

Case Study

Subdividing a Mature Database—Part 1



JOHN T. DOW

Breaking up is hard to do. But the survivability of your Q&A database application might depend on it.

RECENTLY, I began working with a law firm. For several years, they had been using a single Q&A 5.0 database to track clients and cases. The firm has been very successful, and with that success has come a large number of clients and a diversity of types of cases. As a result, the single database could no longer comfortably meet the needs of the many lawyers, legal assistants, and others in the firm who routinely search for clients and update the information in their records.

Recognizing Q&A's limitations, the firm had attempted to move their database application to Microsoft Access. That effort failed. What they wanted to do when they called me was to stay with Q&A (and the existing data and programming) but redesign the application to provide more usefulness and flexibility and to ensure that it would continue to meet their needs into the foreseeable future.

It is in the nature of Q&A that a lot of different types of data often end up in a single database. For example, the database in question had name and address information not only for the client but sometimes for up to 10 additional people. Also, there was a payment history, a section to record numerous appointments, a section to record numerous legal documents that had been required for the case, another section to keep track of critical dates for legal actions to be taken, and so forth. Over time, this table-like or line-item approach was destined to have problems, with the database eventually starting to "burst at the seams."

This is an account of how I worked with this law firm to restructure the application into approximately a dozen smaller databases. My goal here is to help you think through this type of process, and to decide whether to redesign and how to go about it.

The starting point

The firm's database contains some 30,000 records with the following data structure:

- For each client, there can be multiple cases.
- For each case, there can only be one client.
- There are different types of cases.
- For some types of cases, there can be multiple people in addition to the client. Information must be obtained and stored on each of these people.
- For some types of cases, there can be multiple occurrences (that is, more than one of this type of case per client).
- For each case, there can be multiple comments. Information for each

The Quick Answer

The Do-It-Yourself Guide to Q&A

June 1999

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comment must be obtained and stored (for example, the text of the comment, who entered it, the date and time).

- For each case, there can be multiple appointments. Relevant information for each appointment must be obtained and stored.
- For each case, there can be multiple legal documents to be completed and filed. Information for each document must be obtained and stored.

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Garbage-Dump Databases

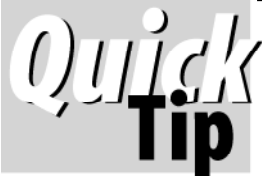
TOM MARCELLUS

ORDINARY Q&A users can't be expected to know the finer points of database structure or the longer-term consequences of initial design decisions. That's why people tend to store everything but the kitchen sink in as few databases as possible. All too often, the "fewest" is *one*.

But how well do these catchall databases stand up to workaday demands as they grow to thousands of records? There can come a point when, as **John Dow** puts it, they start "bursting at the seams" and something drastic has to be done. In this month's lead article, John describes the conditions under which a mature and top-heavy Q&A database can better serve everyone's needs by being divided into several smaller files, along with sensible ways to go about doing it.

You can also *program* a database to death. Though here, at least, Q&A will ward you off with an error message. But what if you really *do* need more than 64K of programming? **Mark Myers** uses an inventive technique to handoff some of that programming to another database. His technique has my vote for the coolest Q&A workaround of the year.

The trouble with your documents is that only people with Q&A can access them. If you need to make your Q&A for DOS Write documents more portable—so you can send them as email attachments, enable coworkers to read them over the company network, or even post them on a Web site—I'll show you the easiest way I know of to do it.



Some DeskJet Printers Are Nothing But Trouble for Q&A DOS

HP DeskJets and compatibles that use the HP PCL3 printer language normally work with Q&A DOS' HPDJ550C.FNT printer driver. For example, we have a DeskJet 870Cse that performs well with the 550C driver, including color printing. Complex fonted reports will sometimes print imperfectly, but we can make adjustments.

One group of printers you should stay away from is the DeskJet 700-series (including the 710C, 712C, 720C and 722C). These printers do not use HP PCL. What's more, some of them (notably the **720C** and **722C**) have *no* built-in fonts—they use *only* Windows TrueType fonts. Q&A DOS users report problems galore with these printers.

The specs for other DeskJet printers, including the 1100, 800, 600, 400, and 300 series, indicate they should work with Q&A's HPDJ550C.FNT driver. (They use PCL3 and have built-in fonts.) Always try before you buy, though.

When shopping for a printer that must work with Q&A DOS, be sure you check its specs. Is it designed for Windows printing *exclusively*? Does it use a printer language other than PCL? Does it lack any built-in fonts (doesn't even have Courier and Times)? If the answer to any of these is "Yes," don't be in such a hurry to part with your money. If in doubt, buy the printer only from an outlet that will let you to return it.

For more on printers and Q&A printer drivers, go to the Home page at www.quickanswer.com and click on the *Q&A Drivers and Newer Printers* link.

The
Quick
Answer™

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The Quick Answer (ISSN 1052-3820) is published monthly (12 times per year) by Marble Publications, Inc., 1927A Harbor Blvd., Costa Mesa, CA 92627 USA

Cost of domestic subscriptions: 12 issues, \$89; Outside the U.S., \$109; Online edition, \$59. Single copy price: \$11; outside the U.S., \$12.50. All funds must be in U.S. currency. Back issues are available upon request, for the same price as a single copy.

