for someone to enter new work orders into the system. Customer information is entered, and the work order is assigned to a technician.
This information now needs to be sent to the handheld so that the technician can complete the work order in the field.



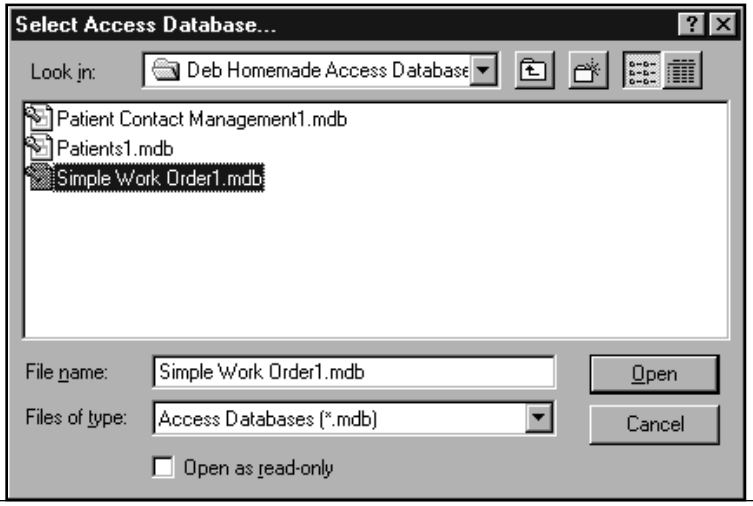
Step 1: Creating a form from an existing database table

The first step in the process of linking to an existing Access database is to create a Pendragon form which is based on the specific Access database table to which you want to link.

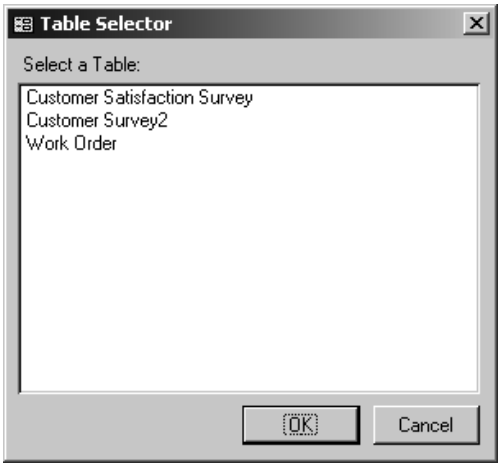
1a. In the Pendragon Forms Manager, click the Import button.



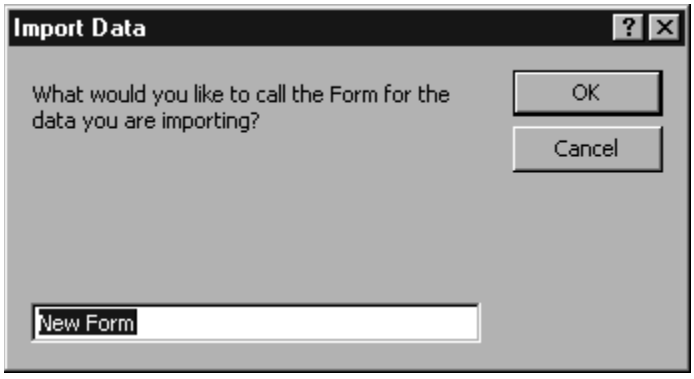
1b. Click the Import Access Table Design button. In the Select Access database window, choose the Access .mdb file to which you want to link.



1c. A Table Selector window appears, displaying a list of the database tables and queries within the selected Access database. Click on a table name and click OK.



1d. An Import Data window appears, prompting you for the name that you want to give the corresponding Pendragon form. Enter a name for the form and click OK.



1e. In the Forms List within the Pendragon Forms Manager, click on the name of the newly created form, then click the **Edit** button. In Step 2 on the next page, the form design will be edited for displaying on the handheld.

Step 2: Editing the form design for use on the Handheld

The Pendragon form that was created from an external Access database table may require editing.

2a. In the Form Designer window, you can edit and delete fields as follows:

- Fields that you do not want to put on the handheld can be deleted from the form design.
- Adjust the layout of fields in the Form Designer, for example, by making the question and answer components of a field fit on the same line, or occupy several lines.
- The names of the fields are based on the database column names from the Access database table. These can be modified to be more readable to the handheld user, for example a column name such as FName can be expanded to First Name.

  WARNING: Although you can change the field names, you should not change the database column names in the Advanced Field Properties window. The database column names are used to map to the existing Access database.

2b. Make sure that the fields in your form design that are marked as primary key fields match the primary key fields in your external Access database table.

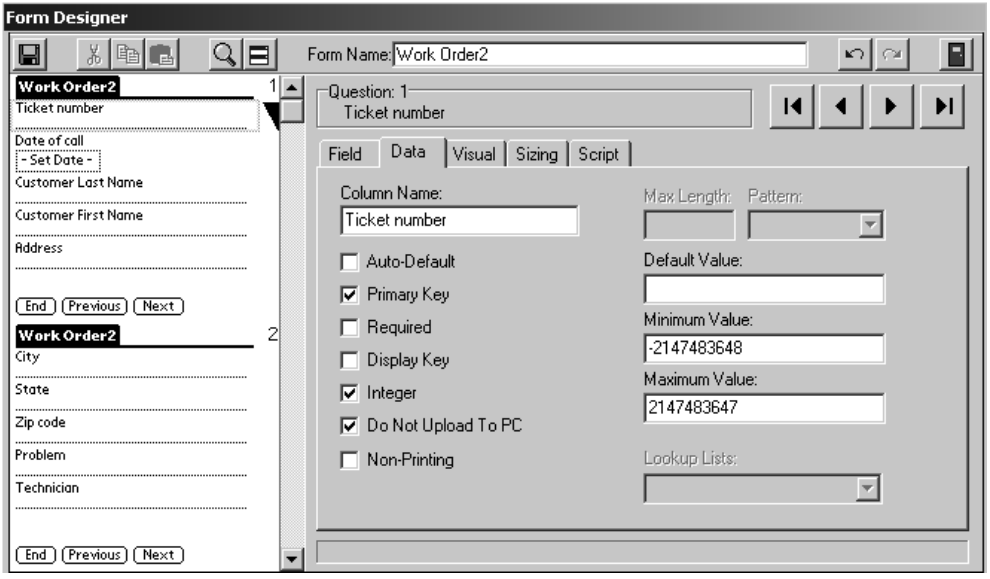
If you imported the form design from an external Access database table that already had primary keys, then the primary key fields in your form design should match the primary key fields in your external Access database.

If you are creating your Pendragon form before creating your external Access database table, you will need to manually check the Primary Key checkbox for each field that is part of your primary key. If you are allowing the handheld user to create new records on the handheld, then you should also set the Advanced Field Property of Required, to ensure that the handheld user fills in the primary key field(s) for every new record.

- To check whether a field is marked as a primary key field in Pendragon Forms, display the field in the Form Designer window and then click the Data tab. Make sure that the Primary Key checkbox is checked.
- In your external Access database, if you view your database table in design view, all the primary key fields will be marked with the icon of a key to the left of the column name.

If the primary key in the existing database table is an Autonumber field, Pendragon Forms treats the field as a special case on the form. The Autonumber field will be populated by Microsoft Access when records are sent to the existing database. However, because the Autonumber field is the primary key, records which are created on the handheld will need to have a unique value in this field at least temporarily until a number is assigned from the PC.

Pendragon Forms automatically makes some special settings in the Advanced Field Properties window to make it possible to store a unique number on the handheld which will be discarded when a new record is sent to the PC.

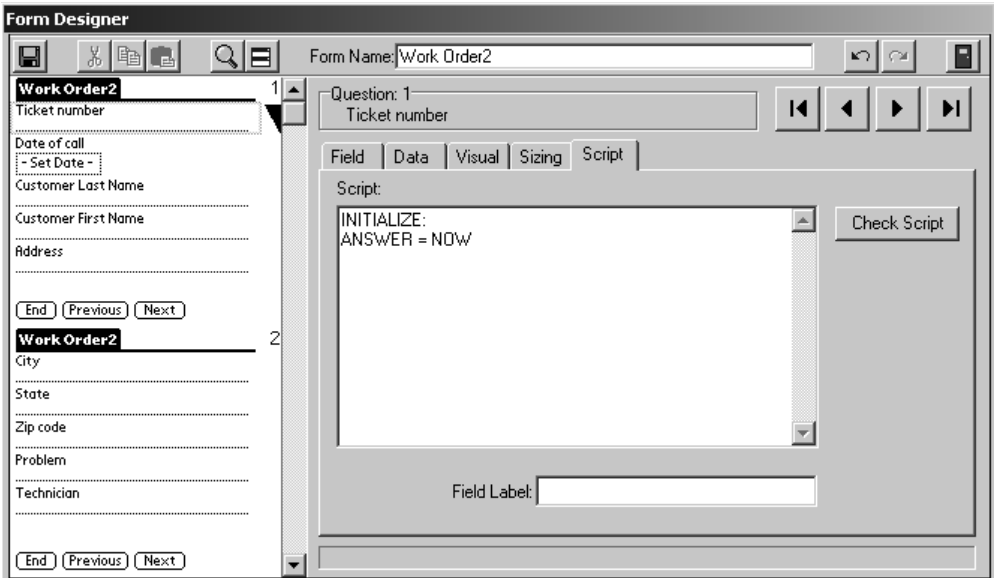


Primary key - this option is checked to indicate that the Autonumber field is the primary key on the form.

- More than one field on a form can be primary. For example, a customer database may use Customer Account Number and Date of Visit as the combined primary key. If a primary key field is not an Autonumber field, and you are going to allow the user to create new records on the handheld, then make the primary key fields Required fields, but do **not** make them read-only.
- If an Autonumber field is the primary key, and this field is going to be filled in via a script (see next page), you can set the primary key to be **Read-Only** to prevent accidental corruption of the primary key on the handheld.

Do Not Upload to PC - this is a special option, used only with AutoNumber fields. When new records are created on the handheld, a unique value will be assigned in the Autonumber field, but this value will not be sent to the PC. This will allow the database on the PC to assign a number according to the sequence in the existing database.

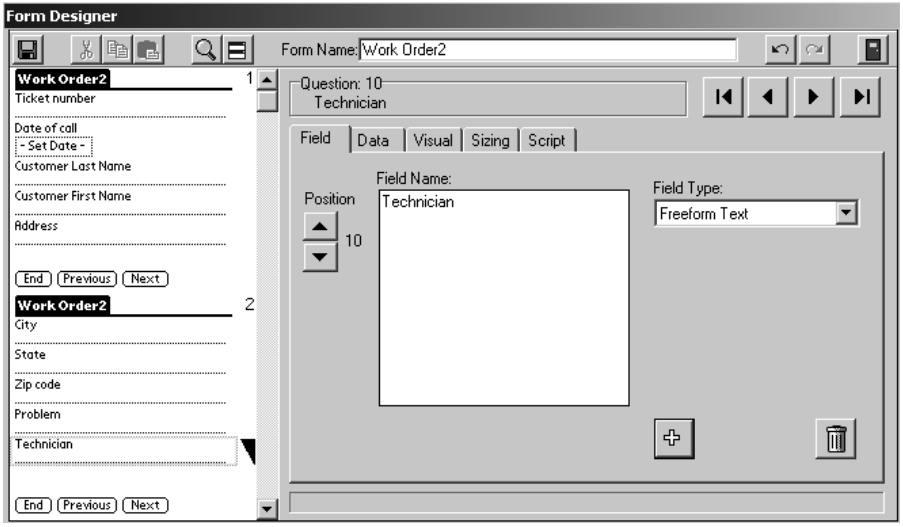
- To assign a unique value on the handheld, Pendragon Forms automatically adds the following script to the Autonumber field:



- An **initialize:** script only runs when a new record is created. By setting the value in the Autonumber field to **now**, a unique number is stored in the field. (The number is equal to the number of seconds since 01/01/1904). This number is just used in order to have a unique value on the handheld until the record is sent to the PC and is assigned a unique number by the Autonumber field in the database.

2c. If you need to control which handheld user receives which database record, then there should be a column in your existing database for storing the handheld user name, that is, the name associated with a given handheld unit.

In our database example, the Technician field serves this purpose and allows the person entering data on the PC to assign which record will go to which handheld.



In this example the Technician field is displayed on the form so that the handheld user can see that his/her name has been assigned. (The field can be made Read-Only to prevent the handheld user from assigning someone else.)

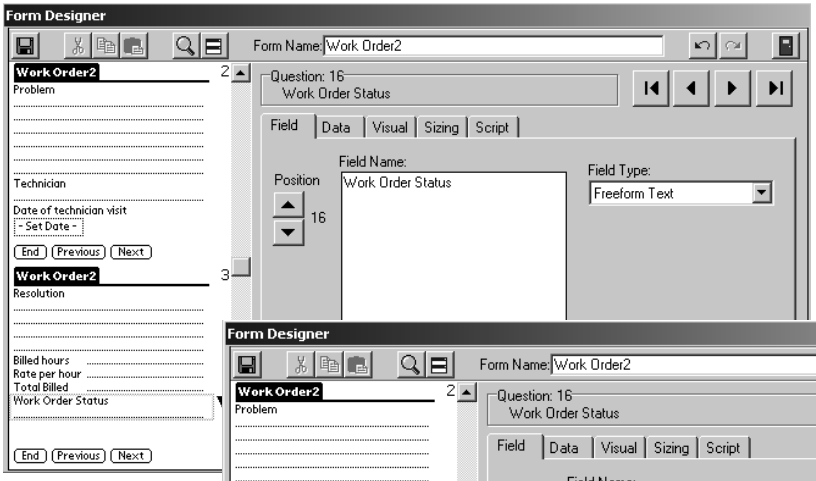
It is not actually necessary have a field on the Pendragon form for this information, as long as there is a field in the database which can be used to determine the criteria for downloading records. (See Step 3.)

