

Does Anybody Really Know What Time It Is?

TOM MARCELLUS

When making long distance calls to friends, customers, vendors, and so on, why risk sounding as though you don't know what time it is? Here's how to make your database tell you the party's local time—and a whole lot more—when you're ready to call.



WHO hasn't received a 10 a.m. phone call from someone saying "good afternoon"? You've probably called someone and said "good morning," only to be told everyone's out to lunch. I'm in California, and now and then I'm rudely awakened by a pre-dawn call from some knucklehead on the east coast.

Why not start off on the right foot? After all, the little things can smooth the way, or give the impression that you're not terribly bright. By supplementing the Q&A database you use to store your contact information (see **Figure 1**), you can avoid greeting a customer with the wrong opening, or calling a business when it isn't open, whether it's across the country or on the other side of the world. I'll show you how.

(The databases featured in this article are available on disk. See "Resource" at the end of the article.)

Fields to add

Let's start with a customer or address database that includes fields such as Name, Address, City, State, Zip, and Phone. **Figure 2** shows a sample

Continues on page 3

The screenshot shows a database window titled "Customers" with a record for "Big Kahuna Surfboards" at "1233 Hualalaia Dr". A "Call Info" button is visible. A "User Query" window is open, displaying: "Local time there is 11:41 am. They're OPEN. They close in 5.3 hours. Want to call now and say 'Good Morning'?" with "Y - Yes" and "N - No" options. The "Notes" field contains: "Wants call every month around the 15th for supplies order. Plays golf & tennis. Wife Mary into botany. Has 3 kids, a doberman, 2 cats, a parrot (Mikey). Drinks Sam Adams." The status bar at the bottom reads "T_ZONE5.DTF Retrieved form 5 of -- Total Forms: 5 Page 1 of 1" and "Esc-Cancel" and "Continue" buttons.

Figure 1. With a few tricks, your database can tell you what you need to know before placing that long distance or overseas call.

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README.1ST

TOM MARCELLUS, EDITOR

THE QUICK ANSWER will be at the Sixth Annual National Q&A User Group Bash in Colorado Springs, Colorado, October 18–20 to host another day-long Q&A Master Seminar. Last year's Bash and seminar near Washington, D.C., packed the house with Q&A aficionados from as far away as Canada and the United Kingdom. This year's events promise to be even bigger. So register now while seats are still available. See the insert in the June issue for details.

Many readers have been using John Dow's DTFSPÉCS database analyzer and reporting good success with it. **Dave Dvorin** shows you how to create a Q&A-based "front end" for the utility so you can run it without having to exit to the DOS prompt.

If you're not taking advantage of on-record-exit (ORE) programs in your databases, you could be missing out on some useful options. **Jeff Nitka** offers a variety of ORE techniques that do everything from final record validation to overcoming Q&A's merge document programming limitations.

How rapidly Q&A can find and display your records isn't always a matter of appropriate indexing. It can depend—believe it or not—on how you fill out your Retrieve Spec. **John Dow** dug into Q&A and unearthed several kinds of retrieval parameters that bog down searches, and what he found might surprise you.

Before calling customers across the country or overseas, you need to know what time it is there and whether they're open for business. Your database can tell you this, and even how to greet the answering party. I'll show you how. **QA**

Correction

In the May 1996 issue, on page 3, there's a misprint in the fourth line of the Listing 1 macro. The two "lucky charms" that follow the <ctrlq> command should be ASCII characters 196 and 217. Together the three commands display the ↵ Enter symbol you see at the top of the field editor in Figure 1 in the same article.

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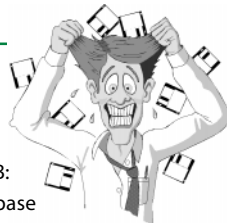
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Does Anybody Really Know ...

Continued from page 1

address database I named T_ZONE for time zone. It includes the additional fields you'll need, along with their formatting. With the exception of the Call Info field at the top of the right-hand column, you can hide (and make read-only) all the fields to the right of the vertical line by placing them on an otherwise empty screen page.

Programming the Country field

T_ZONE.DTF is designed to include foreign contacts, so there's a Country field just above the Time diff field. Country contains the Q&A 5.0 program shown in Listing 1. For Q&A 4.0 and Q&A for Windows databases, you'll have to eliminate the Userselect command, and replace the @Msgbox command with an @Msg message.

Listing 1. Q&A 5.0 program for the Country field. Change the final parameter of the two @XLookup commands to your local time zone.

```
> If Time diff <> "" Then Goto Phone;

Time diff = @XLookup("T_DIFF", State Prov,
    "Locale", "Pacific");

If Time diff = "???" Then {
@Msg("Select time difference of target location.");
Userselect("0,1,2,3,4,5,-1,-2,-3,-4,-5",Time diff) };

If Time diff = "" Then
Time diff = @XLookup("T_DIFF", Country,
    "Locale", "Pacific");

If Time diff = "" Then {
@Msgbox("Country not in lookup database",
    "or country left blank.",
    "Enter country and time difference");
Goto Time diff };

If @Left(Time diff, 1) <> "-" Then
Time diff = "+" + Time diff;

Goto Phone
```

Figure 2. Fields and formatting for the sample T_ZONE.DTF address database. You can place the seven fields on the right side of the form, starting with Our Time, out of the way on a back screen page, and make them read-only.

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To have Q&A auto-fill the Time diff field, you'll need a lookup database with states, Canadian provinces, and countries, and the number of hours they're ahead of or behind your local time. You could store this information in the Lookup Table, or manually enter the time difference, but because of the number of states, provinces, and countries—nearly 200—I created a T_DIFF (time difference) database to store the data. More on this later.

The Listing 1 program leaves the Time diff field alone if it's already filled. Otherwise, it determines if the record contains a United States, Canadian, or foreign address. (I named the usual State field *State Prov* to include Canadian provinces.)

The first lookup checks T_DIFF for a record that matches the state or province. If it finds one, it retrieves the time difference in hours (see Figures 3 and 4) from the Pacific field, since that's my local time zone.

If no match on the state or province is found, the program rechecks T_DIFF for a match on the Country field, and retrieves the time difference in hours. Thus, if I were entering a French contact, the Time diff field would get "9" because France is 9 hours ahead of Pacific Standard Time.

If the country lookup fails—that is, if the Time diff field is still blank—an error message informs you that the

country you've entered can't be found, or you've left the field blank, and prompts you to enter the country and time difference.