Postage paid at Torrance, CA. **POSTMASTER: Send address changes to The Quick Answer, 1927A Harbor Blvd., Costa Mesa, CA 92627.**

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Divide a Database. . .continued from page 1

- For each case, there can be multiple critical dates on which actions must take place. Information for each date must be obtained and stored.
- For each case, there can be multiple payments. Info on each payment must be obtained and stored.

Each record in the database represented a single case for a client. Each record had a case number, which was a combination of the date and the client's name. All of the information described above was stored in a series of table- or line-item-like areas within the one form.

The database had been very functional and in constant use by many members of the firm. There were about 50 workstations used by attorneys, receptionists, legal assistants, paralegals, and others

But there were problems with this type of design—with all the information in one database. It was clear that it had to be broken up in some fashion. Although a Q&A database can lookup information in another database, linking databases isn't its strong point. Breaking up a Q&A database has to be done with forethought and care. (See Tom Marcellus' article "Normalize Your Data for Easier Reporting" in the November 1998 issue for an excellent discussion of the problems involved in doing reports when a database contains line-item-like fields.)

After discussions with the firm's owner, I partially implemented a design that I thought would meet their needs. I divvied up a single record into multiple records in multiple databases, eliminating the line-item lists of things (which I'll simply refer to as "lists"). That is, I *normalized* it. For example, I removed the list of appointments and created an appointment database, with each appointment in a separate record. However, as soon as some of the people who use the application as they work with clients all day long got their hands on it, other problems became evident. Basically, I had misunderstood the degree to which the database should be broken up and had gone too far with it.

The design error was apparent when users said it would require too much effort to use the newly-designed system. They would have to jump around from database to database too often. Finding and displaying information would be difficult. This was not a "Q&A-friendly" database design, and it clearly wouldn't work.

Tom's article shows how you can maintain the data in normalized form (one entry per record) but have a display that shows the whole picture. I designed this type of approach into my databases, but the users rejected it as unworkable. They wanted to be able to see the list without having to do anything to generate it.

This led to a series of meetings in which design issues were discussed with the users. As a result, a new design evolved which was implemented and tested. This might

sound as though a lot of work had to be done over, but that's not true. Some work was done and then redone, but much of the design effort and techniques developed for the initial testing were used in subsequent designs. The design was expected to be modifiable and this was taken into account, thereby minimizing wasted effort.

Reasons for breaking up the database

The task to be accomplished in the design meetings was basically to decide how many pieces to chop the database into. Following are the reasons why breaking up the database was necessary.

- Adding more fields to gather needed information for more types of cases was impractical because the database was already very complex.
- Searching for information in the various lists isn't practical. If you're trying to find a record with a particular value in a particular column in one of the lists, you need a complex Retrieve Spec to search for it in all the rows in the list.

Suppose you wanted to find a record based not on the client's name but on the name of one of the people that appears in the list of up to 10 people. If you're looking for Mary Jones, you have to enter "Mary Jones" 10 times. Furthermore, you have to tell Q&A to find the records that meet "Any" not "All" of your restrictions. Not only is that an extra step every time you do a retrieval, but suppose you want another test to be met, and this one should be "All" instead of "Any"? Clearly, Q&A wasn't designed for searching for this type of complicated pattern.

A workaround is to create another field that holds a concatenated string of all the information in the rows in the list. You then use this additional field for searching. This enables you to use a retrieve spec like "..Mary Jones.." in only one field. Searches using a Retrieve Spec with ".." at the beginning and end are very slow, however. Q&A has to scan the entire database. It can't use a speedy field to find "..Mary Jones.."

You could also create several keyword fields and make them speedy. (You might put the last names of the 10 people in one speedy keyword field, the first names in another speedy keyword field, and so on.) That would speed up searches on those fields. The cost is additional speedy fields, and speedy *keyword* fields at that. So this is not the best solution.

- Doing reports on information in the lists is not practical either. For example, consider the list of payments. Each row contains the date of a payment, the amount of that payment, the balance forward and the balance remaining. How do you do a report on the last payment that was made? From record to record, it's going to be in a different row in the list. Maybe there's a derived column approach, but what a lot of work that would be!

And how would you do a crosstab report showing payments by day of the week or by month of the year?

You could have an extra copy of the last values entered. Each payment is in the list, but information about the last payment also appears in special fields not in the list, the purpose being to facilitate retrieval and reporting. This would allow you to do a report on the last payment. But suppose there were two payments in your reporting time period? And again, how do you do a report showing payments by day of the week, or week of the year?

What the database purists would want

As we've seen, there are certain problems created when you put 11 people in one record. If you were to enter the relational database world, the tools you'd be using would pretty much demand a drastically different approach. Just to give you an idea of the other end of the spectrum from the Q&A one-record approach, I'll describe what a typical relational database solution would look like.

Let's say we have a case involving Jimmy Jones and that there are three other people involved: Sandra Jones, Mary Smith, and Lee Walters. You'd have fields for Jimmy and Jones, then an array holding the other three people and allowing room for up to 10.

But you should allow for the fact that these other people may themselves be clients in their own right, not merely people associated with Jimmy's case.

Assume you create a relational database, named CASE, to hold cases. You would put no names for any of these people in the CASE database. Instead the names and other information would be in a PERSON database. All people, clients and others, would have their own record in the PERSON database. Each record in the database would have a unique identifier number. The CASE database would not need to contain any information about the client (name or birth date, for example) but would merely contain the client's unique identifier in the PERSON database. Any program or report selecting records from CASE would have to use the unique identifiers from the records in CASE to link to the PERSON database to get the client name and other information.