Every Pendragon form has three fields which are generated automatically: UnitID, UserName and TimeStamp. The UserName field is the handheld user name, and the TimeStamp field is the creation date and time of each new record on the handheld.
If your existing database does not have a column for storing the handheld user name, and you want to create one, you can create a column called UserName. If you also want to store the creation date and time of each handheld record, create a column in your database called TimeStamp.

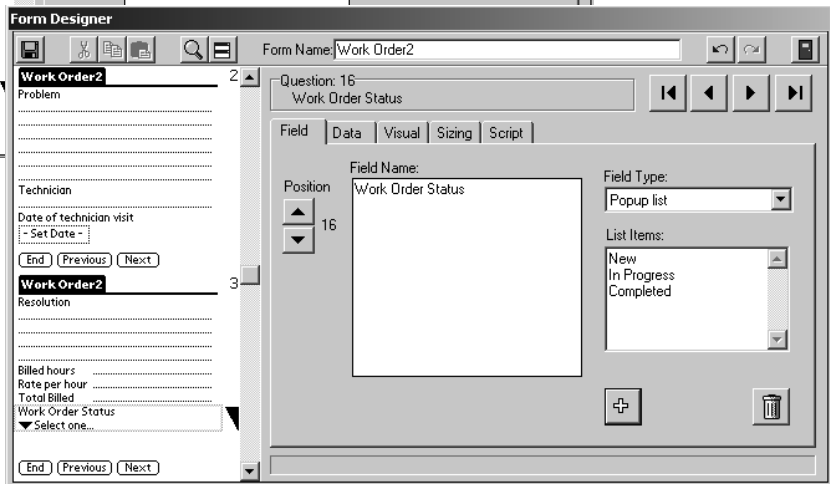
2d. Some field types can be changed in the form design, to promote accurate and efficient data entry on the handheld unit.

In this example, a field called Work Order Status was initially assigned to be a Text field type when the form design was created from the database table. However, if for example there are only three possible Work Order Status values, then the field should be changed to a Popup List or Lookup List to ensure that the handheld user always enters an appropriate value in the field.

Before:



After:



Check the fields on your form to see where data entry on the handheld can be optimized by using Popup Lists, Lookup Lists or Yes/No checkboxes instead of Text fields. (Your external database table must have compatible data types. For example, you would not want to change a field type to a Date field if the external database column is a Yes/No field.)

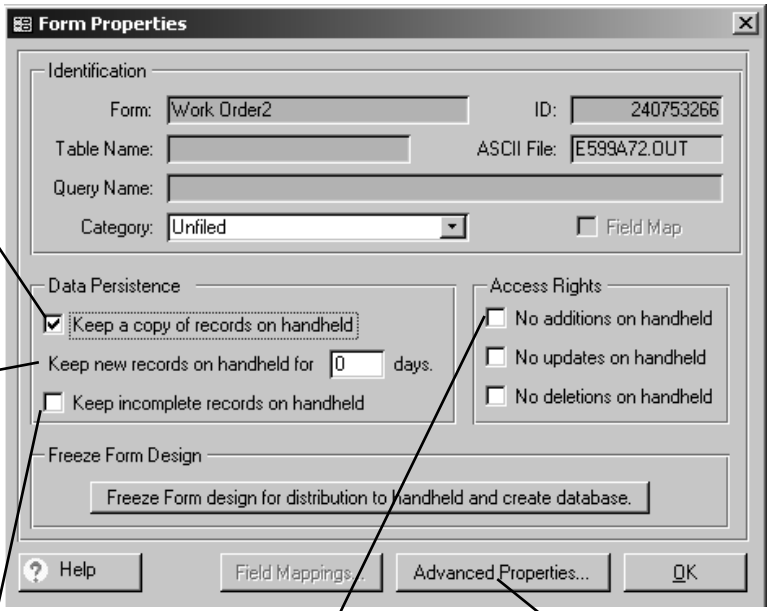
When you are satisfied with your form design, close the Form Designer window.

Step 3: Controlling which records go to the Handheld

Since the storage space on the handhheld is limited, it is very important to specify the rules which will govern which records are sent from the PC to the handheld, and when records will be removed from the handheld.

3a. In the Pendragon Forms Manager, click on the name of your form, and then click the Properties button.

In the Data Persistence section, check the box *Keep a copy of records on handheld.* This allows records to be sent to the handheld.



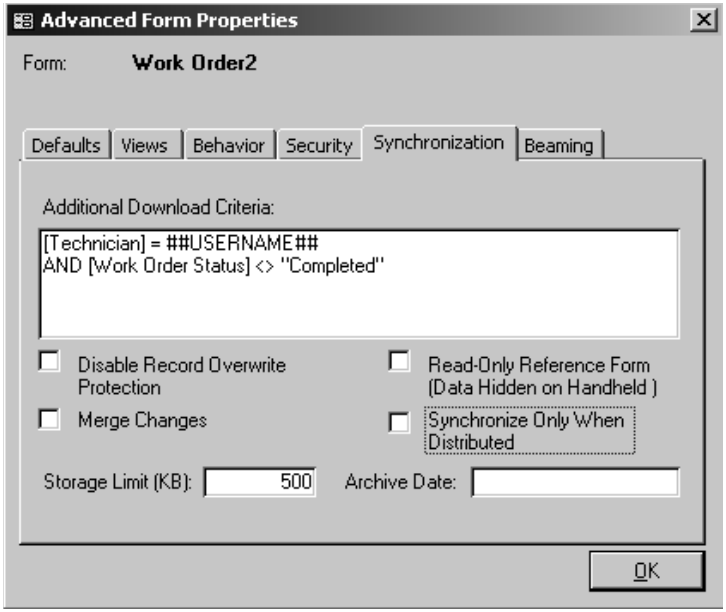
The option *Keep new records on handheld for X days* can only be used if the external database has a TimeStamp column for storing record creation dates.

The option *Keep incomplete records on handheld* can only be used if the Completion checkbox field on the Pendragon form is mapping to a Text field in the external database.

If you do not want the handheld user to create new records on the handheld, check the box *No additions on handheld*. This would be the case if new records are always generated on the PC.

To specify which records are sent to the handheld, click the Advanced Properties button.

3b. The Advanced Form Properties window is where you specify the download criteria for which records get sent to the handheld, and which records are removed from the handheld.



The Additional Download Criteria field stores an SQL WHERE statement which will restrict the records that get sent to the handheld.

##USERNAME## is a special wildcard which Pendragon Forms uses to represent the handheld user name. `[Technician] = ##USERNAME##` means that the Technician field in the database has to match the handheld user name for the record to be sent.

`[Work Order Status] <> "Completed"` means that if a field called Work Order Status is not set to Completed, then the record is sent to the handheld. If the handheld user changes the Work Order Status to Completed, the record will be sent to the PC during the next HotSync data transfer, and then be removed from the handheld.

The general format of the WHERE clause is:

`[Database-Column-Name] = "Criteria"`

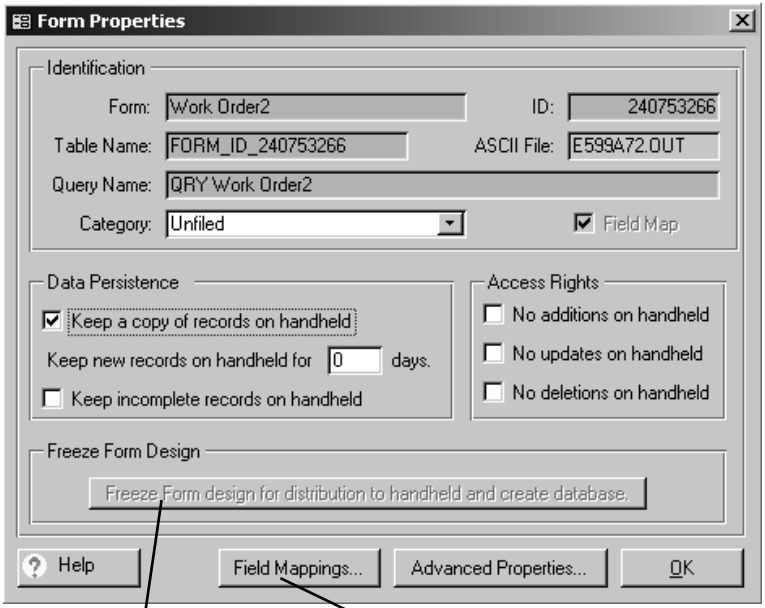
See *Additional Download Criteria* on page 181 for more information on WHERE clauses.

Step 4: Linking the form to the external Access database

Up to this point, the form that has been created based on the existing Access database table is not yet linked to the database table. Once the form properties and Advanced form properties have been selected, the form can be frozen and then linked to the external Access database table.

4a. Before you freeze your form design, make sure that the field(s) that you have selected as primary key fields in your form design are also the primary key field(s) in your external Access database.

4b. In the Properties window, freeze the form design.



Click on the Freeze form design button to freeze the form design.

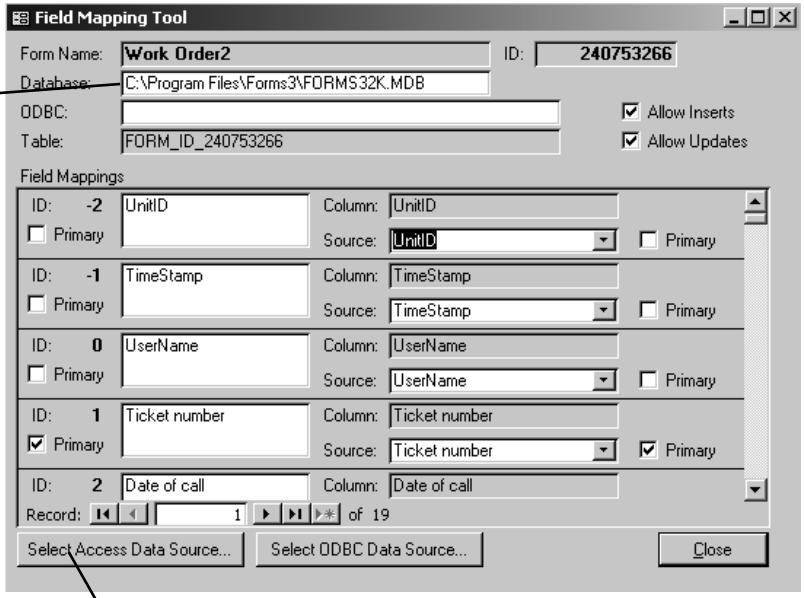
Once the form is frozen, the Field Mappings button becomes accessible.

Click the Field Mappings button to link the Pendragon form to your Access database table.

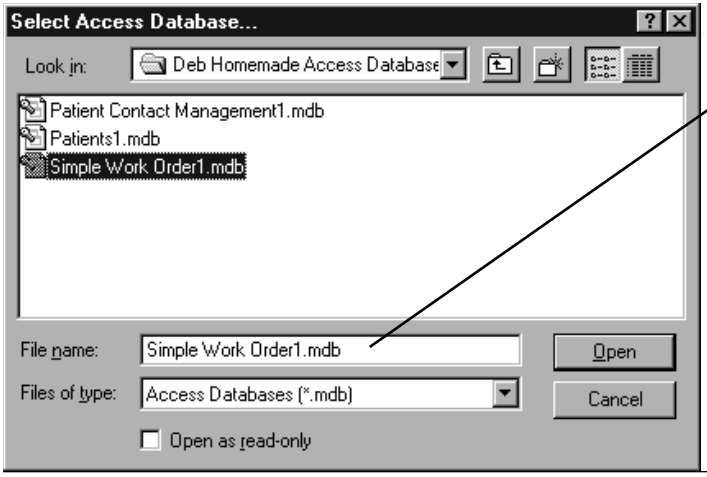
IMPORTANT!
If you change Advanced Form Properties after doing Field Mappings, you will need to re-do Field Mappings.

4c. The Field Mappings window allows you to determine which field on your Pendragon Form will be stored in which column of your external database.

The default database is the Pendragon Forms database. At this point, if you do not make any changes, then data from the handheld would be sent back to the Pendragon Forms database like a regular form which is not linked to an external Access database.



To link the form to an external Access database table, click the Select Access Data Source button.



Select the external Access database name, and click the Open button.

Then you will be prompted to select the specific database table or query to link to.

4d. Once an external database table has been selected, you can verify that the fields on your Pendragon Form are mapping to the correct columns in your database.

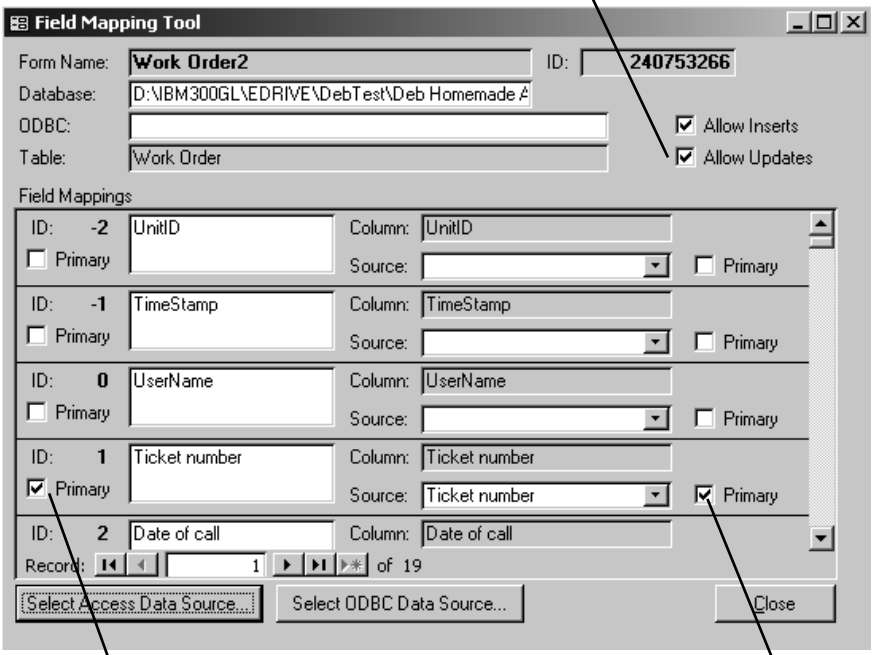
The Column name is the Pendragon form column name.