Finally, the program adds a "+" character to a positive time difference to make it clearer that the target locale is that many hours *ahead* of your time zone.

The Call Info program

When you're ready to place a call, you retrieve the party's record and click on the Call Info field (see Figure 1).

Listing 2 shows the Call Info program. For Q&A 4.0 and Q&A for Windows databases, you'll need to change the @Msgbox and @Askuser commands to @Msg messages, and delete the @Shell routine at the end of the program.

Listing 2. On-field-entry program for the Call Info field.

```
< If Time diff = "" Then {
  @Msgbox("Time difference in number",
    "of hours required. Please enter.", "");
  Goto Time diff };

  If Open at = "" or Close at = "" Then {
    @Msgbox("Please specify customer's",
      "opening and closing times.", "");
    Goto Open at };

  Our time = @Time;
  Their time = Our time + Time diff * 60;

  If @Month(@Date) >= "4" and
    @Month(@Date) <= "10" Then
    If Country <> "" and Country <> "Canada"
    and Country <> "US" and Country <> "USA"
    Then Their time = Their time - 60;

  Open in =
    @Str(@Round(((Open at - Their time) / 60), 1))
    + " hours";
  If @Left(Open in, 1) = "-" then Open in =
    @Str(24 + @Left(Open in, @Instr(Open in, " ")))
    + " hours";

  Closed in =
    @Str(@Round(((Close at - Their time) / 60), 1))
    + " hours";

  If Close at < Their time
  Then Now = "CLOSED"
  Else if Open at > Their time
  Then Now = "CLOSED"
  Else { Now = "Open"; Open in = "OPEN" };
  If @Left(Closed in, 1) = "-"
  Then Closed in = "CLOSED";

  If Their time >= 12:00 am
    and Their time < 11:59 am
  Then Greeting = "Good Morning"
  Else if Their time >= 11:59 am
    and Their time < 6:00 pm
  Then Greeting = "Good Afternoon"
  Else if Their time >= 6:00 pm
  Then Greeting = "Good Evening";

  If @Num(@Left(Their time, 2)) > 12
  Then Call now =
    @Str(@Num(@Left(Their time, 2) - 12))
    + @Str(@Mid(Their time,
      @Instr(Their time, ":"), 3)) + " pm"
  Else Call now = Their time + " am";

  If Now = "Open" Then if
  @Askuser("Local time there is " + Call now
    + ". They're " + Now + ".",
    "They close in " + Closed in
    + ". Want to call now",
    "and say " + Greeting + "'?")
  Then Call now = "Yes"
  Else Call now = "No";

  If Now = "Closed" Then if
  @Askuser("Local time there is " + Call now
```

```
+ ". They're " + Now + ".",
  "They open in " + Open in
  + ". Want to call now",
  "and say " + Greeting + "'?")
Then Call now = "Yes"
Else Call now = "No";

If Call now = "Yes" Then {
  Call now = @Shell("D:\QA\DIAL.BAT " + Phone);
  Call now = "Talk";
  @Msgbox("Pick up the phone and",
    "press Enter to talk.", "");
  Call now = @Shell("D:\QA\RELEASE.BAT");
  Call now = "Dial"; Chome };
Chome
```

Clicking on the Call Info field performs a number of calculations culminating in the display of the @Askuser dialog box you see in Figure 1.

The program first checks the Time diff, Open at, and Close at fields, prompting you to enter the time difference and the target business's local opening and closing times if they're blank. (When entering times in an Hours field, you can type "9" for 9 am, and "5p" for 5 p.m.)

The program then sets the Our Time field to your PC's system time, and calculates the value for Their time (the contact's local time) based on the time difference.

When Daylight Savings Time is in effect between the first Sunday in April and the last Sunday in October, Americans (but not Hawaiians) and most Canadians are an hour ahead of Standard Time. So between these dates (roughly), the program subtracts an hour from Their time on a call to a location outside the United States and Canada.

Additional calculations are then performed to fill the Open in and Closed in fields. (These tell you in how many hours a currently closed business opens or an open business closes).

Next, the program determines the appropriate greeting ("Good morning," "Good afternoon," or "Good evening") based on the party's local time.

The program then assembles the @Askuser dialog box (see Figure 1) that tells you the contact's local time, whether the business is open or closed (if closed, how many hours until it opens; if open, how many hours until it closes), and the appropriate greeting. The dialog box asks you if you want to place the call now, and you can respond with Yes or No.

If you select Yes, the final part of the program executes, dialing the number and prompting you to press Enter to talk. (You'll need a modem and two DOS batch files for this. See Bill Halpern's "Create an Automatic Phone Dialer" in the May issue.)

Two more little programs needed

You'll need an on-record-entry (ORE) program to set the Call Info field (the label for the "button") to "Call Info," and an optional on-record-exit (ORX) program to clear the seven temporary calculation fields. If you already have ORE and ORX programs in the database, simply add the following statements to them. Otherwise, add the statements to two unprogrammed fields, and press F8 at

the Program Spec to set them to ORE and ORX, respectively:

```
#100: Call Info = "Call Info"
#200: Clear(Our time, Their time, Open in,
        Closed in, Now, Greeting, Call now)
```

The T_DIFF lookup database

To have Q&A auto-fill the Time diff field based on the record's state, province, or country, you'll need a supplementary lookup database. I created T_DIFF.DTF for this purpose from information in my phone book. **Figure 3** shows the T_DIFF record for Colorado, and **Figure 4** shows the one for France. The database works as long as you're in the United States or Canada since it includes fields for Standard Time differences based on the four U.S. time zones (Eastern, Central, Mountain, and Pacific), plus the Atlantic, Alaska, and Hawaii time zones.

Of the 48 continental states, 12 span two time zones: Florida (FL), Idaho (ID), Indiana (IN), Kansas (KS), Kentucky (KY), Montana (MT), North Dakota (ND), Nebraska (NE), Oregon (OR), South Dakota (SD), Tennessee (TN), and Texas (TX).

For these states, I decided to place a "???" in T_DIFF's seven time zone fields, and make the Time diff program in T_ZONE (see Listing 1) display a pop-up list so I can select the number of hours difference. In some of the split time zone states, the bulk of the state is in one time zone. For these, you can decide whether to fill T_DIFF's time zone fields with "???" or numbers. **QA**

Tom Marcellus is editor of *The Quick Answer* and author of *PC World Q&A Bible*, published by IDG Books. His QuickClick Calendar Plus—a time- and activity-tracking database for Q&A 5.0—along with his QuickClick RecordFinder for Q&A 5.0, are available from Marble Publications, publisher of *The Quick Answer*.