Now, Q&A can handle this type of arrangement for the client. When doing reports, you can put @XLookups in the Retrieve Spec and Derived Column Spec. So theoretically you could get information from PERSON while reporting on CASE. In practice, it's a bit difficult to do this in Q&A, and it's not exactly very fast.

In contrast, relational database systems are designed to do this. It's easy to specify these relations between databases (hence the name) and the database engines are optimized to do it very efficiently.

In a relational database system, you are not supposed to put the names of the people in CASE, you have to use their unique identifier numbers. But it gets worse. You're not even supposed to put any lists in the database. Lists are strictly forbidden. What you need is another database

(called a *table* in relational parlance) that "co-relates" the proper entries in PERSON with that particular row in the CASE table. This table shows how the cases relate to people and how the people relate to cases. It's called a "many-to-many" mapping.

Suppose the case number is 123456, and in addition to the client (person 9876), three other people (1234, 5678, and 9012) are associated with the case. This additional correlation table would have three rows. The figure at the bottom of the page shows what the CASE, PERSON, and CASE_PERSON_CORRELATION tables would look like. The CASE and PERSON databases would, of course, have more columns to hold more information about the cases and people, but the CORRELATION table has only the two columns, as you can see. (These sample tables have far too few rows for a real-life law firm.)

To display the names of the three people involved with case 123456, you have to iterate over all the rows in the correlation table that have the case number 123456, get the three unique identifiers (1234, 5678, and 9012), then go to the PERSON table three times for the details for those three people. The advantages of this are that you can have 0, 1, 2, 100 or even 1,000 people associated with the case—there's no limit—and you can search and report on them just as easily as if there were only 1.

While this may seem complicated, a good relational database will take this type of design in stride. You should be able to see how powerful and flexible this type of design is, how easy it would be to search for and do reports on all the people involved.

I'm not a snake oil salesman telling you that relational databases are "it" and that it's wrong to use Q&A in a situation like this. Far from it. Actually, a truly relational database system that's as easy to use as Q&A would be really nice. But there isn't one. So we have to make do. The big question is, *how far should Q&A be stretched to incorporate some of these concepts.*

Given this big question, what did we decide we wanted the new design to be? I'll cover this in next month's concluding Part 2.

CASE			
Case	Date	Client	Type of case
123456	05/24/1999	9876	Personal injury
382922	04/19/1999	3378	Power of atty

PERSON		
Unique identifier	First name	Last name
1234	Sandra	Jones
3378	Fred	Kensington
5678	Mary	Smith
9012	Lee	Walters
9876	Jimmy	Jones

CASE PERSON CORRELATION	
Case	Person
123456	1234
123456	5678
123456	9012

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Your Y2K Audit Use Your Head!

ALEC MULVEY



While readying your applications for the new century, here are a few handy shortcuts you might want to add

almost certainly to be in the 1900's. It might even be in the 1800's—but not in the 2000's. So in this case a *reverse* Y2K program is required:

HAVE you ensured that your Q&A databases are Year 2000 compliant yet? No? Shame on you! There have been numerous articles in *The Quick Answer* over the last couple of years on this topic. I'm doing a lot of Q&A Y2K auditing work these days, and I'd like to share with you a couple of things I've found.

You should know by now to set a four-digit-year global date format for each database. (To do this, select File / Design File / Redesign a File, enter the database name, then press F10 until you reach the Global Format Options screen.) And you're probably aware that if you then enter 4 Jul 00 in a date field before or after the new year, then Q&A will assume the year to be 1900. The solution is to write a little program to convert the century. Here's an on-field-exit program I use:

```
DateField:
> If @Yr(DateField) < 1951 then DateField =
@Replace(DateField, @Yr(DateField), @Yr(DateField) + 100
)
```

In this program, the cutoff year is 1951. Any dates before that will have 100 years added, so 1900 becomes 2000. However, before you blithely begin adding a program like this to every date field, think about the *nature of the date* each date field is storing. For some date fields, this program would not be appropriate.

The other day I was at a senior citizens home for a Y2K audit and was confronted by a variety of date fields. Date of admission field—yes, fine. Staff database date of birth field? Well, we don't need the program here. It's going to be at least 16 years before there's an employee with a birth date after 2000. (I made a note in my diary to contact them in 2015 to check how things are going.) Resident's date of birth? Now here we definitely do *not* want the programming. The year is

```
DOB: > If @Yr(DOB) >1975 then DOB = @Replace(DOB,
@Yr(DOB), @Yr(DOB) - 100 )
```

Here, 100 years are *subtracted* if the date entered is after 1975. So an entry of 26 Jun 97, which Q&A interprets as 1997, is converted to 1897. I chose 1975 as the cutoff because, looking forward to 2005, no resident will be under 30 or over 130.

A further complication can occur if the range of possible dates is very wide. This might occur in a database used for genealogy—if actual dates are recorded rather than just the year, for example. Here it might be wise to enter the full four-digit year—28 Feb 1842, for example. Unfortunately, Q&A offers no built-in way to *force* entry of a four-digit year. If you're using Q&A 5.0, though, the following program can do the trick:

```
> @Msgbox("", "Please Select a Century", "");
Date = @Replace( Date, @Left(Date,2),
@Left(@Userselect("1800;1900;2000"),2) )
```

This program displays a message box instructing the user to choose a century from the picklist that follows. (See Figure 1.) The first two digits of the selected century replace those of the date entered by the user. This way, there's no excuse for entering the wrong date!