The Source field is the column from your external database.

If you created your form from the Access database table initially, then the Columns should be mapped to the correct Source. Scroll down the list of fields to verify this.

The UnitID, UserName and TimeStamp fields are implicit on the handheld. Normally, when linking to an existing Access database table with your own primary key, these fields will be unbound, meaning that data in these fields will not be sent to the external database table. However, in the example below, the UserName column in the Pendragon form is being mapped to a column called Technician in the external Access database.

Checking the Allow Inserts checkbox means that you want to allow the handheld user to create new records on the handheld. The Allow Updates checkbox means that database records are allowed to be updated on the handheld.



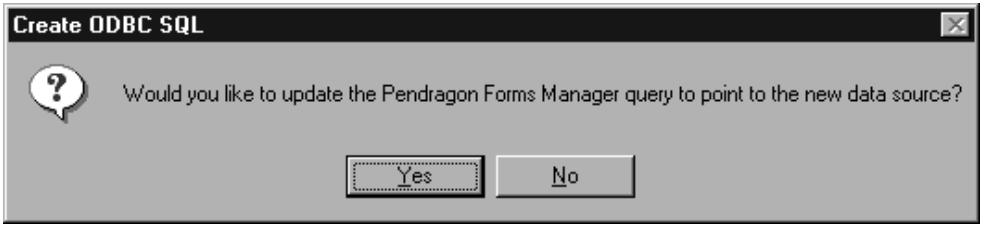
The Primary key(s) on the form must match the primary key(s) in the external Access database table. If they do not, you will need to modify either the form design or the external Access database table so that the primary keys match. Then re-do the field mapping.

When you click the Close button on the Field Mapping window, you will be prompted to save changes to the field mapping. Choose Yes.

If your database has its own primary key and you do not have columns in your database for storing the UnitID, UserName and Timestamp fields that Pendragon Forms creates with every record, you will also receive the following dialog:

This dialog is informing you that the UnitID, UserName and TimeStamp fields will be unbound, meaning that data in these fields will not be stored in your external Access database. Choose OK. As long as you have your own primary key in the external Access database, and that primary key matches the primary key fields in your Pendragon form design, you do not need to keep the UnitID, UserName and TimeStamp fields. If you want to retain this information, then your external database has to have columns for storing the UnitID, UserName and TimeStamp and you will need to re-do the field mapping.

Another dialog window that is displayed is:



Choose Yes. Pendragon Forms will attempt to link the use of the Edit/View button to your external database, so that if you click Shift + Edit/View you can view the data in your external database from within the Pendragon Forms Manager. There are some limitations - see Viewing Data on the PC, page 411.

Step 5: Sending the form to the Handheld

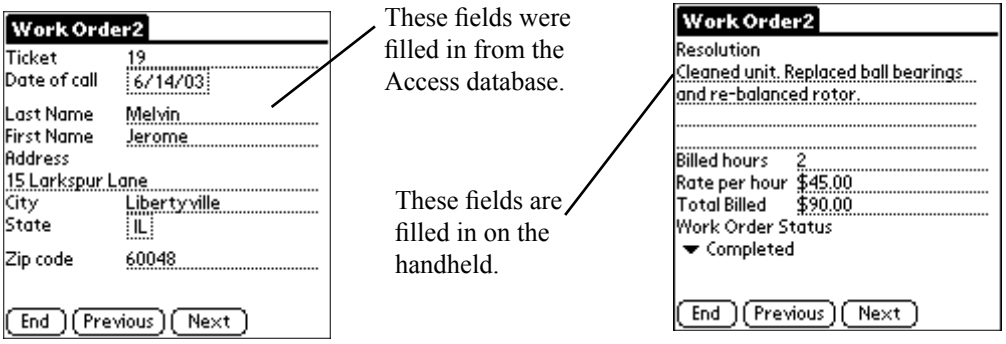
Once field mappings have been set, the form is ready to be sent to the handheld.

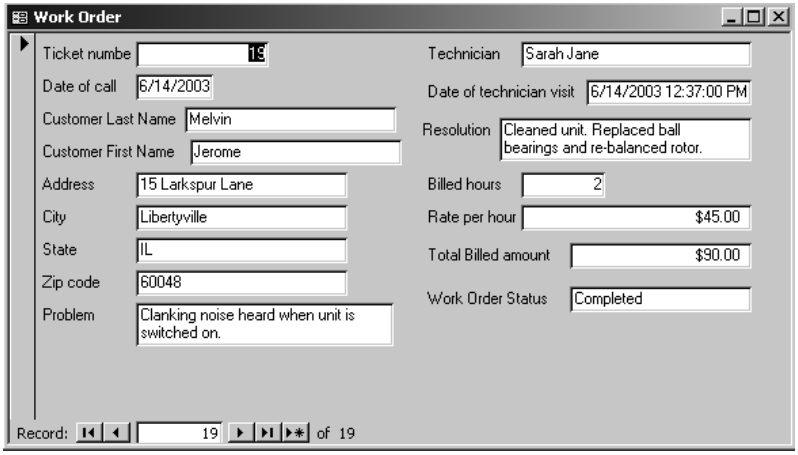
5a. Close the Field Mappings window, then close the Properties window.

5b. Click on the name of the form, then click the Distribute button.

- The form will be placed in the Default group. If you are using user groups, click on the Groups button and assign the form to a user group.

5c. On the next HotSync data transfer, the form will be sent to the handheld, as well as any records from the database which have been selected for that handheld unit.





When the handheld user fills out the Pendragon Form and synchronizes, the record updates the database record in the external Access database.

Step 6: Viewing data on the PC

If you are linking to an external database, and during the field-mapping process (see page 409) you selected to update the Pendragon Forms query to point to the new data source (i.e. your external database), then if you click on the name of the form in the Forms Manager and use the Shift + Edit/View button, you may be able to view the data in your external database table from within Pendragon Forms.

If you just use the Edit/View button and not Shift + Edit/View, the UnitID, UserName and TimeStamp fields will be visible but will not contain any valid data if your external database does not store the data in these fields. Another limitation of using Edit/View is that if a column name in Pendragon Forms does not match the column name to which you are field mapping, then the data for that column will not be visible from within Pendragon Forms.

Shift + Edit/View hides the UnitID, UserName and TimeStamp fields from view. However, a limitation of using Shift + Edit/View is that if you try to edit a record from within Pendragon Forms, fields that are Popup Lists or Lookup Lists will not display any lists.

- The best way to view the data in the external database is to open the external database directly, instead of trying to view the data from within Pendragon Forms.

Troubleshooting Tips

Refer to Appendix B, *Troubleshooting*, page 448, for tips on problems that can occcur when linking to an external Access database.

23. Linking to an ODBC Database

In addition to being able to link to external Microsoft Access databases, Pendragon Forms supports linking to external ODBC databases such as SQL Server, Oracle, and Informix. The process of linking to an external ODBC database is similar to linking to an Access database, with a few extra steps.

There are two possible ways to link to ODBC databases:

- Option 1: Creating a linked table in Access
- Option 2: Mapping directly to an ODBC table

Option 1: Creating a Linked Table in Access

Before a link can be created, a machine Data Source Name has to be created.

To create a machine Data Source Name:

i. In Windows, click on Start...Settings...Control Panel. In the Control Panel, double-click on the 32bit ODBC icon.

ii. An ODBC Data Source Administrator window appears. Click on the System DSN tab. Check if a Data Source Name already exists for the database to which you want to link. If a Data Source Name already exists, you do not need to create one.

iii. If you need to create a Data Source Name, click the Add button.

iv. You will need to select a driver (e.g. Oracle driver), enter a name for the Data Source Name, and select the data source (i.e. the path and specific database name to which you want to link.) Different drivers may require different information. ODBC drivers usually ship with a Help file. Refer to the manufacturer of the driver for further information.

For performance reasons, Microsoft recommends creating a linked table in the Access database (i.e. the Pendragon Forms Manager). Once you have created a machine Data Source Name, you can go into the Pendragon Forms program and link to the Data Source Name, as described on the next page.

Do the following to create a linked table in the Pendragon Forms database that links to your Data Source Name.

a. Open the Pendragon Forms Manager. Bring the Forms3: Database window to the foreground. (If you cannot see this window, click on Window...Cascade.)

b. Click on the File menu, then choose Get External Data...Link Tables.

c. A Link window appears. Select to view files of type ODBC databases. A Select Data Source window appears. Click on the Machine Data Source tab, then double-click on the Data Source Name that you previously created.

d. If you have to enter a password to access the external database, you will be prompted for the password.

e A Link Tables window appears, displaying a list of database tables within the selected database. Click on a database table and click OK.

f. If your database table does not have a primary key, you will be prompted to select one. The primary key is used to uniquely identify each record, and will be used on the handheld.

g. In the Forms3: Database window, click on the Tables tab. Look for the name of the database table to which you just linked. An arrow next to the name indicates that this is a link.

h. Click on the database table name, then click the Open button to view the database table. Verify that you are linking to the correct table and are able to view the records that you want to send to the handheld. Then close the database table window.

i. Bring the Pendragon Forms Manager window to the foreground. Click on the Import button, then click Import Access Table Design.

j. Choose to open C:\Program Files\Forms3\Forms32k.mdb (or Forms3.mdb if you have Access 97), and select the name of the linked database table.

k. Follow instructions on pages 398-411, Step 1c to Step 6. When doing Field Mappings in Step 4, click the Select Access database button, and again select C:\Program Files\Forms3\Forms32k.mdb (or Forms3.mdb) and the linked table.

Option 2: Mapping directly to an ODBC table

Mapping directly to an ODBC table is slightly faster to create than a linked table, but may be slower during the HotSync process than using a linked table.

To setup a direct link to ODBC:

a. In the Pendragon Forms Manager, click the Import button, then click the Import ODBC button.

b. Select the machine data source and log on to the external database if prompted.

c. Select a database table within the external database to link to.

d. Follow instructions on pages 398-411, Step 1c to Step 6. When doing Field Mappings in Step 4, click on the Select ODBC Database button, and select the machine data source, enter the password for that database if one is required, and select the database table to which you want to link.

e. As you leave the Field Mappings screen, you will be prompted *Would you like to update the query to point to the new data source?* If you select Yes, you will be able to use the Pendragon Forms Edit/View button to view data in the external database table. If you select No, then the Edit/View button will not work, and you will need to open the external database to view your data.

Troubleshooting Tips

See Appendix B, Troubleshooting, page 448 for general troubleshooting tips when linking to an external database.

One error that can occur when linking to an ODBC database is related to the way that database columns are named. When database column and table names contain spaces or special symbols, Microsoft Access SQL uses square brackets [and] as quotes to mark the beginning and end of the name. However, other dialects of SQL, including ODBC SQL, do not recognize square brackets. Pendragon Forms uses its best judgement when adding square brackets, but it does not always generate SQL that is appropriate for querying ODBC data sources. For this reason, an option is provided to remove the square brackets when generating SQL.

To change the bracket mode, click the Options button in the Forms Manager window. The default option in the Bracket Mode field is Smart, meaning that Pendragon Forms will try to determine when to use square brackets or not. You can change the default to always use brackets or to never use brackets.

Note: If you change the Bracket Mode, you will need to click the Field Mapping button in the Properties window, and re-save the field mapping.

Security concerns when using ODBC databases

All handheld users will need to have access to the Forms32k.mdb database (or Forms3.mdb if you have Access 97) in order to synchronize. There is therefore a risk that the Forms32k.mdb or Forms3.mdb file can be accidentally deleted by an individual.

- It is extremely important to back up the Forms32k.mdb (or Forms3.mdb) database on a regular basis. See page 416.

If you are using a linked table in Access to link to an external ODBC database, your data will not be lost if the Forms32k.mdb (or Forms3.mdb) file is lost, but you will still need to recover your form designs from a backup copy of the Forms Manager. To enable handheld users to synchronize, you will need to restore a backup of the Forms database.

Another security concern involves the use of passwords to access the back-end database. If you are using linked tables in Access, the password to access the external ODBC database will be stored in the Forms database. If you are mapping directly to ODBC, the password to access the external database will be visible in the Field mappings screen in the Forms Manager.

If is not an acceptable risk for handheld users to have access to passwords to the back-end database, see *Security concerns in a Multi-User environment*, on page 428.

24. Backing Up the Forms Database

Pendragon Forms is designed to be centrally controlled from the PC. In order to synchronize a form on your handheld, each Form ID# on the handheld must exactly match the Form ID# of a form in the database on your PC.

If you lose the program on the handheld, but you still have the database on your PC, you can recover all of your form designs and all data up to your last HotSync data transfer.

Warning: If you lose the database on the PC, even if you still have the program on the handheld you will not be able to synchronize Pendragon Forms unless you can recover the form designs on the PC. It is therefore very important to backup the files on the PC, so that in the event of a hard drive failure you can recover your form designs and data.