Figure 3. The T_DIFF.DTF record for Colorado.



Figure 4. The T_DIFF.DTF record for France.

Resource

The two databases featured in this article are available on disk from Marble Publications. You'll need T_ZONE5.DTF and T_DIFF5.DTF for Q&A 5.0, or T_ZONE4.DTF and T_DIFF4.DTF for Q&A 4.0 or Q&A for Windows. (T_ZONE4 doesn't include the auto-dial feature, and its @Askuser and @Msgbox commands are replaced by @Msg messages.)

The T_DIFF lookup database includes 200 records, one for each U.S. state, two for each Canadian province (one with the full province name, another with its abbreviation), along with a record for each country of the world, from Albania to Zimbabwe.

Foreign country T_DIFF records include the appropriate country code when dialing from the United States. These can come in handy as they don't appear on letterhead and faxes. You can add an XLookup command to your database to retrieve them into the Phone and Fax fields when adding records for foreign contacts.

To incorporate T_ZONE5's features into your existing Q&A 5.0 database, just add the required fields, then copy the programs via the Clipboard. For Q&A 4.0 databases, print the programs to disk, then insert them into the new fields using the F8 Document Insert command. Don't forget the ORE and ORX programs.

The databases are unprotected and modifiable. To order a set, send a check or money order for \$49 (*Quick Answer* subscribers, \$29) plus \$2 shipping to Marble Publications, PO Box 9034, Gaithersburg, MD 20898-9034. Or, you can fax your order with your credit card number, expiration date, and signature (Visa, Mastercard, American Express) to 301-424-1658. Be sure to specify version 5.0 or 4.0.

Optimizing Search and Retrieval Speed

JOHN DOW

How fast Q&A finds your records isn't always an indexing issue. It can depend on how you fill out that Retrieve Spec.



RECENTLY a database containing several thousand records caught me by surprise. When I tried to retrieve some records on an indexed (Speedy) key field, Q&A took way too long. I'd heard that too many duplicate key values can lead to poor search performance. In my case nearly all of the values in the Speedy search field were blank, but I hadn't actually witnessed such poor performance until this.

Suspicious about poor duplicate key value search performance, I'd already tested a situation where a Speedy field in thousands of records was blank, with only one record containing a non-blank value. In that situation, Q&A went right to that one record immediately. Puzzled by the inconsistency, I investigated further.

What I found

I discovered that if you use the *Not* ("/") operator in your Retrieve Spec, it's like telling Q&A *not* to use the index to search the database. However, Q&A does use the index if you search for an exact value or use a simple comparator such as *Greater than* (">").

Accordingly, if the database contains many records with blank key values, and you want to find one with a non-blank value (but you don't know what that value is), searching for *Not blank* ("/=") is far slower than searching for *Greater than blank* (">").

Similarly, if the Speedy field you're searching on isn't blank, but contains duplicate values, such as "A," searching on ">A" is much faster than searching on "/A." Combining inequalities such as "<A;>A" (less than or greater than "A") just slows down the search.

Time for some tests

To perform some tests, I created a Q&A 4.0 database with three Speedy text fields and 26,977 records. (The 26,977 isn't significant—it's just what I ended up with.) **Table 1**

shows the fields and their values. I incrementally numbered the Unique field starting with 00001. I left the Blanks field empty except for the first and last records, which I filled with "X." Likewise, I filled the Dups field in the first and last records with "X," but placed an "A" in the remaining 26,975 records. These conditions, though extreme, allowed me to test Speedy field searches three ways: with all unique values, with mainly blanks, and with mainly duplicate values.

Table 1. Records, Speedy fields, and values in my 26,977-record test database.

Record	Unique	Blanks	Dups
1	00001	X	X
2	00002		A
3	00003		A
..			
26975	26975		A
26976	26976		A
26977	29677	X	X

I copied the database three times and converted the copies to Q&A 5.0, Q&A for Windows 4.0, and Q&A for Windows 4.06 so I could see if there were any differences in search performance between these versions. The combined size of the .DTF and .IDX files was just over 3M.

I based my tests on a series of three Retrieve Specs for each of the three fields. In each case, I noted how long it took Q&A to find the first and subsequent records. I performed each test several times to ensure my results were consistent.

In some cases the results varied slightly if I performed more than one retrieval without restarting Q&A. Accordingly, when testing the Q&A for DOS versions, I performed a test, then exited and restarted Q&A before performing the next one.

I used a 66Mhz 486DX PC running DOS 6 with the Smartdrive disk cache disabled. I also performed some tests with Smartdrive running, as well as with Q&A for DOS running under Windows and OS/2.

Table 2 summarizes the results of Q&A 4.0 for DOS running in DOS only (not under Windows or OS/2) without Smartdrive.

About the results

Test 1 is what I expected for a unique field—the search was too fast to be measured, even with nearly 27,000 records in the database.

Test 2 didn't tell me much, since the first record in the database met the Retrieve Spec. This kind of search should be fast, regardless of whether (or how efficiently) Q&A utilizes the index.

Test 3 was surprisingly slow. I'd thought Q&A would head straight to 10,000 in the index then find the next higher value. However, Q&A took four seconds to find record 10,001. (See the results for tests 7 and 11.)

Tests 4 and 8 searched the Blanks and Dups field, respectively, for an exact value that appears only twice in the databases. These searches were also too fast to be measured.

I wasn't able to determine why there was a brief delay with tests 5, 7, 9, and 11, since in each case the index points to a record that can immediately satisfy the search parameter. Tests 1, 2, 4, 6, 8, and 10 were consistently faster.

Tests 6 and 10 confirm what people might refer to when saying that duplicate key values cause poor performance. It was clear that in these tests Q&A didn't make use of the index but scanned thousands of records before finding a match. (When I removed the index from one of these fields, the search time was unaffected.) Moreover, when I padded the database with more data per record, increasing the .DTF file size to 12M, the search slowed down significantly.

Tests 7 and 11 show a search technique that's functionally equivalent to Not empty (" \neq ") though clearly faster. Here, Q&A obviously utilized the index.

Notice that in test 7 I used the greater than comparator (" $>$ ") by itself. I also tested the time it took to add a record with a duplicate key value to the database, and didn't notice a penalty.