If you want the default century to be other than the first one on the picklist—say, 1900 rather than 1800—in the

Concludes on page 9

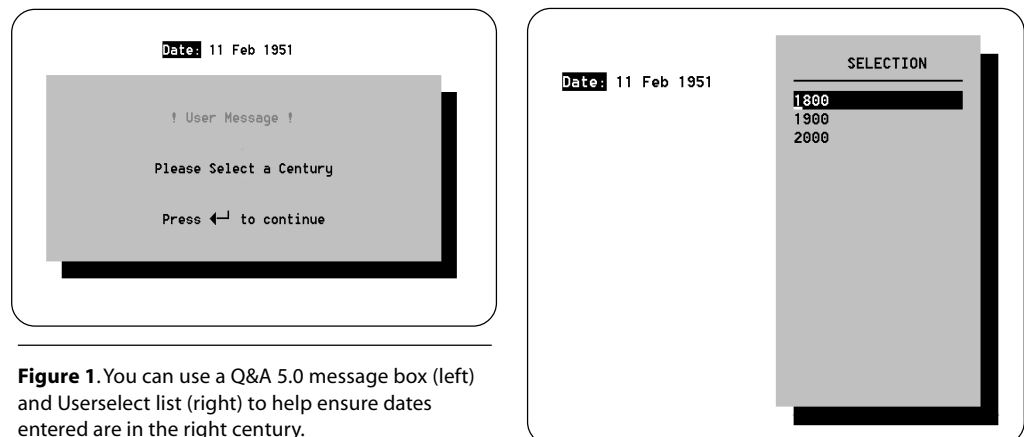


Figure 1. You can use a Q&A 5.0 message box (left) and Userselect list (right) to help ensure dates entered are in the right century.



EDITED BY GORDON MEIGS AND WILLIAM HALPERN



Auto-Strip Punctuation from Address Fields

We're updating our mailing list database to conform to the Canadian Postal Addressing Standard which requires that we remove punctuation marks and symbols from our address fields. The first example below is an address that needs to look like the second example after removing the periods, pound sign (#), and comma. How do we do this?

Before: R.R. #8, Station Main
After: RR 8 Station Main

Judith via email

You can use Q&A's @Replace function to strip out the unwanted punctuation characters. Simply Mass Update your database using the following Update Spec (program) in the pertinent address field:

```
#10: #10 = @Replace(#10, "#", "");  
#10 = @Replace(#10, ",", "");  
#10 = @Replace(#10, ".", "");
```

This program performs three actions on the field. It first removes any pound signs, then removes any commas, and finally removes any periods. Actually, what it does is *replace* these unwanted characters with nothing. (The double quotes indicate replace with nothing.) @Replace works this way:

Make the field = What's in the field, replacing all "Character(s) specified" with the "New Character(s) specified"

You can use the same program for regular data entry programming, so that if someone enters an address with any of these punctuation marks, Q&A will automatically strip them out when the cursor leaves the field.

Y2K Patch Won't Run In Windows 3.x

DOS

I have Q&A 4.0 for DOS and am looking for a Year 2000 update for it. The one you have available for download from your Web site says it must be run in Windows 95 or 98. I have only Windows 3.11. Please let me know if there's a version available to solve my problem.

Cheryl via email

The Y2K patch for Q&A DOS corrects the way post-1999 file dates will be displayed on Q&A's List Files screens—it has no affect on your data or Y2K compliance. (Your Q&A databases are Y2K-compliant as long as they use a four-digit-year date format.) Since the patch runs only in Windows 95, 98, or NT, you'll have to copy your QA1.EXE file to a PC running Windows 95, 98, or NT (the file should just fit on a 1.44M floppy), run the Y2K patch on it there, then copy the file back to your Windows 3.1 PC, overwriting the old QA1.EXE file.

Macro Prevents Display Update

DOS

We have a problem using the @Macro command in a network environment. Here's an example. Another user is viewing record 1234 in Customer.dtf. In the record where I'm working, the @Macro macro "presses" F11 to copy 1234 to Q&A's clipboard, then pastes it into Customer.dtf's Retrieve Spec and "presses" F10 to display record 1234. The problem is that the macro keeps "working" and record 1234 never appears. Normally if another person is using a record, Q&A will indicate this with a message "This record is being edited by so-and-so. You can view it only." How come Q&A hangs when the record is retrieved via a macro?

Andrew Aronson via email

The problem isn't with the @Macro command, per se, but with the macro it's running. When you finish recording a macro and are about to save it, Q&A displays the three-line Macro Options screen. On the first line, you can give the macro a meaningful, descriptive name. The second line is "Show Screen... Yes/No" If you choose Yes (which is video on), Q&A will display all the screens as the macro executes. If you choose No (video off), Q&A won't update the screen until the macro has completed or the user is prompted for keyboard input. Evidently, you have this macro set to video off. When Q&A arrives at record 1234, since "you can view it only" and cannot change any fields, Q&A stays in video off mode.

You can change the macro by opening your Qamacro.asc file in Write (If Q&A displays the Import Document screen, choose ASCII). Find the macro—the



Stumped?