Backing up the Database

On a regular basis, you should back up the entire C:\Program Files\Forms3 directory folder. In particular, you should back up the following files within the Forms3 folder:

- Forms3.mdb (Access 97 version)
- Forms32k.mdb (Access 2000 / Access XP (2002) version)

This file contains the Pendragon Forms source code, as well as your form designs and all data up to your last successful synchronization.

If you are linking to an external Access or ODBC database, you must back up your external database in order to protect your records.

Backing up Form Designs

As a precaution, whenever you distribute a form to the handheld, Pendragon Forms makes a backup of the form design in a .PFF file, which is placed in the C:\Program Files\Forms3\PilotF folder.

You should also backup these .PFF files to a ZIP disk or floppy disk, so that in the event of a hard drive failure, you will be able to re-install Pendragon Forms from the CD-ROM and then import your form designs into the database. To manually make a backup of a single form design, you can export the form to a Pendragon Forms Design (.PFF) file - see pages 204-205.

Recovering Forms Designs

If you accidently delete a form design from the PC but the form is still on the handheld, and you need to synchronize the form, first check the Recycle Bin (see page 34) to try to recover the form.

If the form design is not in the Recycle Bin, go into Windows Explorer and check whether the form design .PFF file is still in the C:\Program Files\Forms3\PilotF folder. To figure out which .PFF file corresponds to your form design, tap the Forms icon on the handheld, then tap the Menu button and choose Help...Form Info. A dialog box will show an ASCII file name.

The .PFF file corresponding to the form design will have the same file name as the ASCII file name, but the file extension will be .PFF instead of .OUT.

If you find the correct .PFF file in the PilotF folder, you can then go into Pendragon Forms and import the .PFF file back into the database. See page 204 for instructions on importing a .PFF file. You will need to re-create lookup lists and freeze the imported form design and re-distribute the form.

IMPORTANT: Before synchronizing, tap the name of the form on the handheld, then tap the Review button. Tap the handheld Menu button (the drop-down menu icon below the House icon) and choose **Mark All Changed**. This will force all records on the handheld to be sent to the PC on the next synchronization.

Backing up Data within a Form

To make a backup of the data within an individual form, you can export the data to ASCII (see page 196) and save the ASCII file to ZIP disk or floppy disk.

Switching on ASCII Backups

Pendragon Forms stores data from the handheld directly in the Forms database during synchronization. If your data is extremely important, or if you have a problem synchronizing your data and you urgently need to back up the data that is on the handheld, you can switch on ASCII backups by clicking Start...Programs...Pendragon Forms...Configuration Tool. On the Configuration tab of the Configuration window, check the box labeled *Keep ASCII Backup Files for synchronized data*.

When ASCII backups are switched on, data from each form design will be stored in an ASCII file with a .OUT file extension in the C:\Program Files\Forms3\PilotF folder, as well as being stored in the Forms database. The Form Info dialog (see picture above) identifies which .OUT file corresponds to a given form design. Switching on ASCII backups may have security implications, because you are essentially making two copies of your data - in the database and in the .OUT file.

VFS Backup on the Handheld

Palm OS version 4.0 (and higher) supports VFS - Virtual File System - to allow the use of external storage media such as a compact flash card, an SD (Secure Digital) card, an MMC (Multi-Media Card) or a memory stick. Examples of handhelds that support VFS are Palm Tungsten devices or the Palm Zire 71 with SD or MMC cards, and the Sony Clie with memory stick.

If your handheld device has Palm OS 4.0 and supports VFS, then the VFS Backup options in Pendragon Forms can be used to perform a backup of new or changed records from the handheld to the external storage media. You may want to use VFS with Pendragon Forms if the data that you are collecting on the handheld is extremely important to you, and you do not want to risk losing the data if the handheld loses battery power or breaks. By performing a backup to external media, you will have a second copy of your data.

Switching on VFS Backup for a Form Design

The VFS Backup options are an Advanced Form Property, described in detail on page 178.
There are three VFS Backup options in Pendragon Forms:

- **Use Backup If Available** - causes records for this form to be backed up if the media card is present. If the media card is not present, no backup occurs.
- **Require Backup Media** - the media card must be present in order to use this form design, and all new and changed records for this form are backed up.
- **Disable Backup Feature** - no backup occurs even if the media card is present. This is the default setting.

You can select a VFS Backup option before you distribute a form design. If you change the VFS Backup option after a form has been sent to the handheld, you will need to re-distribute the form and synchronize for the change to take effect.

How VFS Backup Works on the Handheld

If VFS Backup is enabled for a form design, then each new record and each modified record is automatically written to the external media storage device. The backup file on the storage media essentially contains a history of activity for that form design. For example, if the handheld user creates a new record, and then two days later makes a change to that record, the backup file will

contain one entry with the contents of the record when it was created, and a second entry with the contents of the record two days later when the record was modified. If the data in the backup file is restored, the original record will be written to the handheld, and then will be replaced by the changed record.

Warnings about using VFS Backup

If you manually delete a record on the handheld, performing a restore from the external media will not bring the record back.

Pendragon Forms can only restore from the external storage media to a handheld device containing the appropriate form design. This means that if the handheld device is lost but the external media is safe, a replacement handheld device will have to be obtained, and the replacement handheld must be assigned the same user name as the original handheld. Pendragon Forms must be installed on the replacement handheld, and the correct form design will have to be synchronized to the handheld before the records on the external media card can be restored to the replacement handheld.

If the Use Backup if Available option is set, there is a risk that the user might create a record with the external media present, but then make changes to the record when the external media is not present in the handheld device. In this example, the original record is backed up but the changes are not. If the user then restores from the storage media to the same handheld, the more recent changes will be lost, overwritten by the original copy of the record that was present on the external media card.

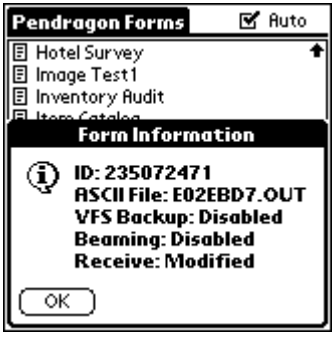
One way to ensure that all changes to records are backed up is to set the Require Backup Media option. In this case, the handheld user cannot use the form - even to review records - unless the external media is present in the handheld. The risk in this case is that if the handheld user loses the media card, then he/she cannot use the form until another media card is inserted. This may be a problem if the user is on a field expedition and no replacement cards are available.

Restoring records from the external media card to the handheld requires caution, and should only be attempted if all the records are lost from the handheld. There is a risk that the card may contain older records that have since been modified on the PC, or modified on the handheld without being backed up on the media card. Restoring from the external media card would cause changes on the PC or handheld to be lost. Always synchronize **before** performing a restore, and also backup the Forms database on the PC before performing a restore as well. To backup the Forms database, see page 416.

Restoring from an external media card restores data for all the forms that have been backed up on the external media.

Checking if VFS Backup is Enabled on the Handheld

Since VFS Backup is an Advanced Form Property, each individual form on the handheld may or may not have VFS Backup enabled.



To see if VFS Backup is enabled for a form design:

- Tap the Forms icon on the handheld, then tap the name of the form.
- Tap the handheld Menu button (the drop-down menu icon below the House icon).
- Tap the Help menu and tap Form Info. A Form Info message is displayed, showing whether VFS Backup is enabled or disabled.

Restoring Records from External Media

This is the procedure for restoring records from an external media card to the handheld:

1. Perform a HotSync. If the handheld is brand new or was hard reset, then when the HotSync Manager prompts you for the handheld user name, select the original user name of the handheld device.

2. Tap the Applications button (House icon) on the handheld to see if the Forms icon is present on the handheld. If not, you will need to install Pendragon Forms to the handheld. To install Pendragon Forms, click Start...Programs...Pendragon Forms 4.0...Install Pendragon Forms 4.0 on Handheld. Then synchronize twice - once to install the Forms4.prc program onto the handheld, the second time to receive your form designs.

3. If the Forms icon is on the handheld, tap the Forms icon to see if your form designs are present on the handheld. If the form designs are not present, open the Forms Manager on the PC and re-distribute the form designs. Then synchronize the handheld.

4. At this point, it is strongly recommended that you backup the Forms database - see page 416. This provides you with a copy of the database before the restore is performed.

Continued on next page...

5. Insert the external media card in the handheld. Tap the Forms icon, then tap the handheld Menu button (the drop-down menu icon below the House icon).

   Tap the Help menu, then tap Backup Info.

6. The Backup Info dialog screen displays the size of the backup file for all forms that have VFS Backup enabled.

   The dates From and To indicate the date of the earliest entry and the latest entry in the backup file. Since the backup file also records the date of each HotSync data transfer, the To date might be today's date if you synchronized today.

   To restore from the external media, tap the Restore button.

7. A Restore Backup File screen warns you that performing a restore may delete or modify existing records. This might occur if records were changed without being backed up, or if records were changed on the PC. This is why it is recommended to backup the Forms database on the PC before performing a restore.

   Tap Yes to continue with the restore procedure, or tap No if you still need to backup the Forms database on the PC.

8. The Restore Backup File gives you one last chance to cancel the restore procedure.

   Tap OK to continue, or tap Cancel to cancel the restore procedure.

   If you tap OK, you will be prompted to select the date on which you lost your data.

9. Select the date on which you lost your data.

   As soon as you tap on a date to select it, the restore procedure will begin.

   Pendragon Forms will search the backup file on the external media for the most recent HotSync date before the date you selected, and will restore all new and changed records for all backup-enabled forms since that HotSync date.

10. A Restore Complete dialog will be displayed to confirm that the restore procedure has been completed.

    Review the records that have been restored to verify that you have all the records. If some records are missing, you may need to re-do the Restore procedure and select an earlier date of data loss in step 9.

    Finally, perform a HotSync data transfer to send the restored records to the PC.

Purging Old Records from External Media

When VFS Backup is enabled, Pendragon Forms writes to the external media a copy of every change to every record for every form that has the VFS Backup option enabled. In addition, the backup file logs every synchronization date.

Although the external media card can store megabytes of data, you should consider purging old records from the external media regularly. If the backup file grows to more than the amount of free space on the card, a purge may no longer be possible.

Pendragon Forms allows you to delete records that are more than 30 days old from the external media card. In order to perform a purge, there must be as much free space on the external media as the size of the backup file itself. For example, if the backup file is 2MB, you need an additional 2MB of free space on the media card in order to perform the purge.

Warning: Always synchronize and ensure that all of the records on the handheld are successfully backed up to the PC before purging records from the external media.

1. To purge old records from the external media card, make sure that the media card is inserted in the handheld.

   Tap the Forms icon on the handheld, then tap the handheld Menu button.

   Tap the Help menu and then tap Backup Info.

   On the Backup Info dialog screen, tap Purge.

2. The Purge Backup File dialog gives you the option to cancel. If you have not yet synchronized the handheld to backup records to the PC, you should cancel the purge procedure and perform a HotSync first.

   Tap No if you want to cancel erasing records from the backup file.

   Tap Yes if you want to erase records that are more than 30 days old from the backup file on the external media card.

25. Using Forms in a Multi-User Environment

This chapter covers some of the issues involved if you have a multi-user license for Pendragon Forms.

Entering a Multi-User Code

Pendragon Forms initially ships as a single-user license, that is, for use with one handheld.

To activate a multi-user license:

1. In the Pendragon Forms Manager, click on the Options button.
2. Enter your multi-user code.

Setting up Users and User Groups

A User List and User Groups are used to centrally manage the distribution of forms to multiple handhelds.

Refer to the *Users and User Groups*, starting on page 37.

Every handheld user name must be listed in the User List as an active user in order to synchronize with the Forms database.

- The first time a handheld is synchronized, you will be prompted for the user name for that handheld. If you change the handheld user name in the Palm Desktop program or by doing a hard reset, you will need to update the User List in Pendragon Forms. To see what the user name is, tap the Applications (House icon) button, then tap the HotSync icon. The handheld user name will be displayed in the upper right corner of the screen.
- If the number of handheld users in the User List exceeds the multi-user license count, the handheld user with the oldest synchronization date will be made inactive. The inactive handheld will not be able to synchronize and will receive a HotSync Log Message (see page 455) to alert the user about the inactive status.

You can use User Groups to determine which handheld receives which form.

- Handheld user names must be in the User List before they can be added to User Groups.
- When you distribute a form, the form automatically goes into the Default User Group if the form is not assigned to another group. If you are designing forms, you may want to add yourself to the Default User Group so that you can receive all forms that are distributed.
- You can create a User Group for the other handheld users. Adding a form to this User Group will have the effect of distributing the form to all users in the group.
- A handheld user can be a member of more than one User Group, and a form can be assigned to more than one User Group.
- If you modify a frozen form and click the Distribute button to re-distribute the form, all handheld users in a User Group containing that form will receive the updated form during their next synchronization.
- To remove a form from all of the handhelds in a group, go into the User Group and delete the form from the list of forms for that group. Do not delete the actual form from the Pendragon Forms Manager until all users have had an opportunity to synchronize, otherwise the form will remain on the handhelds indefinitely. (See page 42.)
- Removing Lookup Lists from handhelds also requires care. (See page 89.)

Sharing Records Across Handhelds

By default, Pendragon Forms is set up to allow users to share form designs, but not to share records. See pages 23-26 for information on the form design isues when sharing records across multiple handhelds.

Choosing the right Multi-User Installation

Depending on how your organization is set up, you can choose to:

- Install to a stand-alone PC, so that all handhelds synchronize via the same cradle.
- Install Pendragon Forms on a network server, and allow each handheld to synchronize to an individual workstation which is connected to the server via local area network (LAN).
- Install Pendragon Forms on a server, and allow handheld users to synchronize wirelessly using Palm devices with TCP/IP connectivity, or to synchronize via PC's or laptops with Internet access.