In all cases I found little improvement when using Smartdrive, though this is what I expected since the disk cache couldn't hold the entire .IDX file in memory.

Version makes little difference

I repeated the tests in other versions of Q&A and didn't notice a significant difference in performance. There was a suggestion that Q&A 5.0 for DOS might have been a little faster in

one case, and Q&A for Windows a little slower in a couple of others, but the differences were really much smaller than the other effects I've already described.

A primer on Q&A's index file structure

Evidently, when you convert a Q&A database to another version of Q&A, the .IDX file is unaffected. My file comparisons showed them all to be identical. Though that in itself doesn't rule out the different versions using different internal search logic, the evidence suggests that the logic must be pretty much the same across the board.

As index file structures go, Q&A is efficient. For one thing, Q&A minimizes disk space and optimizes search speed by not repeating duplicate key (Speedy) values in indexes.

A Q&A .IDX file follows what's called a B-tree structure. This means that when you enter the tree with a specific search value, Q&A can find it with a minimum of disk accesses. To illustrate, suppose you have a dictionary organized in a B-tree fashion with five-way branches at each node. If you were to search for the word *computer*, you might first be presented with a five-word list such as this:

`decent ground nuts rough suspicious`

Because *computer* comes before *decent*, you'd follow that branch and find these five choices:

`aim base bravery chair cry`

Continues on page 8

Test	Indexed Field	Retrieve Spec	Each hit in Secs	Comments
1	Unique	10000	0	
2	Unique	/10000	0, 0, 0	All searches very fast.
3	Unique	>10000	4, 0, 0	Returns "10001", "10002", "10003", etc.
4	Blanks	X	0, 0	Both searches very fast.
5	Blanks	=	2, 0, 0	Second and subsequent searches very fast.
6	Blanks	/=	0, 4	Time depends on which record has a value.
7	Blanks	>	1, 0	
8	Dups	X	0, 0	Both searches very fast.
9	Dups	A	2, 0, 0	Second and subsequent searches very fast.
10	Dups	/A	0, 4	Time depends on which record has a value.
11	Dups	>A	1, 0	

Table 2. Test results with Q&A 4.0 for DOS.

Quick Tip

Create a Canned Upcoming Birthday Report



If you keep track of birthdays for customers, friends, or relatives, you might like to have a canned report you can run each month to tell you who has a birthday in the following month. This way, you can get a card or gift at your leisure, and send it in plenty of time to arrive before the birthday. If you're familiar with Q&A's date functions, you know that you can retrieve records by specifying the month of the dates you're after. You don't want to be bothered having to change the month each time you run the report, but you can't use a retrieval expression that simply adds 1 to the current month because adding 1 to December (month 12) won't get you the January (month 1) birthdays. However, you can use the database's Lookup Table and a retrieval expression to do the job. First, add the following values to your Lookup Table:

KEY	Column 1
1	2
2	3
3	4
4	5
5	6
6	7
7	8
8	9
9	10
10	11
11	12
12	1

Next, create and save the following Retrieve Spec expression for your Next Month Birthday report. (In this example, field #10 is the birthdate field.):

```
={@Month(#10) = @Lookup(@Month(@Date),1)}
```

When you run the report (or any operation that includes a Retrieve Spec) using this retrieval expression, Q&A will include the records for those with a birthday in the following month. **QA**

Bill Halpern

Optimizing Search ...

Continued from page 7

Computer lies between chair and cry, so you'd proceed down another level, then another, until you arrived at the actual list of words (a "leaf" in the tree).

In my test database, a search on 10,000 in the Unique field proceeds through three levels of nodes. The **Figure 1** diagram shows the actual key values from the nodes in the database.

Each entry in a node points to another node at the next level, or to a leaf. Each entry in a leaf, in turn, points to a record in the database. A search on "X" in the Blanks or Dups field is even more efficient, since it involves just one node level. Thus, if you're searching on a "scarce" value in an indexed field containing duplicate values, the B-tree structure works exceptionally well.

The moral of the story is this: duplicate key values don't cause poor search performance. Q&A's search speed depends more on your retrieval parameters. **QA**

John Dow has been working with computers professionally since the 1960's. Currently, he's director of development at The Lackner Group in Pittsburgh, Pennsylvania. John is the creator of DTF SPECS, a Q&A programmer's tool reviewed in the October 1995 The Quick Answer. 412-521-1577, Internet jtd@pgh.net, CompuServe 102701,2751.

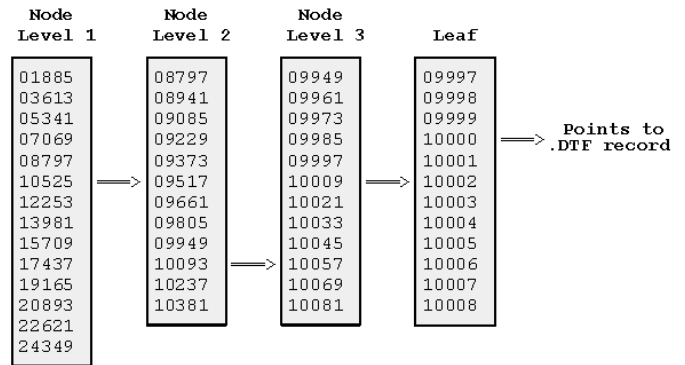


Figure 1. A Q&A .IDX file B-tree structure showing a search for a record containing 10,000 in the Unique field.

Stage Left—On Record Exit Programming

JEFF NITKA



WHEN designing a database, I try to minimize the chance for human error. Help screens, @Msgbox and @Msg messages, and field restrictions are invaluable tools in pursuit of this goal, but they aren't always enough. That's why I make use of On Record Exit programming statements to verify the data in each record as it's saved. (You specify the On Record Exit field by pressing F8 at the Program Spec, typing in the field ID number on the On Exit Field ID line, then pressing F10.)

The Q&A *Application Programming Tools Manual* says that statements in an On Record Exit field are executed when a record is saved. Though it's true enough, it's somewhat misleading, as I'll explain later.

On Record Exit statements can verify data integrity before performing important calculations. Here are a few ways I've used them.