Send your Q&A questions to @Help, The Quick Answer, Marble Publications, Inc., 1927A Harbor Blvd, Costa Mesa, CA 92627 or email to mailbox@quickanswer.com. Include your name, address, phone, and your Q&A version number (and whether DOS or Windows) and a detailed description of the problem. We'll publish those questions we feel are of general reader interest; individual responses aren't possible.

beginning of it will look something like this:

```
<begdef><nokey><name>"Go<sp>to<sp>cust<sp>record"  
<vidoff>...commands...<enddef>
```

begdef means begin macro definition.

nokey—If you assign a key identifier (a shortcut keystroke) to a macro, such as Alt-M, this would read "altm." With no key identifier, it simply reads "nokey."

name is followed by the descriptive name (in quotes) you've assigned to the macro, with <sp> indicating where you pressed the spacebar when typing in the name.

Following the macro name you'll see either <vidoff> (video off) or <vidon> (video on). Simply change vidoff to vidon, then press Ctrl-F8 to resave the macro file as an ASCII file. (Don't press Shift-F8, or you'll save it as a QA Write document.) Next, press Shift-F2 and select Get macros to reload the edited macro file. When you next run the macro under the conditions you mention, Q&A should display the record along with the message "This record is being edited by so-and-so..."

Can't Save Program Spec

When programming a particular field, when I try to save the program I receive a *Not a valid program spec* error message with the cursor in a particular spot. If I then change something in the program, I get the same message but with the cursor in a different position. If I delete some of the programming, then Q&A will accept it. It seems as though I'm running into the programming barrier for the field or database. The program is only 3,704 bytes and is by far the longest in any of the fields. DTFDOCTR reports that of the 64K of database programming space and 32K of field programming space, 61,786 and 30,337, respectively, are available. I'd appreciate your help in troubleshooting this.

Bob Brant via email

From your description, it sounds like you have a syntax error in the program. A field can hold up to 32K of programming (or something less than that depending on how much memory is available to Q&A). Syntax errors are usually near the cursor position, but not always. The first thing to check for is an equal number of opening and closing parentheses. In the expanded field, press F7 to Search, set the search to Fast Automatic, and search for each character in turn. Q&A will give you a count at the bottom of the screen. If the count on the two characters differs, you'll need to find the missing one(s) and insert them in the right locations. Also, search for matching left and right French braces, and even matching quote marks. I had a program recently where I had forgotten one quote mark in an XLookup statement and it took me 20 minutes to find it! Also, if you're using field names in your program, be sure they are actual field names. When you expand a field, the field name appears below the box.

Can't Copy Records When Database Is in Use

One of my clients runs a multi-user invoicing system that includes installation invoices, service invoices and warranty invoices. He schedules all installation, service, and warranty calls on each type of invoice. I wrote a macro that copies data in four fields in each of these databases to a fourth database (Schedule). A report is then run from this database that lists the day's calls and the technicians scheduled to handle them. It all works just fine and the client is pleased.

The macro uses Q&A's Copy command (on the File menu) to copy the data from the invoice databases to the Schedule database. The problem is that the Copy command won't work when someone else on the network is in any of the three invoice databases. Is there a workaround so the data can be copied to get the report whether or not any of the three invoice databases are in use?

Bob Brant via email

The File / Copy command is one of Q&A's *Locked File/Single User* commands. Others include File / Mass Update, File / Post, and File / Remove Records. There's a whole chapter on Multi-user Network Operations in the *Q&A User Guide*. (See Chapter 8, p. 6, "Access to Shared and Locked Files" for a list of database operations that are true multi-user and those that are restricted.)

Whereas the File / Copy command will fail if the database is in use, the File / Utilities / Export and Import commands will work whether or not the database is in use. Modify your macro(s) to export the data to a file that the macro always overwrites—a file such as transfer.tmp—then have the macro continue, importing this file into your target Schedule database.

Thought for the Day (or Millennia)

A user in the Q&A discussion group recently posted a message explaining that he had just gone through the process of moving all his Q&A data to Microsoft Access and that he was now hopelessly stuck and needed some help or advice on getting the Access database to work. We thought the best answer to his dilemma was this reply:

You poor soul!

Exporting the data is very easy.

It's getting Access to keep & use the data that is going to cost you countless hours and thousands of dollars if you are a business!

We used Q&A, switched to Access, then switched BACK to Q&A! Why? Q&A works!

Believe me, we jumped on the "must use Win 95 programs bandwagon," too.

*Very, very expensive mistake. *Shaking head.**

Good luck! —Rock

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Shatter Q&A's 64K Program Spec Barrier

MARK MYERS

"This spec is too complex. Please shorten it." Ever seen this error message when saving your programming? You don't want to. And you never will if you have Q&A handoff part of your program to another database.



Q&A developers who continue to add functionality to a database can eventually run headlong into the 64K limit (or 32K per field limit) on programming space. Past issues of *The Quick Answer* have dealt with the risk of database corruption this can introduce, as well as ways to reduce the overall amount of programming. (See "Use Your Programming Allowance More Effectively" in the December 1994 issue) Reduction techniques range from programming with field numbers instead of field names and using function abbreviations, to eliminating unnecessary white space and deleting all comments.

If you find these methods unacceptable, or if you've done everything you can to reduce the size of your Program Spec and you're still at the limit, there's another option—one that allows you to have Programming Specs virtually unbound by the 64K constraint.

The technique I'll describe uses Q&A's XPost, @Shell, and @XLookup commands to work around it. XPost copies values to another database for further calculation, @Shell makes it possible to execute external programming on those posted values, and @XLookup reels in the calculated results for the record you're working on. Thus, you can link as many 64K specs as you need to perform all your data manipulation and calculations.