Stand-Alone Install

If you are synchronizing locally to a stand-alone PC, then once you have entered your multi-user code and set up your User List and User Groups, you are all ready to deploy forms to multiple handhelds.

Network Options

There are three possible options to consider when synchronizing over a network:

Network Option 1: Using Pendragon SyncServer

Pendragon SyncServer is an add-on product for Pendragon Forms that allows users to synchronize their built-in applications (Address Book, Date Book, etc.) locally at their workstations, but to synchronize Pendragon Forms across a TCP/IP network. Pendragon SyncServer comprises of server software that runs on the server where the Pendragon Forms database is installed, and client software that runs on the workstation. For information on Pendragon SyncServer, and to download a trial version of the software, visit http://www.pendragonsoftware.com.

Network option 2: Palm Network Hotsync

This product allows you to synchronize all the applications on the handheld, including Pendragon Forms, to a server. Users cannot synchronize simultaneously; instead, if two users attempt to synchronize simultaneously, one will be put in a queue. If users need to synchronize their built-in applications (Address Book etc.) to their local workstation, but synchronize Pendragon Forms to the network server, they will need to manually select whether they are performing a local or a network HotSync data transfer each time they synchronize. For information on using Network HotSync with Pendragon Forms, see:
http://www.pendragonsoftware.com/netsync.html

Network Option 3: Pendragon Forms NSetup Program

The Pendragon Forms NSetup program is primarily for networks that do not support TCP/IP. The NSetup program is located in the Network folder on the CD-ROM that ships with Pendragon Forms. NSetup allows each workstation to synchronize using HotSync Manager software on the workstation. All applications on the handheld synchronize to the local workstation except for Pendragon Forms, which synchronizes to the network server.

The NSetup option places more of a burden on network traffic than Pendragon SyncServer or Palm's Network HotSync product. With Pendragon SyncServer and Palm's Network HotSync, the Pendragon Forms conduit and the Pendragon Forms database are both installed on the server, and so communication between the conduit and the database is across a single hard drive, and only the communication to the handheld is across the network. In the case of NSetup, the Forms conduit is installed on the local workstation to facilitate a local HotSync data transfer. Consequently, communication between the Forms conduit and the Forms database is across the network, which may be slow if the Forms database is large and the conduit has to copy portions of the database to the workstation. If you have several handheld users synchronizing simultaneously, and at the same time other PC users are transferring data across the network, the network may seem slow to all users. It is recommended that your local area network run at 10Mbps or faster if using this option.

To install the Pendragon Forms NSetup program:

1. At the first workstation:
   a. Follow the instructions on page 1 to install Pendragon Forms. When prompted for a folder to install to, choose the shared network folder where you want to store the Pendragon Forms database that the users will share.
   b. Enter your multi-user code into the Pendragon Forms Manager on the server.
   c. Set up your User List and User Groups.
2. At each subsequent workstation:
   a. Check that the Palm Desktop software and HotSync Manager are installed.
   b. Insert the Pendragon Forms CD-ROM and run the NSetup.exe program in the Network folder of the CD-ROM. When prompted for the database to install to, select the Pendragon Forms database in the shared network folder on the server. The Forms database is Forms32k.mdb (Access 2000/2002) or Forms3.mdb (Access97).
   c. You will be prompted to select the shortcuts that you want to make available on the workstation. The default options are:
   Install Forms 4.0 on Handheld - this option makes it possible for the workstation user to install the Forms4.prc program onto their handheld.

Pendragon Forms Manager - this option enables the workstation user to access the Forms Manager to design forms and view data. If you only want the workstation users to synchronize, but not access the Forms Manager directly, then do not select this option.

Pendragon Forms Help - this option is only recommended if you are allowing workstation users to view the Forms Manager, in case they need help while designing forms.

Configuration Tool - this option is not selected by default, to prevent the workstation users from easily finding the location of the Forms database on the network. However, it is a good idea to allow access to the Configuration Tool application for troubleshooting purposes, such as for switching on ASCII backups.

d. To queue the Forms4.prc program to be sent to the handheld on the next HotSync data transfer, click on Start...Programs...Pendragon Forms 4.0...Install Forms 4 on Handheld.

Internet Option

If you plan to use Palm devices with wireless modems that support TCP/IP, or if you plan to support users who need to synchronize from home or in the field via a PC or laptop with Internet access, you will need to use the Pendragon SyncServer add-on product for Pendragon Forms. For information about Pendragon SyncServer, visit http://www.pendragonsoftware.com.

Security concerns in a Multi-User environment

In many cases, administrators may be comfortable with little or no security, especially with small, close-knit user groups. For example, a small office of professionals who share data on a peer-to-peer network already accept the risks associated with sharing their files, and trust their co-workers implicitly.

However, in an enterprise where the data is proprietary or extremely valuable, it makes sense to impose security measures.

Security Issues to Consider

There are several security issues to consider when creating your data collection application.

1) Access to sensitive data: You may want to limit access to the central database by users with handhelds, or users on the network.

2) Deletion/corruption of data: Though there may be a minimal risk of malicious damage, it may be possible for users to delete or corrupt data on the server.

3) Deletion of database files: Microsoft Access is a file-based database. This means all users who access it must have read-write access to an .MDB file. This means that users may be able to delete the entire database file via file management tools.

4) Access to external databases via the Pendragon Forms database: In order to synchronize with password-protected external database systems, the Pendragon Forms database generally needs to include the database username and password in the Forms32k.mdb (or Forms3.mdb if you have Access 97) file. This is true whether using the Access linking feature, or using a direct ODBC field map. Unfortunately, this means that users who gain access to the Forms32k.mdb or Forms3.mdb file will generally gain some access to the external databases too.

5) Impersonation ("spoofing"): It is relatively easy to change the name assigned to a Palm device to impersonate another user. By performing a hard reset of the device, and performing a synchronization, users can rename their handheld device quite easily. If your Pendragon Forms applications send data from the desktop to the handheld (e.g., sales reports), you may need to defend against this type of attack. Since the handheld username is the mechanism used to control which users see which datasets, spoofing may allow users to see data that was only meant for another user.

6) Data on the handheld is not encrypted. This means that if the Palm OS hardware is compromised, so is the data it holds.

   A number of third-party products allow the handheld device to automatically become password protected when powered off. These tools make it more difficult, though not impossible for hackers to access the memory of the device. Some version sof Palm OS 5.2 and hagher have built-in encryption features. Consult your handheld documentation for information on switching on encryption features.

7) Network traffic is not encrypted. "Packet Sniffers" can be used to intercept packets of information sent to and from stations where users are synchronizing. This is generally not an issue for users synchronizing on a local area network (LAN), but may be an issue for users synchronizing via the Internet.

Precautionary Measures

The Pendragon SyncServer add-on product for Pendragon Forms provides improved security. Pendragon SyncServer runs as a Windows NT service, and handhelds synchronize to the SyncServer, which manages the communication with the Forms database. Handheld users do not need to be given file access to the Forms3.mdb or Forms32k.mdb files, thus reducing the risk of the users deleting these files.

Pendragon SyncServer requires a password. The SyncServer password can be stored on the workstation in environments where all workstation users are authorized to synchronize to the Pendragon Forms database. In environments where the workstation is not secure, the Pendragon SyncServer password can be stored in a Pendragon SyncServer Link application (S-Link icon) on the handheld. Storing the SyncServer password on the handheld reduces the risk of spoofing.

For synchronizing across the Internet, Pendragon SyncServer uses 56-bit Data Encryption Standard (DES) encryption and MD5 authentication to protect the data as it passes across the TCP/IP network. A 168-bit Triple DES version of SyncServer is available.

Performance

In single-user environments, performance problems typically stem from the amount of data being transferred during the HotSync process. The only way to mitigate this is to use criteria that will limit the amount of data downloaded to the handheld during each synchronization.

In multi-user and networked configurations, there are other factors that may affect performance. If you are synchronizing with the standard Pendragon Forms conduit to a Microsoft Access database that is large and stored on a network, then each workstation will likely be transferring a large amount of data across the network.

For example, if you are downloading work orders from a work orders table, and the table is 10MB in size, you may end up downloading a significant fraction of the 10MB to the workstation during each HotSync. The workstation needs this information to determine which records meet the criteria for synchronization. These network transfers are time consuming and will occur even if no records qualify to be sent to the handheld.

The solution to this problem is to use the Pendragon SyncServer add-on product (available separately). The server component of Pendragon SyncServer runs on the same local hard drive as the Pendragon Forms database, and manages communication with the Forms database. The client component, called the SyncServer Proxy, runs on the client workstation and manages communication with the handheld device. This means that the only data that is sent across the network is data required for the synchronization.

Appendix A: Sample Forms

Several sample forms are stored as files with .PFF file extensions in the C:\Program Files\Forms3\Sample Forms folder.

You can follow the instructions on page 204 to import any of the sample forms into the Forms Manager database. After a form has been imported, you will need to freeze the form and distribute the form before synchronizing the handheld.

Here are a list of the sample form designs:

Form Name	What This Sample Form Demonstrates
HandheldSurvey.pff	This form shows some of various field types that you can use when designing forms. The form has some branching scripts.
AddressBookLookupButton.pff	A form that has a Button field to do a lookup to the handheld Address Book, and copy the selected Address Book data into the form.
AverageofTestScores.pff	A form that illustrates how to add more than one field together, and take an average.
CustomerVisitParent.pff CustomerVisitSubform.pff	Import both of these form designs to see an example of a parent form and a subform.
BarCodeExample1.pff	A simple form that uses a scan: event script to allow the user to scan a bar code into a specific field at any time.
BarCodeClone1.pff	A form that allows the user to scan a bar code to generate a new record via a clone statement in a scan: event script.

Continued on next page...

Form Name	What This Sample Form Demonstrates
BarCodeLookup2Ref.pff BarCodeLookup2.pff	This pair of forms show how you can create a reference form (BarCodeLookup2Ref.pff) with inventory data, and then scan a bar code in another form (BarCodeLookup2.pff) to do a lookup to the referenc form and copy data from the reference form into the other form.
Beaming1.pff Beaming2.pff	These two forms can be used independently of each other. They illustrate the scripts necessary for allowing beaming of records from one handheld to another.
PrintReportTest1.pff	A form that illustrates the type of scripts required for printing a record from the handheld.
PrintReportTest2Parent.pff PrintReportTest2Subform.pff	Import both of these form designs to see an example of printing from a parent form and a subform.
CustomerMainMenu.pff CustomerInfo1.pff	The Customer Main Menu form is an example of a custom main menu form that replaces the Pendragon Forms main menu. The Customer Info1 form is the form that the Customer Main Menu allows access to.
ReferenceForm1Customers.pff OrderForm1Parent.pff OrderForm1Subform.pff ReferenceForm1Items.pff	These four forms combined, illustrate a simple order entry application that uses a parent form for the customer information on the order, a subform for the order line items, and two reference forms - one for looking up customers and one for looking up items. After you import and freeze these four forms, enter some data reocrds on the PC for the two reference forms before distributing all four forms to the handheld.

Appendix B: Troubleshooting

This Troubleshooting Appendix covers the following topics:

Problems with Sending Form Designs or Data to the Handheld

If you do not see your form on the handheld after you distribute a form and perform a HotSync data transfer, here are some things that you can check:

Is there a Forms icon on the handheld?

If you tap the Applications button (House icon) on the handheld, and choose to display All applications, you should see a Forms 4.0 icon. If you do not see a Forms 4.0 icon, refer to page 2 of this manual for instructions on how to install the Pendragon Forms program on the handheld.

Is the Pendragon Forms conduit listed as an application in the HotSync Manager?

Third party applications such as Pendragon Forms must be registered in order to synchronize during the HotSync data transfer. To check if Pendragon Forms is registered:

a. Click the red & blue arrows icon of the HotSync Manager in the Windows task tray, and choose Custom.

b. In the Custom window, select your handheld user name. Pendragon Forms 4.0 should be in the list of applications, with the action *Synchronize the Files*.

If Pendragon Forms is not listed in the Custom window, here is a quick way to re-register the Pendragon Forms conduit:

1. Close the HotSync Manager Custom window if it is still open.
2. Click the red & blue arrows Hotsync icon, and choose Exit.
3. Click Start...Programs...Pendragon Forms...Configuration Tool.
4. In the Configuration Tool window, click the Diagnostics tab. Then click the *Setup Forms 4.x HotSync* button.
5. Close the Configuration Tool window. Re-start the HotSync Manager by clicking Start...Programs...Palm Desktop...HotSync Manager. The red&blue arrows icon of the HotSync Manager should re-appear in the lower right corner of your screen. You can verify that the Pendragon Forms conduit is now registered by following steps a and b above.
6. Go into the Pendragon Forms Manager, select a form and click the Distribute button distribute to the handheld. Perform a HotSync data transfer.

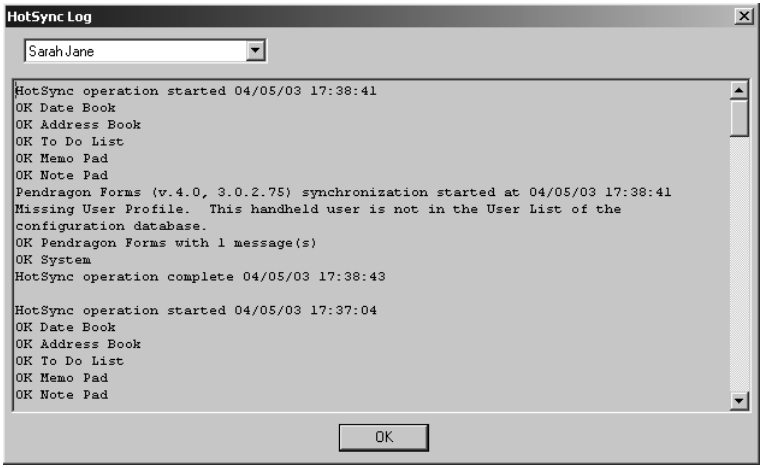
Is there a message in the HotSync Log?