Creating a string value

Suppose a CAN SHIP field in a product history database stores a concatenation of a batch number and whether it's ready to be shipped. (The field is used by XLookups in other databases). An On Record Exit statement such as the following takes care of this, in addition to other calculations:

```
<#10: Can Ship = @Str( @Toyesno( Quantity Available > 0 ) )
      + @Str( Batch Number );

      REM "Perform other calculations";
```

Preventing changes to fields

Suppose you have three fields (Invoice No, Item, Invoice Date) that you must protect against changes once the record is saved. Also, suppose you have a unique identifying field (such as Page Number) that's read-only. Here's a statement that ensures a user can't change the information in these fields once the record has been saved:

```
<#10: If @Update then
      XLu(@Fn, Page Number, "Page Number",
          "Invoice No", Invoice No, "Item", Item,
          "Invoice Date", Invoice Date)
```

Compensating for loose field restrictions

Totally Inept Inc. wants their databases free of field restriction because nobody there likes being told what to do by a stupid computer. This "flexibility" leaves a lot of room for error, so an On Record Exit program attempts to "fix" potential data entry mistakes:

```
<#10: REM "If Item field is empty or not a standard
product, then the record is useless. In these cases,
notify the user and make possible corrections. If not
corrected, then erase all data in the record so it won't
appear in reports or other data retrieval routines.;"

If Item = ""
Then { Clear(#1..#25); @Msgbox("Item cannot be blank.",
    "All data has been erased.", "") }

Else
If @XLu("Products", Item, "Item", "Item") = ""
Then { @Msgbox(Item + " is not a standard
product.", "", "");
      Item = @XLr("Products", Item, "Item", "Item");
      If not @Error
      Then { If not @Askuser("Do you mean " + Item + "?", "", "")
            Then { Clear(#1..#25); @MsgBox("Record cleared",
                "", "") } }
            Else { Clear(#1..#25); @MsgBox("Item not allowed.",
                "Record cleared.", "") } } }

If Item <> "" Then
If Cost = "" or Cost <= 0
Then Cost = @XLu("Products", Item, "Item", "Cost");

If Item <> "" and Cost <> ""
Then REM "Perform Calculations";
```

Overcoming merge document programming limitation

In addition to verifying data, suppose an invoice database contains a field that, because of the 16 @XLookup limitation in a merge document, concatenates several values into a text string that's later retrieved by a single merge document @XLookup. Rather than producing the text string via an automatic Calc statement (which could slow data entry, since automatic Calc statements are executed every time data is entered) or a manual Calc statement (which requires the user to press F8), you could use an On Record Exit statement this way:

```
<#10: If Item No <> "" and Cost <> "" and Ext Cost <> ""
      Then REM "Insert string construction code here"
      Else Clear( #1 .. #25 )
```

Using On Field Entry with ORE

Notice that I've used an On *Field* Entry symbol ("*<*") in each of my sample programs. This isn't necessary for On Record Exit statements to execute—it's a strategy to ensure these statements execute *only* when a record is saved. Without an On Field Entry or On Field Exit symbol, the statements would execute as Calc statements, and that's not what you want.

Herein lies the somewhat misleading claim in the *APT Manual* that On Record Exit statements are executed *in addition to* all other modes of execution, whether as Calc statements, or as statements in On Entry or On Exit fields. Of course, you're free to combine On Record Exit (or On Record Entry) statements with other modes of executing

statements, but doing so is usually redundant.

For Q&A 5.0 databases, I recommend liberal dosages of @Msgbox to force the user to press Enter before the record is saved. This way, data entry errors are difficult to ignore.

The idea is that in any database, you want to minimize mistakes. Rather than allow data entry goofs to run the course, why not use On Record Exit statements to prevent them from leaving the starting gate? **QA**

Jeff Nitka works for a chemical manufacturer and develops Q&A applications part-time for Epoch Software, 908-874-3989. Jeff is the author of the Program Evaluator, a Q&A program debugging utility available from Marble Publications.

Quick Tip

Add a Quick Address Block Maker to Your Database

50

Part of my usual routine involves browsing my address database and finding a few people to whom it's time to write a personal letter. I hate having to type a name and address on a letter when the information is already in the database, so I decided to make Q&A do it for me. First, I added a multi-line AddressBlock field to the otherwise blank second screen page, making the field six lines high and 35 characters wide—large enough for a complete four-line address block, a blank line, and the current date.

I programmed the new field like this:

```
< AddressBlock =
FirstName + " " + LastName + "
" + Company + "
" + Address + "
" + City + " " + State + ", " + Zip + "
" +
" + @Month$(@Date)
+ " " + @Str(@Dom(@Date))
+ ", " + @Str(@Year(@Date));
@Macro("Copy to Clipboard")
```

This way, all I have to do is press PgDn from any record to auto-create the address block and date and copy it to the Clipboard (see **Figure 1**). I can then simply switch to Write and press F12 to insert it at the top of the letter.

The Copy to Clipboard macro contains just one command—F11. To format the address block, each line in the program that ends with an opening quote mark is followed by a carriage return, then the closing quote mark at the beginning of the subsequent line, as shown in the sample program. **QA**

Tom Marcellus

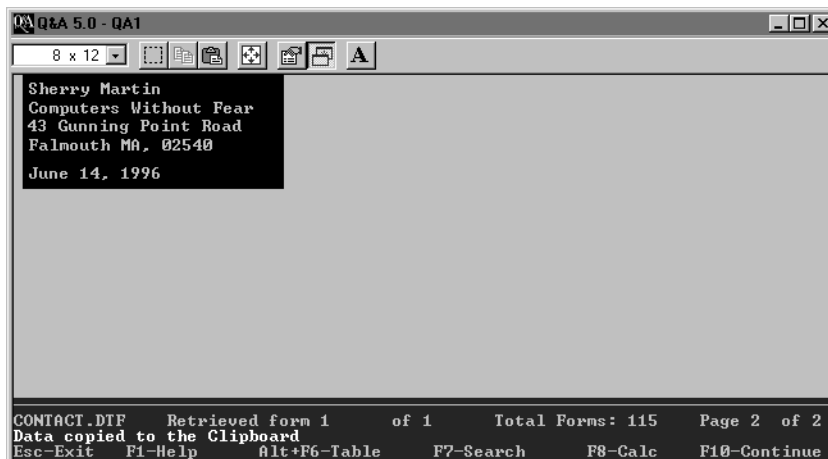


Figure 1. The program in the AddressBlock field on the second screen page formats the address for a letter and copies it to the Clipboard.