Suppose, for example, that you need to calculate a price based on the total amount of an invoice, the delivery distance, and the number of days from the order in which delivery is required. You might have five ranges for the invoice amount, say, \$1-\$2000, \$2001-\$4000, \$4001-\$6000, \$6001-\$8000, and greater than \$8000. Likewise, you might have five delivery zones and four categories for the lead-time on an order. That would give you 100 possible combinations of those variables, and your programming might look something like this:

```
If Price Category = 1 and Region = 1 and Days for Delivery = 1 then Selling Price = 2.2 * Cost
```

```
If Price Category = 2 and Region = 1 and Days for Delivery =2 then Selling Price = 2.1 * Cost
```

etc...

This program would continue to 100 If-Then statements. But if you had Q&A execute it in an *external* database, you could reduce by about 90 percent the size of the program in the original database.

This example might be a little extreme. (I'm sure none of you program your databases this way.) So, let's look at a simpler situation. Suppose you have a database where the user enters a date and you need Q&A to calculate the date of the next Monday. If you calculated this value externally, you could reduce the programming in your original database by about half.

To do this, you have Q&A XPost the value on which you need to calculate to your secondary database. Then, you have Q&A start a second copy of Q&A, open the secondary database, and perform the calculation. Finally, you have Q&A return to the original database record and retrieve the result of the calculation from the other database. All this happens automatically without any user intervention. The program in the original database might look something like this:

```
XPost("Function.dtf", "1", "Index", Test Date, "Date");
Next Monday = @Shell("Getdate.bat");
Next Monday = @XLookup("Function.dtf", "1", "Index", "Date");
```

I've chosen to use a batch file to start the second instance of Q&A because it saves a little bit more of our 64K. Here's what the batch file (getdate.bat) looks like. Your paths and switches will probably be different:

```
c:
cd\
cd qa5
qa.com -alc:\qa5\function.asc -m1
exit
```

The batch file resides in the Q&A program files directory. It starts a second instance of Q&A and tells Q&A via the *-al* switch to autoload the macro file *c:\qa5\function.asc* and run its *Alt-1* macro. If you wanted to run the second copy of Q&A directly from your program (without the batch file), the @Shell command would look like this:

```
Next Monday = @Shell("qa.com -alc:\qa5\function.asc -m1")
```

Previous articles in *The Quick Answer* have discussed

in detail auto-starting, running, and returning from a second copy of Q&A. (You can use TJ's *Quick Answer* Q&A Index database at www.quickanswer.com to find these articles. Search the keyword *@Shell*.)

In this case, the external or secondary database contains only one record. There's a field in it named **Index** that always contains 1. The Alt-1 macro retrieves that single record (File / Search / Function.dtf), which executes the calculation program. The macro then saves the record, returns to the Main menu and exits, returning you to the original record.

To automatically execute the programming in the external database record, there's a field that contains the initial on-record-entry program. (Of course, GOSUB and GOTO programming can be placed in additional fields.) To set an on-record-entry program for a database, press F8 in the Program Spec, and type the ID number of the field whose program you want Q&A to execute when the record is retrieved.

Here's the program that executes on-record-entry in the example under discussion:

```
If @Dow$(Date) = "Tuesday" then Date = Date + 6;
If @Dow$(Date) = "Wednesday" then Date = Date + 5;
If @Dow$(Date) = "Thursday" then Date = Date + 4;
If @Dow$(Date) = "Friday" then Date = Date + 3;
If @Dow$(Date) = "Saturday" then Date = Date + 2;
If @Dow$(Date) = "Sunday" then Date = Date + 1;
```

You might want to place every externally-programmed operation in its own database. Or you might want all external operations to be performed in the same database. The program above is for the former case. If you wanted to perform more than one operation in the external database, you'd need to place this statement before the *@Shell* command in the original database:

```
XPost("Function.dtf", "1", "Index", "Next Monday",
"Function Name");
```

Then, the external database would need to nest each operation it contains within an If-Then statement in the following form:

```
If Function Name = "Next Monday" then
{
  programming as shown above
};
```

Note that you have the option of "linking" more than one primary database to any secondary database. That is, you can link as many databases as you want to the date calculation database shown above. So even if you're not approaching the 64K limit in a Program Spec, this technique can help you maintain your code more efficiently.

The simple example I've used doesn't reduce the original Program Spec by all that much. But if you work with this technique a bit, chances are you'll spot blocks of code particularly well-suited to being moved to an external file. A block of code in which the actual size of the program is relatively large compared to the number of fields used in it is an excellent candidate for removal to an external file. Also, look for blocks of code that are accessed infrequently. This is because there'll be a performance hit each time an external operation is executed.

The technique I've outlined is a workaround. So whether you've tried everything else to reduce the size of a Program Spec or you just aren't willing to sacrifice the clarity of your code in order to stay comfortably within the 64K limit, this technique offers a way to add new functionality to an already very large Program Spec without having to worry about that dreaded and impenetrable (until now) 64K barrier.

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Y2K Audit...continued from page 5

example above—see Tom Marcellus' "Picklists with Dynamically Changing Default Selections" in the April 1999 issue.

Remember these two key points:

- It's essential to use a four-digit-year global date format in all your databases that contain one or more date fields.
- If you enter a date with a two-digit year, Q&A will add 1900 to it.