If Pendragon Forms has a problem synchronizing, the Forms conduit displays a message in the HotSync Log.

To check the HotSync Log, click the HotSync Manager icon on the PC (the red & blue arrows icon in the Windows task tray), and choose View Log. You must view the HotSync Log on the PC and not on the handheld, as the handheld does not provide full details of the log messages.

If Pendragon Forms has a problem synchronizing, the log will contain the following lines:
Pendragon Forms synchronization started at...
Error message here
OK Pendragon Forms with 1 message(s)

See page 452 for a list of common HotSync Error Messages.



There are no error messages in the HotSync Log, but still no form designs on the handheld.

Check the following:

- Have you distributed the form? Click the name of the form in the Forms Manager, then click the Distribute button. Then try synchronizing.
  Note:You can only distribute a **frozen** form design.
- Is the handheld user is assigned to a user group in the Forms Manager? In the Forms Manager, click the Groups button and then click the Edit Members button next to the Default Group. If the handheld user name is not in the list of users, click the arrow button in the empty row in the list of users, and select the handheld user name.
- Is the Advanced Form Property of *Hide Form in Forms List* set? If yes, you will not see the form in the Forms main menu, but the form may be there. See page 176 to unhide the form design. You will need to re-dsitribute the form design and synchronize.

My form design goes to the handheld, but data that I entered on the PC does not.

Check that the correct Data Persistence option has been set to allow records to be sent to the handheld. In the Forms Manager on the PC, click the name of the form, then click the Properties button. Look in the Data Persistence section of the Properties window. If no Data Persistence options have been selected, then records will not stay on your handheld. See page 165 for the Data Persistence options that you can choose.

Another cause of data not being sent to the handheld is due to a mismatch between the handheld user name and the user name to which the records have been assigned. By default, only records that have been assigned to a given user will be sent to the handheld of the same name. If you freeze a form design and then click Edit/View, you can enter records on the PC. In the Edit/View window, you will need to select your handheld user name in the UserName column, in order to assign the records to your handheld device.

If you have a multi-user license for Pendragon Forms and you need to share data across several handhelds, you will need to create your own primary key on a form (before the form is frozen), and then you can choose to delete the default Additional Download Criteria that sends records to the handheld based on the user name. See pages 23-26 for information on sharing records; page 155 for information on primary keys, and page 181 for information on Additional Download Criteria.

Form Designer Error Messages

If you get an error message when exiting the Form Designer window, the error is usually a warning that there is a problem with your form design. If the problem is not corrected, you may not be able to freeze the form design later.

If a Warning Messages dialog window comes up, it will specify which question (i.e. field number) on your form has the problem, so that you can correct it.

If you click the Cancel button you will cancel closing the Form Designer window. You will return to the Form Designer window and correct the error before saving and exiting the Form Designer window.

If you click OK you will continue with closing the Form Designer window. This means that you will have to correct the error later, before you freeze the form design.

Field Name is Required

This Form Designer error occurs if you added a new field to the form but did not type a field name. The field name area will contain the phrase *Enter question text....* You will need to highlight that text and type a name for your field.

The Warning Messages dialog box will specify which question (i.e. field number) on your form has the problem, so that you can correct it.

List Item Entries are Required

The means that a Popup List field does not have any items in the Popup List.

A Section Name Entry is Required

This Form Designer error occurs if you have a Section field on your form, but you have not entered a name in the Section Name area. A Section field has to have a field name (question name), and a Section Name.

A Lookup List Entry is Required

The means that a Look List field is not referencing the name of a Lookup List or the name of a form.

Problems with Freezing a Form Design

If there is a problem with your form design, when you attempt to freeze the form an error message may be displayed and the form design may not freeze. The error message that is displayed will indicate the problem that is preventing the form from being frozen, and will also indicate which field on your form has the problem.

The solution is to close the Form Properties window, edit the form design to correct the error, and then try to freeze the form design again.

Common error messages that can occur when freezing a form are described below.

Duplicate field name found - field names must be unique.

When you freeze a form design, a database table is created for storing records associated with the form. Each column in the database table is based on a field in your form, and Microsoft Access requires each database column name to be unique.

If two fields have the same name, then when you try to freeze the form, the Duplicate field name found error will be displayed. You have the option to click Cancel to stop freezing the form, and then go back to the Form Designer to change the field name of one of the specified fields. Or, if you click OK and freeze the form design, Pendragon Forms will internally add the number 1 to the database column for the duplicate field, so that although the field names will be the same, the database column names will not be the same.

This error can also occur if you make a copy of a form. When you copy a form, the column names from the original form design are retained on the copy, even if you rename a field. If you rename one field and then add another field with the same name as the original name of the first field, then when you try to freeze the form design the column names of the two fields will be identical and will cause an error. The solution in this case is to go to the Data tab in the Form Designer window (see page 152) for one of the duplicate fields, and erase the Column Name, then try to freeze the form again.

Popup List (or forms / sections list) is Empty

If this error occurs when you are trying to freeze a form, it means that a Popup List on your form does not contain any items in the list. The error message will tell you which field has the problem, so that you can go to the Form Designer window and edit that field.

Every Section Requires a Name

This means that your form has a Section field that has a blank Section Name. Edit the form and type in a name for the Section Name. (Note that the Section Name is required in addition to a field name.)

Lookup List Not Specified

This means that the field specified in the error message is a Lookup List field that does not reference the name of a Lookup List to display in the field. (If you are doing a lookup to another form, the name of a form is missing.) Edit the form and either select a Lookup List or type the name of the form to which you want to do a lookup.

The Field Name You have Chosen is Reserved by Pendragon Forms

Pendragon Forms always adds four fields to your form design when you freeze a form. The fields are called: RecordID, UnitID, UserName and TimeStamp. Since Microsoft Access requires database column names to be unique, you cannot name any of your fields these reserved field names. If you get this error message, re-name your field so that it does not conflict with any of the the reserved field names.

No Caption (default value) has been specified for your Button field

A Button field needs a name on the button. This is entered by typing in the Default Value field on the Data tab of the Frm Designer window. If you forget to enter a name for the button, you will get the No Caption error message when freezing the form. Your form will still freeze and you can add the Default Value to the Button field before distributing the form.

The Default Value for a Checkbox must be either Y or N

A Yes/No Checkbox can only store the values Y for Yes or N for No. If you type anything other than Y or N in the Default Value field, you will get this error. Edit the form and correct the Default Value (see page 158).

The Default Value for an Option 1-5 field must be in the range 1-5

An Option 1 to 5 field can only store the values 1, 2, 3, 4 or 5. If you type anything else as the Default Value of an Option 1-5 field, you will generate this error. Edit the form and correct the Default Value.

Problems with Lookup Lists

Lookup Failed Error

On the handheld, if you get an error message *Lookup Failed. List not found.* then either:

1. The Lookup List is not on the handheld.

OR

2. The form is not referencing the correct name of the Lookup List.

The error message tells you the name of the Lookup List that the program cannot find. To check if this Lookup List has been sent to the handheld, click the Lookups button in the Forms Manager on the PC. If the *Available* checkbox is not checked, edit the Lookup List and check the *Make this lookup available on handheld* checkbox. Synchronize the handheld and see if the Lookup List appears.

If the problem persists, check if the form design is referencing the correct Lookup List. Click on the form in the Forms Manager, then click the Edit button to open the Form Designer. Display the Lookup List field and re-select the Lookup List that you want to use. Re-distribute the form design, synchronize, and check the handheld again.

Problems with Subforms or Single Subforms

Form Not Found Error

On the handheld, if you tap the subform field on the parent form and receive the error message: *Form not Found*, then there are two possibilities:

1. The subform is not present on the handheld.

OR

2. The parent form is referencing the wrong subform name.

If the subform is not on the handheld, distribute the subform and synchronize.

Check the exact spelling of the name of the subform in the list of forms in the Pendragon Forms Manager on the PC.

Then click the name of the parent form and click the Edit button to open the Form Designer.

Display the Subform field on the parent form, and check the Subform List section of the screen to see if the correct subform name is listed. If the subform name is not that same as the name of the actual subform, correct the name here.

A common error that might occur if you have copied the subform to make changes, is that the parent form may reference the original subform name, such as:
Patient Visit
but the actual subform being used is a copy with the name:
Patient Visit*

In this scenario, either change the subform name to match the name referenced by the parent form, or else change the subform field on the parent form to reference the new subform name that includes the asterisk * symbol.

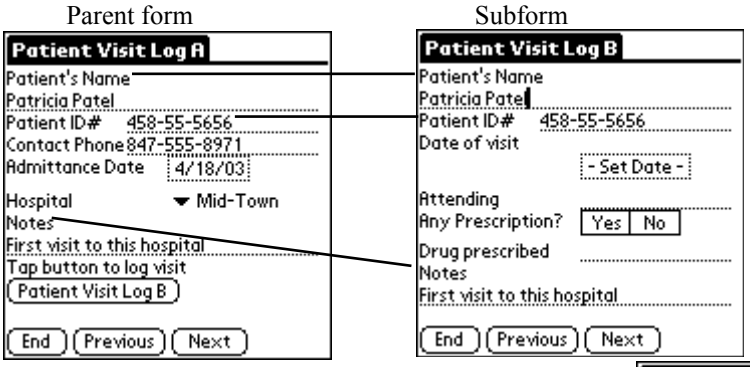
Close the Form Designer window, re-distribute both the parent form and the subform, and then synchronize the handheld. To re-distribute a form, click on the name of the form and click the Distribute button.

Note: If you are using scripts, the *Form not Found* error may be due to a script referencing the wrong subform name. Check your scripts.

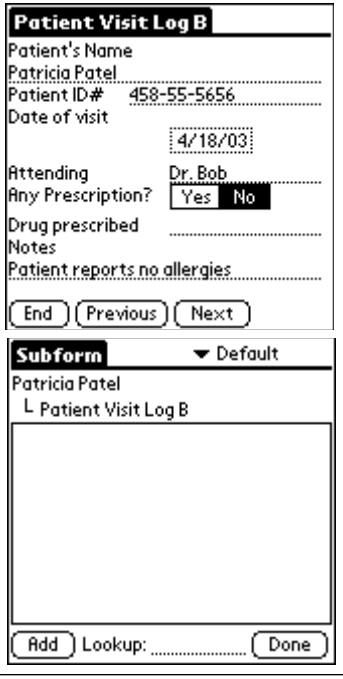
Subform records appear to vanish when reviewed in the parent form

If you add a subform record and then tap the End button, and you do not see the newly created subform record in the list of existing subform records, the most common cause is that you have changed a field on the subform that is used to match the parent to the subform.

In the example below, a parent form and subform are supposed to match on fields 1 and 2 only (Patient's Name and Patient ID#), but inadvertently also matches field 6 (Notes field) of the parent with field 7 of the subform.



Changing the Notes in field 7 of the subform causes the subform record to stop being a match with the parent. When the user exits the subform, the record appears to have vanished for the list of subform records.



The solution in this case is to re-name the inadvertently matching field on either the parent form or on the subform, and re-distribute the form. Just the field name has to change, not the database column name on the PC.

In this example, the ‘Notes’ field on the subform (field 7) could be renamed to ‘Visit Notes’ or ‘Patient Notes’, and then it will no longer match the ‘Notes’ field on the parent (field 6).

You can check which fields match and change the names of any fields that are not supposed to match. This can be done before or after freezing the form designs of the parent form and the subform.

The Pendragon Forms Manager can generate a report to show you which fields within the first 10 fields of the parent form match fields on the subform. If no fields match, or if fields match that you did not want to match, you can change the field names before distributing the form.

To generate the Matching Fields Report:

1. In the Form Designer, display the Subform List field of the parent form. (The Subform List field must reference the name of a subform.)

2. Click the Matching Fields button on the Field tab of the Form Designer window.

A Matching Fields Report will be displayed. To print the report, click the File menu and choose Print.

Data in a parent form is not copyiing to the subform

Only data in the first 10 fields from the parent form will copy into the subform.

If data from the first 10 fields on the parent is not copying to the subform, then either the fields are not named identically in both parent form and subform, or else the field types are not identical. Check the spelling of the field names, including upper and lower case letters and spaces. You can change the field names in the Form Designer on the PC to correct them, and re-distribute the parent form or the subform.

If the field types do not match, you will need to copy the subform and change the field types to match those of the parent form. Make sure that the parent form references the new subform.

Problems with Working with Multiple Forms

Form Not Found

See page 443 in this Troubleshooting Appendix.

Data from my parent form is not copying into my subform

See page 445 in this Troubleshooting Appendix.

Subform records seem to vanish

See page 444 in this Troubleshooting Appendix.

In a Lookup to Another Form, I get the error message Lookup List Failed. List Not Found

Check the following:

- Is the Lookup List referencing the correct reference form name? In the Forms Manager, click the name of the form and then click the Edit button to open the Form Designer window. View the Lookup List field and make sure that the name of the form being referenced is spelled correctly, with the same upper and lower case letters and spaces as the reference form name. If you make any corrections, re-distribute the form and synchronize to send the changes to the handheld.
- Has the reference form been sent to the handheld? In the Forms Manager, click the name of the reference form and then click the Distribute button. Synchronize to send the reference form to the handheld.

In a Lookup to Another Form, not all of the fields copy over from reference form to current form

Make sure that the field names and field types are the same in both the reference form and the current form.

For example, if the current form has a field called Part #, but the reference form has a field called Part Number, then data from the reference form will not copy into the current form.