Create a Q&A Interface for DTF SPECS

DAVID E. DVORIN

DTFSPECS, a utility from John Dow (412-521-1577), furnishes you with a wealth of information about your Q&A for DOS or Q&A for Windows databases, and helps you quickly troubleshoot and modify them. (For an in-depth review of DTF SPECS, see the October 1995 issue of *The Quick Answer*. Also, see the ad for it in the February 1996 issue.) Dave Dvorin found himself using the utility so often that he decided to integrate it with Q&A.



As useful as I've found DTF SPECS to be, I've never liked exiting Q&A to DOS to invoke it, then typing in the required database name start-up parameter. So I decided to integrate DTF SPECS in a way that would let me run the utility from inside Q&A. When I was finished, I'd be automatically returned to Q&A. In this article, I'll show you how to integrate DTF SPECS with your Q&A environment whether you're using Q&A 4.0 or 5.0. Let's begin with Q&A 4.0.

Q&A 4.0 concepts

With Q&A 4.0 you can place up to six alternative programs (.EXE, .COM, or .BAT files) on the Main menu. However, simply running DTF SPECS with the DTF SPECS.EXE command isn't enough—you must also supply the name of the Q&A database you want the utility to analyze.

You can use a batch file to start DTF SPECS and supply the database name start-up parameter. The trick is to have the batch file include a *variable* database name. How do you make Q&A 4.0 run a batch file with a variable parameter? As you'll see, you'll have Q&A create the batch file on-the-fly, then run it.

With my technique, you create and use a simple Q&A database to serve as a DTF SPECS front end. Everything is automated by a macro. It prompts you to enter the database filename and path, creates the batch file, then temporarily shells out to the utility via an alternate program on the Main menu.

The DTF SPECS front end

The database requires only a few fields and a little programming. I named mine DTF SPECS.DTF. Its five fields are shown here with their attributes:

Label	Read-Only	Format	Name	Length
Datafile	N	TU	Datafile	8
Drive	N	TU	Drive	1
Path	N	TU	Path	
Command	Y	T	Command	
Record #	Y	NO	RecordNum	

I've include field lengths for only two of the fields. The Datafile field contains the name of the database (without the .DTF extension), so you should limit it to eight characters. The Drive field contains the drive letter with no colon, so it's only one character. The remaining fields can vary in length. The Path field is optionally user-filled, while the remaining two fields (Command and Record #) are filled by programming and can be read-only.

Figure 1 shows my DTF SPECS.DTF form design for Q&A 4.0.

The database includes Print, Retrieve, and Restrict Specs. The Retrieve Spec portion of the Print Spec consists of Max1 in the Record # field, and the freeform Fields Spec contains 1+ in the Command field. At the File Print Options screen, the default *Print to* selection is set to *Disk*. Save the Print Spec as *Execute DTF SPECS* by pressing Shift-F8.

The Restrict Spec for the Drive field includes a letter for each drive on your computer, without the colon. My PC has drives A: and C:, so my Restrict Spec for the Drive field is A;C.



Figure 1. Sample DTF SPECS form design for Q&A 4.0.

The lookup table

You'll need to store two parameters in DTFSPCECS.DTF's lookup table: the name of your default Q&A database directory and the location of the DTFSPCECS program.

Make the key column entries *Database files* and *DTFSPECS*, respectively. The values you enter in column 1 depend on your PC's configuration. Starting with *Database files*, enter the default database files location as specified at the Set Global Options screen (Utilities / Set Global Options). On my computer, it's C:\QADOS40\DATAFILE\. For the DTFSPCECS column 1 entry, enter the full path to the DTFSPCECS utility. On my PC, it's C:\QADOS40\DTFSPECS.EXE. With these values, the lookup table looks like **Figure 2**. Don't forget to include the backslash (\) at the end of Database files entry.

Creating the batch file

The batch file's contents are assembled by the database program, which also performs field validation to help ensure accurate data entry. Here's the program for the Datafile field:

```
> #105:
If @Len(Datafile) < 1 or @Len(Datafile) > 8
  then {@Msg("Enter a valid datafile name
           (8 characters maximum).");
       Goto Datafile}
else @Msg("Press <Alt-F7> for a list of choices.")
```

This program checks the length of the Datafile entry. If it isn't between 1 and 8 characters, a message displays and the cursor returns to the field. Otherwise, you're prompted to press Alt-F7 to display the pick list of valid drive letters. Here's the program for the Drive field:

```
> #110:
If @Len(Drive) <> 1
  then {@Msg("Press <Alt-F7> for a list of choices.");
       Goto Drive}
```

KEY	1	2	3	4
Database files	C:\QADOS40\DATA\			
DTFSPECS	C:\QADOS40\DTFS\			

Expand field: C:\QADOS40\DATAFILE\
DTFSPECS.DTF Lookup Table Page 1 of 1
Esc-Exit F6-Expand field PgUp-Previous page PgDn-Next page F10-Continue

Figure 2. DTFSPCECS.DTF's lookup table.

Here's the program for the Command field:

```
< #998:
If @Add
  then {Drive = @Left(@Lookup("Database files", 1),1);
       Path = @Right(@Lookup("Database files", 1),
                    @Len(@Lookup("Database files", 1)) - 2)}
```

This on-record-entry program executes on a new record. It fills in the Drive and Path with default values based on the *Database files* entry in the lookup table.

Add the following program to the Record # field:

```
< #999:
RecordNum = @Number;
Command = @Lookup("DTFSPECS", 1) +
          " " +
          Drive + ":" +
          Path +
          Datafile
```

This on-record-exit program assigns an incremented number to the record, and fills the Command field with what will be the batch file's contents. (Later, you'll see how the batch file is created.)

To make sure these on-record-entry and on-record-exit programs are executed, press F8 from the Program Spec, and enter 998 and 999, respectively.

Adding DTFSPCECS to the Main menu

To install DTFSPCECS as an alternate program, select Utilities from the Main menu, then select Alternate Programs. Type DTFSPCECS.BAT in an Alternate Program field, then type DTFSPCECS in the corresponding Menu Selection field. Save the screen, return to the Main menu, and you'll see the menu selection *D - DTFSPCECS*. It must be the only "D" selection on the Main menu.