If you omit the year entirely when entering a date, or use the *@Date* function in programming or as an Initial

Value, then Q&A will get the year from your computer's system clock. If your PC's clock thinks the year is "2000," then that's the year Q&A will use.

Finally, if you haven't already done your Y2K audit, do it now. Don't wait until December!

Alec Mulvey owns Keyword Training & Consultancy based in Ascot, near London, England. Alec has been building Q&A applications and training clients on it for nine years, and is the current president of the (Inter)National Q&A User Group. Keyword Training is also the UK distributor for the International English edition of Q&A (the "Definitive Edition" CD-ROM) and also John Dow's Utilities. Fax +44-1344-884-111, alec@keywordtraining.com, www.keywordtraining.com.

Make Your Q&A Write Documents Portable

TOM MARCELLUS



Want others to have access to your Q&A documents over the network or Internet? With a third-party program, your associates won't need Q&A at all to read and even print them.

DOS

Currently, all of our brochures and technical support information is printed from the various programs in which they were created using Acrobat Distiller or PDF Writer and easily combined for transmission across the net and for digital filing. As for our quotations in Q&A, we have to print them to paper, then scan them into PDF format. This is okay, but not everyone has a scanner and the file size is much larger than when printing directly to Acrobat format.

If document production is an important part of your company's business, chances are you've thought about how you might make your documents more portable.

By portable I mean capable of being shared—viewed and printed—by others without Q&A. Document portability is a rapidly growing trend in today's business world. Perhaps you're on a company network where others who aren't running Q&A need network access to documents created in Q&A Write. Or maybe you'd like a way to send your vendors or customers Q&A mail-merged invoices, quotations, purchase orders or the like via email as electronic documents. Portability is the key.

If you subscribe to the electronic Online Edition of *The Quick Answer*, you already know what a portable document is because that's what you download each month from www.quickanswer.com. No matter what kind of computer system you have, as long as you have the ubiquitous Acrobat Reader program and a Windows-compatible printer, you can view and print your *Quick Answer* issues.

Acrobat portable documents retain the precise content and formatting of their originals whether someone on your network accesses them or you send them across the Internet as email attachments. You can even display Acrobat documents on a Web page. All anyone needs to view and print them is Acrobat Reader, which can be downloaded free from www.adobe.com.

What got me going on the portability issue for Q&A documents was a recent email exchange between us and a *Quick Answer* subscriber (abridged and edited for clarity):

Subscriber: Please contact us to discuss the development of a Q&A printer driver for Adobe Acrobat.

Our response: This sounds rather far-fetched. Are you using Q&A for Windows or DOS? And why do you need a Q&A Acrobat printer driver?

Subscriber: We are using Q&A for DOS. (We tried Q&A for Windows but didn't like it.) We want to print our quotations directly from Q&A into Acrobat PDF format for ease of transmission over the Internet.

Since an Acrobat Reader printer driver for Q&A DOS isn't likely to appear soon, I found a quick and easy way to turn Q&A DOS documents (including merge documents) into Acrobat Portable Document Format (PDF) files.

The technique allows anyone (they don't need Q&A) to read and print your custom-formatted Q&A documents. People on your company's network will be able to access them. You'll be able to send them to customers or vendors as email attachments. You'll even be able to put them on a Web site where anyone with Acrobat Reader can view and print them online and optionally download them. If you archive your important business documents in Acrobat format, you'll always be able to read and print them without needing Q&A. (You can even password-protect them.) And they'll always look exactly as you designed them to look.

But there's another outstanding benefit—you'll be able to easily add your company's custom letterhead, logo, or other graphic element to every Q&A-to-PDF document you generate.

(If you're using Q&A Windows, this discussion isn't for you. You may be able to use Acrobat's PDFWriter Windows printer driver to generate PDF files from your Write documents on-the-fly. Contact Adobe Systems for more information.)

I wanted to make the process of generating PDF files from Q&A Write documents as easy as possible. Once you've got things set up, all you'll need to do is print your document to a file in Q&A, then run it through a utility to create the PDF file. You'll see how this works just ahead.

Install a Q&A printer driver

As I mentioned earlier, Acrobat Reader, which you use to view and print PDF files, is free to anyone. However, the program you use to create PDF files is not. If you don't already have the full Acrobat 2.0, 3.0 or 4.0 program, you can purchase it almost anywhere for under \$200.00. (You

can upgrade from an earlier version for less than \$100.00.) The full Acrobat program contains Acrobat Reader in addition to several other PDF-related utility programs. The one you need to create PDF files is called *Acrobat Distiller*.

Distiller will turn any standard Postscript file into a PDF file. Q&A for DOS can generate a Postscript file for any Write document. (No, you don't need a Postscript printer.) Here's how to set up Q&A for Postscript printing:

1. From the File menu, select Utilities / Install Printer.
2. Select the Apple Laserwriter (Portrait) printer and set it to print to FILE. You can assign it as Printer D or E if one of those slots are available. (The Laserwriter is a Postscript printer. It uses Q&A's POST.FNT printer driver. If you don't have POST.FNT in your Q&A directory, you can selectively install it from your Q&A master diskettes.)

Now, when you create your Write document, just press Ctrl-F9 and assign the POST.FNT font file. You can then choose from a nice variety of scaleable Postscript fonts and assign them to the text and merge fields in your document in the usual way.