Similarly, if the reference form has a Numeric field called Quantity, and the current form has a Text field called Quantity, data still will not copy because the field types are different.
The only exception is that a Text field in the reference form can copy into a Lookup List field on the current form (up to 50 characters).

I am using scripting with a select statement and no data is copying from my reference form to the current form

Check the following:

- Does the script with the **select** statement reference the correct form name? For example, if you made a copy of the reference form, the copied form may have a different name and the **select** statement script may need to be changed to reference the new form name.

- Does a matching record exist in the reference form? Perhaps the select statement is working, but it is not finding a matching record in the reference form to copy into the current form. For testing purposes, you can add to your script a message box to display the number of matching records that the select statement finds in the reference form. Since the **result** variable stores the number of matching records after a select statement has been run, you can add the following line to your script **after** the select statement:

  ```
  msgbox result
  ```

  If the select statement cannot find the reference form, the Result variable will be -1.

  If the select statement can find the reference form, but cannot find a matching record, the Result variable will be 0 (zero).

  If there is exactly one matching record in the reference form, the Result variable will contain the number 1.

  If there is more than one matching record in the reference form, the Result variable will contain the number of matching records.

  The message box that appears on the handheld will display the number corresponding to the value in the Result variable.

Problems with Linking to an External Database

When linking to an external Access database or an external ODBC database, it is very important to test that data synchronizes from the external database to the handheld, and the reverse: from the handheld to the external database.

Pay particular attention to HotSync Log Error Messages, as they are messages from the Forms conduit about synchronization problems. See page 452 for a list of common HotSync error messages.

In addition to HotSync Error Messages, here are some common problems when linking to an external database:

No data from the external database appears to be going to the handheld

If the form design is on the handheld, but data from your external Access or ODBC database table does not populate down to the handheld during synchronization, check the Data Persistence settings. In the Forms Manager, click the name of the form, then click the Properties button. In the Properties window, the Data Persistence option *Keep a Copy of Records on handheld* (see page 165) should be checked in order to allow records from the external database to be sent to the handheld. If this checkbox is not checked, check the box and then click the Field Mappings button. In the Field Mappings window, click OK to save your changes. Then try synchronizing again.

New records from the handheld go to the database, but changes to existing records do not

Pendragon Forms uses the primary key to uniquely identify records, and to match a changed record on the handheld with an existing record in the database. If your external database table does not have a primary key, Pendragon Forms will be able to add new records (perform inserts) to the database, but will not be able to update existing records.

If you are linking to a query instead of linking to a database table in the external database, you will also find that you can add records but not update existing records. This is because in Microsoft Access, a query cannot have a primary key.

Unable to Open Database; File Already in Use

When opening a Microsoft Access database, there is an Exclusive option which allows the database to be used only by the person opening the database. If someone on the PC is using the external database exclusively, and a handheld user attempts to perform a HotSync data transfer, the database will be locked. Error messages will be generated during the HotSync data transfer process to alert you if this occurs. The solution is to close the external database and re-try the HotSync data transfer. The HotSync Log message that may be generated is shown below.

```
Unable to open database: Couldn't use 'D:\DebTest\Deb
Databases\Simple Work Order1.mdb'; file already in use
Skipping record deletion for form.
Skipping new record download for form.
OK Pendragon Forms with 3 message(s)
OK Backup
```

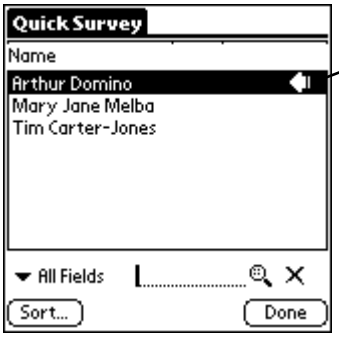
Unable to Append Record - the changes you requested to the table were not successful because they would create duplicate values in the index, primary key or relationship

Since the primary key is used to uniquely define each record, the field (or combination of fields) which make up the primary key has to be unique on the handheld and in the external database.

A HotSync error message that warns about duplicate primary keys can occur if a record that is marked as new on the handheld has a primary key that matches an existing record on the PC.

To eliminate the risk of accidentally overwriting an existing record, the new record will not be allowed to be uploaded to the PC. To alert the handheld user to the fact that a duplicate primary key has been entered, a HotSync log message will be generated, and records which did not get sent to the handheld will be flagged with an arrow. (See pictures below and on the next page.)

```
Unable to append record 'Customer Survey2' (111777267), field 8  -- The changes you
requested to the table were not successful because they would create duplicate
values in the index, primary key, or relationship.  Change the data in the field or
fields that contain duplicate data, remove the index, or redefine the index to
permit duplicate entries and try again.
OK Pendragon Forms with 1 message(s)
OK Backup
```



Records marked with an arrow have not been uploaded to the PC.

If the handheld user has entered a duplicate primary key by accident, the record has to be edited on the handheld to make the primary key unique, before the record can be uploaded during the next HotSync data transfer.

Important Note:
There is another scenario in which the duplicate primary key error might occur.
If a HotSync data transfer is interrupted, it may be possible for new records to be sent to the PC, but not be flagged as changed on the handheld. This can also cause the duplicate primary key error to occur. The solution in this case is to check whether the records that are marked on the handheld as not uploaded are in fact already successfully in the database on the PC. If yes, there are two possible solutions:

a) Delete the records on the handheld and synchronize again. (You must be certain that the records are on the PC before you delete them from the handheld.)

OR

b) You can switch on the Advanced Form Property of Disable Record Overwrite Protection. This allows a new record to overwrite an existing record in the database - see page 186 for more information.

What happens if a field in a column of the external database is too large to fit on the handheld?

A Memo field in Microsoft Access can store up to 2 Gigabytes (2GB) of data. In a Pendragon form on the handheld, a the maximum that a Text field can be is 2000 characters or 2 Kilobytes (2KB). If a Memo field for a given database record has more than 2KB in the external database, only the first 2KB will be sent to the handheld. To prevent the 2KB on the handheld from over-writing the 2GB already in the database during the next HotSync data transfer, Pendragon Forms makes this field of the specific record on the handheld read-only and non-updating on the server. Other records which do not exceed 2KB in this field will not be set as read-only or non-updating.

Similarly, if a Currency field in the database is greater than, $10,000,000.00, (or less than -$10M) the field is too large to store on the handheld. This field will display as null on the handheld and will be read-only and non-updating on the server for the specific records which are affected.

Number fields in Access which are integer fields will also be set as integers on the handheld, so that the handheld user cannot enter decimal places which will be thrown away by the server.

HotSync Error Messages

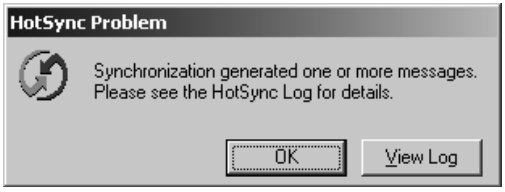
If the Pendragon Forms conduit experiences a problem during synchronization, a HotSync Error Message will be generated in the HotSync Log. Always resolve any HotSync error messages, because the synchronization problem may cause your data not to be backed up to the database.

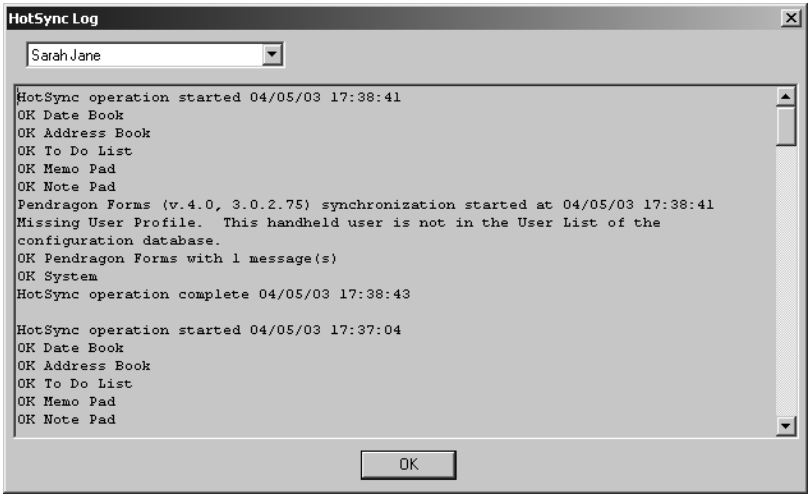
Important: Always view the HotSync Log on the PC, not on the handheld. This is because the log on the handheld does not display the error message in its entirety.

If a HotSync error message has occurred, the HotSync Manager will display a HotSync Problem dialog box on the PC screen for 60 seconds. You can click the View Log button to view the log.

If you miss the HotSync Problem dialog box, then to view the HotSync Log on the PC, click the HotSync Manager icon (the red and blue arrows icon) in the Windows Task Tray, then click View Log. The most recent HotSync Log is at the top.

If Pendragon Forms has a problem synchronizing, the log will contain the following lines:
Pendragon Forms synchronization started at...
Error message here
OK Pendragon Forms with 1 message(s)





Missing User Profile

This HotSync error typically occurs if:

a) Your handheld user name is not in Pendragon Forms Manager, or

b) There is a mismatch between the user name on the handheld and the user name in the Forms Manager, or

c) You actually have more than one copy of the Forms Manager database, and while your handheld user name is present in the copy of the Forms Manager that you are checking, the user name is not present in the copy of the Forms Manager database to which you are synchronizing. The second copy of the Forms Manager may be in another folder on your PC, or may be on a shared network drive.

To check your handheld user name:

1. Tap the Applications (House icon) button on the handheld, then tap the HotSync icon. The handheld user name will be displayed in the upper right corner of the handheld screen.
2. In the Pendragon Forms Manager, click the Users button to display the User List. Make sure that your handheld user name is in the User List, with the identical spelling and use of upper and lower case letters and spaces as on the handheld.

   Also make sure that the Active checkbox is checked. Close the User List window.
3. Click the Groups button in the Forms Manager. Click the Edit Members button next to the Default Group. In the User Group Editor window, make sure that your handheld user name is listed in the left-hand column. If it is not listed, click in the Username column and select your user name.

If your user name appears correct in the Forms Manager, you will need to verify that you are actually checking the same copy of the Forms Manager database with which the handheld synchronizes.

To find the location of the Forms Manager database to which you are synchronizing:

1. Click Start...Programs...Pendragon Forms...Configuration Tool.
2. On the Configuration tab of the Configuration Tool window, make a note of of the directory folder of the Configuration database. (This is typically C:\Progra~1\Forms3, meaning C:\Program Files\Forms3).
3. Close the Configuration Tool window and use Windows Explorer to go to the directory folder named in the Configuration database field. Double-click the file Forms32k.mdb (or Forms3.mdb if you have Access 97). This opens the copy of the Forms Manager to which you are synchronizing. Once again, check that the user name in the User List exactly matches the handheld user name, and check that the user belongs to the Default User Group.

License Count Exceeded

This HotSync error message occur if the Pendragon Forms conduit detects that more handheld devices are synchronizing Forms than there are licenses for.

If this error occurs, the Forms conduit will de-activate the user who least recently synchronized. Users will continue to be de-activated until the licensed number of handhelds are synchronizing.

The License Count Exceeded error will occur under these circumstances:

a) You you have added more users to the User List in the Forms Manager than your current Forms license allows.
The solution in this case is to purchase additional Forms licenses - one per handheld user. You can order additional Forms licenses at www.pendragonsoftware.com.

OR

b) You have a valid multi-user license, but either the license code has not been entered correctly, or at all.
The solution in this case is to get your multi-user license code(s), open the Forms Manager and click the Options button. If any license codes are not entered correctly, correct the error. If there are no license codes, click the Add button and enter a license code.

OR

c) You actually have more than one copy of the Forms Manager database, and while your multi-user code is present in the copy of the Forms Manager that you are checking, the multi-user code is not present in the copy of the Forms Manager database to which you are synchronizing. The second copy of the Forms Manager may be in another folder on your PC, or may be on a shared network drive.

To find the location of the Forms Manager database to which you are synchronizing:

1. Click Start...Programs...Pendragon Forms...Configuration Tool.
2. On the Configuration tab of the Configuration Tool window, make a note of of the directory folder of the Configuration database. (This is typically C:\Progra~1\Forms3, meaning C:\Program Files\Forms3).
3. Close the Configuration Tool window and use Windows Explorer to go to the directory folder specified in the Configuration Tool window. Double-click the file Forms32k.mdb (or Forms3.mdb if you have Access 97). This opens the copy of the Forms Manager to which you are synchronizing. Once again, check that the multi-user code is entered correctly.

Inactive User

This HotSync error message occurs if a user who has been de-activated in the User List in the Forms Manager, tries to synchronize.

Important: If users have been deactivated due to a License Count Exceeded error message (see page 454), you will need to correct that problem first to avoid continued deactivation of users.

To re-activate a user, open the Forms Manager and click the Users button.
Check the Active checkbox on the row with the user's name. Close the Users window and synchronize the user's handheld.

Evaluation Period Expired

This HotSync error message occurs if you have been using the evaluation version of Pendragon Forms and you have passed the expiration date of the evaluation version. Pendragon Forms will no longer synchronize the handheld in this case.

The solution is to purchase a copy of Pendragon Forms and enter your product serial number.

If you have already purchased a copy of Pendragon Forms and you still get this error message, the problem may be that either the product serial number was not entered correctly or at all.
Click Start...Programs...Pendragon Forms...Configuration Tool. Enter the product unlock code or serial number in the Evaluation Unlock Code field. Click Exit to close the Configuration Tool window.

Note: You must have access rights to the Windows Registry in order to save the Forms unlock code or serial number. If you do not have access rights to the Windows registry, contact your LAN administrator or IT support person in your organization for assistance.