Gluing it together

All the pieces are now in place for a Q&A macro to automate the procedure. Type the following macro in Write, then save it as an ASCII file with Ctrl-F8 to the name DTFSPCECS.ASC:

```
<begdef><altd><name>"Execute DTFSPCECS"<vidoff>
<esc><esc><esc><esc><esc><esc>
FA<home>C:\QADOS40\DATAFILE\DTFSPECS<enter>
<wait><f10>
<f10>
<esc>
PDTFSPECS<enter>
PEXecute DTFSPCECS<enter>NI<enter>
<home>C:\QADOS40\DTFSPECS.BAT<enter>Y<enter>
<esc><esc><esc><esc><esc><esc>
D<enddef>
```

The Alt-D macro (named *Execute DTFSPCECS*) includes the drive and path to the DTFSPCECS database and DTFSPCECS.BAT. Substitute your own drives and paths to these two files. The batch file must reside in your Q&A program files directory.

The macro goes to the Q&A Main menu, opens DTFSPÉCS.DTF in Add mode and pauses for you to enter the path and name of the database you want DTFSPÉCS to evaluate. When you press F10 to save the record, the macro resumes, returning to the File menu and running the Print operation using the *Execute DTFSPÉCS* Print Spec. This results in a saved ASCII file named DTFSPÉCS.BAT in the Q&A program files directory. Finally, the macro executes the batch file from the Q&A Main menu.

Using the system

Once all the elements are in place, you can load the DTFSPÉCS.ASC macro file into memory and execute the Alt-D macro. (You can optionally press Alt-F2 for the Macro menu, and select *Execute DTFSPÉCS*.) A blank record appears in which you enter the name and location of the database you want DTFSPÉCS to analyze. Save the record as usual by pressing F10, and the macro continues, creating the batch file and starting the utility. When you exit DTFSPÉCS, you'll be returned to the Q&A Main menu.

When Q&A reloads after you quit DTFSPÉCS, the default QAMACRO.ASC macro file will be in memory. This might not be what you want. You can always reload DTFSPÉCS.ASC, or you can copy DTFSPÉCS.ASC as QAMACRO.ASC, or even add the Alt-D macro to your existing default QAMACRO.ASC macro file. If you'll use DTFSPÉCS frequently, this latter option is the way to go.

Q&A 5.0 factor

Everything described up to this point will work in Q&A 5.0 as well. Version 5.0, however, allows for an even smoother integration. For example, you won't have to abandon what you're doing in Q&A to run DTFSPÉCS. Instead, you can run it from anywhere in Q&A via a pop-up menu, and automatically be returned to the screen you were on.

The modified DTFSPÉCS.DTF database incorporates four new Q&A 5.0 programming commands: @Askuser, @Userselect, @Macro, and @Shell. @Askuser prompts for confirmation to run DTFSPÉCS; @Userselect displays a pick-list of drives and paths; @Macro runs the macro; and @Shell shells you out to the utility, supplying it with the name of the database to analyze. You won't need a batch file.

Taking advantage of Q&A 5.0's ability to run multiple Q&A sessions, you'll use the External Programs menu and an autostart macro to take you to the data entry screen where you'll specify the database to analyze. From there, the program will start DTFSPÉCS via @Shell. When you're done using the utility, an @Macro command will quit the second copy of Q&A and return you to the original screen in the first copy of Q&A.

The new DTFSPÉCS database

For the Q&A 5.0 DTFSPÉCS database, you won't need the Record # field, the Print Spec, or the Retrieve Spec. Nor will you install DTFSPÉCS on the Main menu as an alternate program. You'll still need the Lookup Table and Restrict Spec, though. **Figure 3** shows a sample Q&A 5.0 DTFSPÉCS.DTF data entry form.

Programming changes

The program for the Database field (#105) is the same as shown earlier for the Q&A 4.0 database. For the Drive field, the new @Userselect function automatically displays the available drives on a pop-up selection list. Here's its program:

```
>#110:
If @Len(Drive) <> 1
  then {@Msg("Choose a drive from the list.");
        Drive = @Userselect("A;C")}
```

The Path field contains the bulk of the program:

```
>#115:
@Msg("");
Command = @Lookup("DTFSPÉCS", 1) +
  " " +
  Drive + ":" +
  Path +
  Database;

If @Askuser("Execute DTFSPÉCS for:",
  Drive + Path + Database, "?")
  then {Command = @Shell(Command);
        @Macro("Exit Extra Copy")}
  else {Clear(Command);
        @Msg("Re-enter the database name.");
        Goto Database}
```

The Path field program creates the DOS command necessary to execute DTFSPÉCS, and confirms, via @Askuser, that you want to run DTFSPÉCS on the selected database. If you answer "Yes," @Shell is invoked; otherwise, a message prompts you to enter another database name.



Figure 3. The Q&A 5.0 DTFSPÉCS.DTF database form.

I use the Clear statement to clear the Command field because @Shell returns a value—in this case, a superfluous one—after it's executed.

The Command field (#998) is the on-record-entry field, and the Path field (#115) is the on-record-exit field. Before saving the Program Spec, press F8 and enter 998 and 115, respectively.

The Macro for Q&A 5.0

The Q&A 5.0 macro file differs from the one used with Q&A 4.0. For one thing, it contains two macros:

```
<begdef><alt1><name>"Execute<sp>DTFSPECS"<vidoff>
FADTFSPECS<enter>
<enddef>
*
<begdef><altx><name>"Exit Extra Copy"<vidoff>
<esc>Y<esc><esc>X
<enddef>
```

Type the macros in Write, and press Ctrl-F8 to save them to an ASCII file named DTFSPCECS.ASC in your Q&A program files directory.

The first macro is an Alt-1 autostart macro. This means that you can use a Q&A start-up parameter to run it as soon as the second copy of Q&A loads. In this case, Alt-1 opens the DTFSPCECS database in Add mode. The second macro, called by the Command field program, exits the second copy of Q&A, from where you launched the DTFSPCECS utility.

The Case of the Extra Carriage Returns

An interesting situation occurs with the Q&A 4.0 batch file method of integrating DTFSPCECS. When you exit the DTFSPCECS utility, you'll briefly see a series of harmless DOS prompts echo on the screen. These are caused by invisible carriage returns in the DTFSPCECS.BAT file due to the way it's created via the Print Spec.

Although I could remove these extra returns by displaying the batch file in Write and resaving it as an ASCII file, I found that using the macro to do it didn't work. The failure, I believe, is due to timing.

Most PCs, including my own, have a cache to improve disk performance. When using a macro to strip out the carriage returns, the macro runs so quickly that the cache can't resave the edited file fast enough to beat the command that runs the unedited file already on disk.