When you're ready to output your document, press F2 for the Print Options screen and make sure the selected printer is the Apple Laserwriter set to print to FILE. Press F10, and Q&A will prompt you for a filename. (If it's a merge document, Q&A will first prompt you to select the record(s) to merge.) Tell Q&A where to save the file, and give it a .PS (for Postscript) filename extension.

Now start Acrobat Distiller. Click File / Open, and select the Q&A document you just saved. Distiller will propose the same directory for the resulting .PDF file. If that's okay, just click OK. Distiller will take a second or two to perform its magic, and you'll now have a portable Acrobat document that you (or anyone else) can view and print in Acrobat Reader.

Not all that complicated, is it?

(If you're planning to make your PDF files available for viewing on a Web site, you'll additionally need to run them through Acrobat Exchange, using its *Optimize for the Web* feature. You can batch-optimize an entire directory of documents at one time.)

Now, how about adding your company's letterhead or other graphic element to your Q&A-PDF's?

Adding graphic elements to your PDF files

Q&A Write's **Postfile** command (it's on the F8 Options Menu under Printer Commands) lets you place a Postscript file in your document. **Postfile** accepts only *Postscript ASCII* (.PS) files, not what are called *Encapsulated Postscript* (.EPS) files.

Postscript, like HP PCL, is a page description language. The problem with Postscript ASCII files is that they describe an *entire page* (or *multiple pages*). So, if you

place a **Postfile filename** command, say, at the top of your Write document, any text and merge fields below the merged Postscript file will be shoved onto the next page.

An *Encapsulated Postscript* file, on the hand, behaves more like a bitmap image file. When you place one in a document, it takes up only the amount of space it needs to display the graphic and doesn't displace the surrounding text.

But Q&A's **Postfile** command doesn't support .EPS files! So what do you do? Well, sometimes you just have to lie to Q&A to get anything done. In this case, you simply use an Encapsulated Postscript file with a .PS (instead of .EPS) filename extension. Q&A won't complain.

Acrobat Distiller doesn't like Encapsulated Postscript files either. (It likes straight Postscript files.) But Distiller is more discriminating than Q&A. If the Q&A-generated file you're converting to PDF format contain any .EPS elements (even though the file has a .PS extension), Distiller will sneeze, abort the job, and you'll get no .PDF.

Fortunately, there's a workaround for this, too: You simply make sure that the .EPS file you create for your letterhead or other graphic element contains only straight Postscript code and no bitmap information. (.EPS files typically contain at least one bitmap image, where a regular Postscript file contains only programming code.)

Now, how to create a graphic element for your Q&A-to-PDF documents.

If you have an existing .BMP, .PCX, or .TIF bitmap file (or a Windows Metafile) of your company's logo or letterhead, a program like Hijack can convert it to straight Postscript format. (You can scan your letterhead on a desktop scanner to create a bitmap file.)

Or, you can design your letterhead in a vector graphics program like Corel Draw. If you do this, take care to place all the elements (lines, text, boxes, graphical shapes, shaded areas, and so on) in the exact position on the 8½ x 11 design page as you want them to appear in your Q&A-PDF document. *Don't place any bitmap images in the design.*

When you're ready to save your graphic, select File / Export / Encapsulated Postscript (.EPS) format, and change the filename extension to .PS. When you're prompted for Save options, choose *Text as curves* and *do not* include a header (usually a thumbnail .TIF file inserted in the EPS file). This way, you'll have a clean ASCII file that contains nothing but Postscript code. Q&A will like it. Distiller will like it.

(Adobe Illustrator, another vector graphics program, has features similar to Corel Draw, but I can't vouch that it will let you save a graphic file in the format described above.)

With your graphic ready, simply position it at the top of your Q&A Write document (or in the header) using the **Postfile path\filename** command. Print the document as described earlier, run it through Distiller, and you'll have a nice clean portable Acrobat document that you can send anywhere in the world electronically (including over the

network to your boss or over the Internet to your client) and that anyone can read and print on their own printer.

Notes on simplifying the process

If you'll be producing a lot of Q&A-to-PDF documents each day, you can further simplify the process with a macro that saves each document and starts Distiller for you (either as a Q&A 4.0 Alternate Program, or a Q&A 5.0 External Program). Distiller will always propose the last used folder where it expects to find the .PS file you want processed. So if your Q&A macro saves each document to the *same filename* (overwriting the previous .PS file of the same name), you'll save some steps in Distiller, and you won't get confused over which document to convert. (There will be only one .PS document in the folder—the one you just generated in Q&A.) When Distiller opens the .PS document for processing, it will also propose the last used folder as the place to save the .PDF file. This is where you'll assign a unique name to the PDF document. And it can be a long descriptive filename in Windows 95 or later.

If you'd rather not have to deal with Distiller every time you generate a new Write document, you can set up Distiller to run resident in Windows and "watch" the directory you specify for any new .PS documents. This way, Distiller will automatically generate PDF's from any new documents that appear in this directory and place them in the directory of your choosing. If you use this option, you'll have to name your Write documents (including the "watched" folder) when you print them to FILE in Q&A. The drawback here is that you won't be able to use long filenames.

I don't claim to be an authority on Acrobat or Distiller, but I did experiment at some length with the techniques covered in this article and found them to be workable and reliable with typical Q&A DOS merge and non-merge documents. If document portability is what you're after, and you want to continue working in Q&A, this, it seems to me, is a practical way to go about it.

Tom Marcellus is editor of *The Quick Answer* and Webmaster at www.quickanswer.com.

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