Other HotSync Error Messages

HotSync error messages that are generated by the Forms conduit take the following format:

Unable to <*perform action*>

<*message*>

The *action* tells you what the Forms conduit was trying to do when it encountered the problem. The *message* tells you what the problem is. Read the message to figure out what the problem is.

There are 4 possible actions that the conduit might be unable to do:

Unable to sync via ADO or DAO
: This means that the conduit has not even started synchronizing any form designs and there is already a problem with the database.

Unable to execute downlink SQL
: This means that the conduit is trying to send records from the database on the PC to the handheld, and is encountering a problem.

Unable to append record
: This means that the conduit is trying to write a new record from the handheld to the database on the PC.

Unable to update record
: This means that the conduit is trying to update an existing record in the database with changes from the handheld.

The *message* part of the Forms conduit HotSync error message contains some or all of:

- The name and ID number of the form design that was synchronizing when the error occurred.
- The SQL statement that the conduit was attempting to execute. This is the command that the conduit was sending to the database when the error occurred.
- The field number of the field on the form that was being updated when the error occurred. If the field number is one more than the number of fields on your form (e.g.: your form has 10 fields, but the error message is referencing field 11), then the error is usually a constraint error such as a referential integrity problem (e.g.: child record without a parent record) or a conflicting primary key.
- An Access or ODBC database error. This is typically the cause of the synchronization problem.

There are hundreds of Access and ODBC errors that could possibly occur. Different database systems may generate different errors. Here is a list of the most common Access database errors you may encounter:

Too few parameters. Expected <*number*>

One or more column names (possibly specified in your Additional Download Criteria) do not exist in the table. Make certain that you are using column names in your Additional Download Criteria and not field names. If you are field mapping and you changed the name of any columns in your external Access database table, you will need to field map your form again.

Database or object is read-only

Most likely you are attempting to update or append a record in a table or query for which you have no permission for updates or inserts. Determine the database user account that you are using to connect to your database server. Check with your database administrator to confirm that the account you are connecting with has SELECT, INSERT and UPDATE privileges for the database table you are mapping to.

Out of present range

A value entered on the handheld will not fit into the corresponding column in the database table. This could be because the numeric value entered is out of range, or has too great a precision. It may also be that a text value entered on the handheld contains too many characters to fit into the database column.

Database <*name*> is exclusively locked

The database you are connecting to is in use by another user or program. Exit all of your applications and try synchronizing again. If the database is shared by other users, you may need to wait until the other user has relinquished control of the database.

Database <*name*> isn't a valid database name

The database to which you are mapping cannot be found. It could be on a drive letter that is no longer mapped to a network resource. Try remapping your form design, or recreating the shared network drive that was used when you originally mapped your form design.

The Microsoft Jet database engine could not find the object <*name*>.
Make sure the object exists and that you spell its name and the path name correctly.
or
The Microsoft Jet database engine could not find the input table or query <*name*>.
Make sure it exists and that its name is spelled correctly.

A column or table name cannot be identified by the database. Try changing the Bracket Mode to *Always* and remapping your form design. To change the Bracket Mode, open the Forms Manager and click the Options button. After changing the bracket Mode, click the Properties button, then click the Field Mapping button and re-save your field mapping.

Record is too large

All databases have limits on the number of fields and the total amount of data that can be stored in each record. For example, you can create a Microsoft Access table that has 50 text fields, each able to hold 50 characters. However, you will not be able to fill all the text fields of a single record to capacity because Microsoft Access has a limit of 2000 characters per record. The solution is to abbreviate responses in your record on the handheld, then resynchronize. If necessary, manually transcribe information from your record on the handheld to a document on your PC, delete the transcribed data from the handheld and resynchronize.

The changes you requested to the table were not successful because they would create duplicate values in the index, primary key, or relationship. Change the data in the field or fields that contain duplicate data, remove the index, or redefine the index to permit duplicate values and try again.

A new or modified record on the handheld cannot create a corresponding record on the PC because it would have a duplicate primary key value. By default, Pendragon Forms automatically adds to the database, records that were added on the handheld. It is possible that the record on the handheld was already inserted into the database table, but the handheld is unaware of this because the HotSync operation was interrupted. To confirm this, compare the field values on the handheld with the field values on the database table. If they match exactly, you can delete the offending record from the handheld.

If your Primary Key is unlikely to be a duplicate (e.g., if it contains a timestamp), you can set the Disable Record Overwrite Protection option in the Advanced Form Properties (see page 186) to enable newly created records on the handheld to overwrite existing records on the PC. This will prevent future occurrences of this problem due to HotSync interruptions.

You can't add or change a record because a related record is required in table <*name*>

A relationship exists between two tables in your external database. Pendragon Forms is not permitted to add a record to a table because a related record is first needed in the named table.

If you are also field mapping to the related table mentioned in the error message, it is possible that this error is caused by synchronizing the child table before its parent. This can usually be confirmed by performing a second synchronization. If the synchronization proceeds without errors, your child form is synchronizing before your parent form. To solve this problem, copy, freeze and field map your child form. You child form will have a higher Form ID number and will synchronize after the parent form.

The field is too small to accept the amount of data you attempted to add. Try inserting or pasting less data.

A user has entered more text data on the handheld than will fit into the corresponding database column. Abbreviate the text on the handheld, or manually transcribe the data to the PC before deleting the text from the handheld. To prevent this from occurring in the future, either 1) enlarge the capacity of the database column, or 2) copy the form and impose a text length restriction on the field in question, before freezing and mapping the new form.

Can't start your application. The workgroup information file is missing or opened exclusively by another user.

Most frequently, this error occurs because you are field mapping to a password protected Access database. See the Knowledgebase article at www.pendragonsoftware.com for information about how to field map to password protected Access databases.

Data type mismatch in criteria expression

The column types in your database do not match the data types in the Additional Download Criteria or in the SQL generated by Pendragon Forms. Confirm that your Additional Download Criteria is appropriate for the column types involved. If you have chosen **Keep incomplete records on handheld** as your synchronization rule, try instead choosing **Keep a copy of records on handheld** and set equivalent Additional Download Criteria to implement the synchronization rule you need.

Problems with Sending Data from the Handheld to the PC

If you create records on the handheld and synchronize, but the records do not get sent to the Forms Manager database on the PC, here are some things to check.

Did Pendragon Forms synchronize?

On the PC, click the HotSync Manager icon in the Windows Task Tray (the red and blue arrows icon in the lower right corner of the Windows desktop). Choose View Log. The most recent log is at the top of the screen. Always check the most recent log, as it is recording what happened on your most recent synchronization.

The following table describes the possible HotSync Log entries that you might see for Pendragon Forms:

HotSync Log Entry	Meaning
Pendragon Forms synchronization started at... *OK Pendragon Forms*	Pendragon Forms has synchronized successfully.
Pendragon Forms synchronization started at... Error message here *OK Pendragon Forms with 1 message(s)* Note: Instead of 1 message, there could be 2 or more messages.	Pendragon Forms had a problem synchronizing. Data on the handheld may not have been uploaded to the PC. See page 452 for information on various HotSync error messages.
No Pendragon Forms entries at all in the HotSync Log.	The Pendragon Forms conduit is not registered with the HotSync Manager. See page 434 for information on how to re-register the Forms conduit.

What if there are No HotSync Error Messages?

If the Pendragon Forms conduit does not generate any HotSync error messages, but your data on the handheld is still not uploading to the Forms Manager Database on the PC, there are some additional items to check, as described on the next few pages.

Check that the Form ID on the Handheld Matches the Form ID on the PC

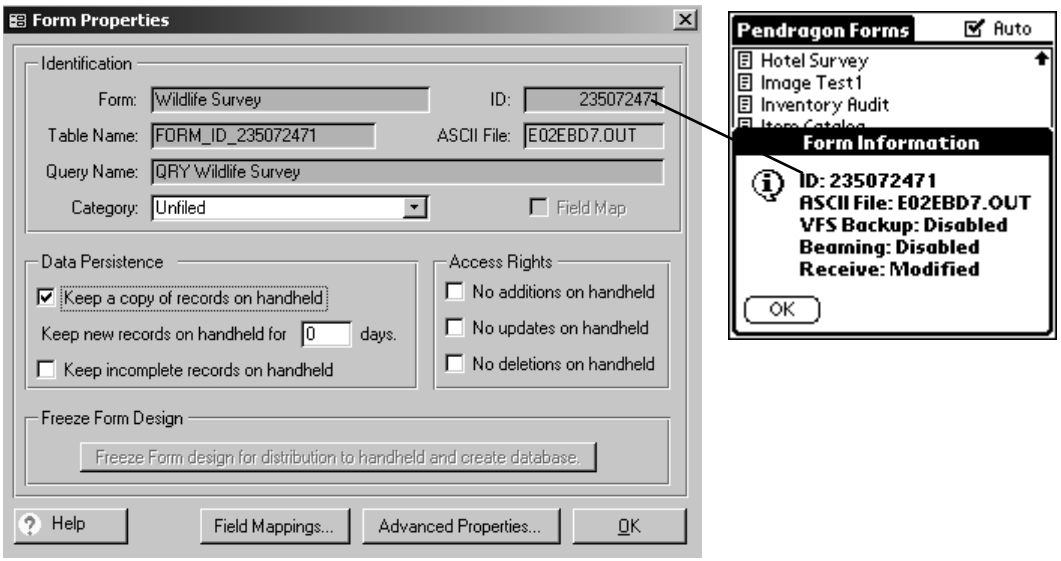
Pendragon Forms can only synchronize a form if the Form ID number on the handheld exactly matches a Form ID of a form design in the Pendragon Forms Manager database on the PC.

If there are no HotSync error messages, but a form on the handheld is still not sending its data to the PC, it is possible that the handheld has a different version of the form design from the Forms Manager database. This can happen if the form on the PC was accidently deleted, and then a new form was created with the same name as the original form. The Form ID number on the PC will not be the same as on the handheld, even though the forms have the same name.

To check the Form ID number of the form on the PC, click the name of the form in the Forms Manager, and then click the Properties button. Look at the value in the ID field in the upper right of the Form Properties window.

To check the Form ID number on the handheld, tap the Forms icon on the handheld, then tap the name of the form. Tap the handheld Menu button (the drop down menu icon below the House icon). On the Help menu, choose Form Info. A Form Information dialog will display the Form ID number.

Compare the Form ID numbers on the PC and on the handheld. If they do not match, you need to find the form design on the PC that does match. Check the Recycle Bin category (see page 34) in case the form design was accidentally deleted. If the form design is not in the Recycle Bin, try recovering the form design from the PilotF folder - see page 417. Or check any backup copies of the Forms Manager that you have.



Check if the Edit/View window in the Forms Manager is open

If you open the Edit/View window in the Forms Manager to view your data, and then synchronize, you will not actually see any new records in the Edit/View window until the window is refreshed.

Close the Edit/View window and then re-open it and check if your data is updated on the PC.

Are you Linking to an External Access or ODBC Database?

If you are linking to an external Access database or an external ODBC database, you may not be able to view your data from the Edit/View window within Pendragon Forms. Instead, go to your external database and check if the data from the handheld has been uploaded.

Check if you have more than one copy of the Forms Manager

If you have more than one copy of the Forms Manager on your PC, it is possible that the handheld may be synchronizing to one copy of the Forms Manager database, but you are looking in a different copy of the database and the data is not there.

You would not get any HotSync error messages if the handheld was synchronizing successfully with the other copy of the database.

To check the location of the database with which Pendragon Forms is synchronizing, click Start...Programs...Pendragon Forms...Configuration Tool.

On the Configuration tab of the Configuration Tool window, look in the Configuration Database field at the path to the database with which you are synchronizing. The default is:
C:\PROGRA~1\FORMS3\FORMS32K.MDB
where PROGRA~1 means the Program Files folder, so the default is
C:\Program Files\Forms3\Forms32K.MDB (For Microsoft Access 2000 or Access XP users. For Microsoft Access 97 users, the directory folder is the same but the database file is FORMS3.MDB.)

Go into Windows Explorer and open the exactly named .MDB file in this location, to verify if your data synchronized successfully.

Technical Support

Technical support is available via the following:

- Visit the Support page at our Web site, http://www.pendragonsoftware.com
- E-mail: support@pendragonsoftware.com

Appendix C: Converting form designs from an earlier version of Forms

When you import your form designs from an earlier version of Pendragon Forms into Pendragon Forms 4.0, there are several modifications that you may want to make to take advantage of new features in Forms 4.0, and to make scripts work in the new Layout View.

Modification	Reason for Modification
Edit the form design to use Layout View instead of Field View or Record View.	You can choose how many fields to place on a given screen, and how much space on the screen each field occupies. **Tip 1**: Copy your original form and make changes to the new form design. Changes might include altering the question height or answer height of a field, starting a field on a new screen, or changing the question font size or color. See *Advanced Form Designer*, page 132. **Tip 2:** You will need to go to Advanced Form Properties and set the Default Views to Layout View.
Edit the form design to cluster related hidden fields on one screen.	In Layout View, Forms 4.0 allocates screen space for Hidden fields. Earlier versions of Forms did not do this. To avoid having screens with gaps where the hidden fields will reappear, you can put all related hidden fields at the bottom of a screen, or on a separate screen to which you when the user needs to fill in those fields.
If you are switching from using Field View to using Layout View, change **exit:** to **exitscreen:** scripts and change **enter:** to **enterscreen:** scripts.	**Enter:** and **exit:** scripts do not work the same way in Layout View (see page 213). Instead of running an exit: script after leaving an individual field, you may want to use an **exitscreen:** script to trigger after leaving an entire screen. Similarly, instead of using an enter: script upon entering a field, you can use an **enterscreen:** script that triggers upon entering a screen. You can also use **select:** events if you want to trigger a script when a user makes a selection in a Yes/No field, a Popup List or a Lookup List.

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