The DTFSPCECS utility as an external program

Q&A 5.0 can launch up to nine external programs (.EXE, .COM, or .BAT files) from an Alt-F9 pop-up menu. One advantage external programs have over alternative programs is that you can run them from anywhere in Q&A.

To add DTFSPCECS to your external programs menu, from the Q&A Main menu, select Utilities / External Programs. In the Menu Option column, type *DTFSPECS*. In the Command Line column, type the following:

```
qa -alDTFSPECS.ASC -m1
```

This command temporarily suspends the first copy of Q&A and starts a second copy. It also loads the DTFSPCECS.ASC macro file via the *-al* autoload start-up switch, then runs the Alt-1 macro via the *-m1* start-up parameter. The Alt-1 macro opens the DTFSPCECS database in Add mode, ready for you to tell Q&A which database you want DTFSPCECS to analyze.

Using the Q&A 5.0 method

With the DTFSPCECS utility in your Q&A program files directory, the external program selection added, and the database and macro ready to roll, just press Alt-F9 from anywhere in Q&A and select DTFSPCECS. You can then enter the name and location of the database to analyze and save the record in the usual manner by pressing F10. The on-exit program prompts you to confirm, then runs the utility on the selected database.

When you exit DTFSPCECS, you'll be back at the screen where you originally displayed the External Programs menu.

Conclusion

Of course, you can customize any of these elements to suit your preferences. All I've provided here are suggested techniques and points of departure. If, for example, all your databases reside in a C:\QA5\DATA\ subdirectory, you can simplify things by having your DTFSPCECS.DTF database present you with a pop-up list of database names. This way, you could run the utility simply by pressing Alt-F9, selecting DTFSPCECS, then selecting the database from the pick-list. **QA**

David Dvorin owns Phoenix Solutions of Hillsborough, New Jersey, which specializes in tailoring off-the-shelf software for a broad range of business needs. 908-281-6272, Internet dvorin@bms.com.



EDITED BY DAVE REID

Can Line Draw and Merge Fields Co-Exist?

How can I prevent line draw in my merge documents from coming apart when I print the documents? One section of my merge document looks like this:



Invoice Line1	*Amount1*
Invoice Line2	*Amount2*

The printed document is practically unreadable, forcing me to remove all the lines from around the fields.

Howard Gilfillan, Pittsburgh, Pennsylvania

Your line draw breaks up in the printed document because the length of the merged data varies from line to line. For example, the Invoice Line1 entry for a merged record might be "Large Blue Sprockets," while the Invoice Line2 entry might be "Dirt." When Q&A merges the data, it adds the number of spaces between the end of the merge field and the vertical lines. Because the data varies in length, the vertical lines to the right of the merge fields don't align like they do on the screen. To solve the problem, you need to format your merge fields with the "L" and "R" codes, like this:

*Invoice Line1(L) *	*Amount1(R) *
*Invoice Line2(L) *	*Amount2(R) *

The (L) code following the Invoice Line fields tells Q&A to pad the merged data with spaces until the closing asterisk is reached. If the data is longer than the space between the asterisks, Q&A truncates it. Similarly, the Amount fields will be padded with spaces and, as an added bonus, the dollar amounts will be right justified within the asterisks. This should make for a nice-looking merge document every time.

Aligning Merge Fields in Q&A for Windows

I created a merge document that shows the Old Price and New Price for the wines I sell. I plan to



mail it in the form of a personalized merge letter to all my clients. Here's a portion of my document:

Sonoma County Cabernet	»Old Price«	»New Price«
Sonoma County Chardonnay	»Old Price«	»New Price«
Chalk Hill Chardonnay	»Old Price«	»New Price«

When I print the letters, though, the money columns wind up misaligned and wavy. Apparently, this happens because I'm using a proportional font. Is there a fix?

Flo Butler, Windsor, California

In Q&A for Windows you can use tabs to align columns of merged data. In your case, you should first remove any tabs on the lines that contain your price list, then insert two tabs—one at the beginning of the first price column and another at the beginning of the second price column. To do this, delete the spaces between the first wine name and the first price, then press Tab (once) to move that merge field to the first tab. Next, replace the spaces between the two price columns with another tab and continue this way through the rest of the document. When printed, the money columns should be neatly aligned.

Create Totals on the Fly

I have a database that tracks orders. My company sells only two items—let's call them Wheels and Gears. The database includes fields that calculate the total of each item for each customer. I print reports that list each total in a column, with totals at the bottom, like this:



Customer	Wheels	Gears
Joe Smith	\$4.50	\$1.75
Tim Smith	\$22.50	\$1.75

I'd also like to track the total dollar amounts for each customer. I need the information only in the report, but I'm concerned I'll have to write some complex programming in the database in order to get it. Any ideas?

Steve Greenburg, Las Vegas, Nevada

You don't have to modify the database to get the additional report information you're after. You can add what's called a Derived Column to the report to perform

the summary calculations on the fly. From the Report menu, select Design/Redesign a Report, then select the report you want to modify. Press F10 at the Retrieve Spec to continue to the Column/Sort Spec, which probably looks like something like this:

```
Customer Name: 1,AS,CS
Wheels: 2,T
Gears: 3,T
```

Press F8 to display the Derived Columns screen, and enter the following information:

```
Heading: Total
Formula: #2 + #3
Column Spec: 4,T
```

This Derived Column adds the data from columns 2 and 3, and places the result in the new column 4. A total for Column 4 will appear at the bottom of the report.

Mysterious "500N" on Main menu

From time to time I see "500N" at the bottom of the Main menu, just to the right of "Q&A Version



5. "What does it indicate? Is it a warning that something is corrupted, and I should reinstall the program?"

Peter Venuto, Santa Clara, California

The code is no cause for alarm. It indicates the copy of Q&A you're using is the first production build of Q&A 5.0. If a subsequent Q&A 5.0 update is released, the code will probably change to 501N. Although it shouldn't display at all, it doesn't indicate any kind of corruption.

QA

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Have a nagging question? Send it to @Help, *The Quick Answer*, Marble Publications, Inc., PO Box 9034, Gaithersburg, MD 20898-9034 or fax to 301-424-1658. When writing, please include your name, address, and phone number, along with your Q&A version number (and whether DOS or Windows) and a detailed description of the problem. We will publish those questions we feel are of general reader interest; individual responses are not possible.

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