

HP BUSINESS BASIC/3000: AN UPGRADE PATH FOR HP260 APPLICATIONS

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Summary

One of the goals of HP Business BASIC/3000 is to provide an upgrade path from the HP260 to the HP3000. The next release will be targeted specifically for this market. Because the HP260 and the HP3000 are very different machines this conversion will not be 100% automatic. This paper will discuss how to convert HP260 applications to HP Business BASIC/3000, dealing with the mechanics of the automatic conversion and how to make the manual conversion as easy as possible. How to have your applications make the most out of HP Business BASIC/3000 will also be discussed.

Introduction

HP Business BASIC/3000 Phase I was introduced last year and Phase II will be introduced later this year. It is a complete program development system providing editing, debugging and program execution in one environment. The main reason that HP has brought out HP Business BASIC/3000 was to provide upgrade paths from HP260 to HP3000 and to provide a superior BASIC for BASIC/3000 users. HP Business BASIC/3000 was started in August 1981, after several years of investigation and specification. It has taken over 60 man-years to complete, and contains over 310,000 lines of PASCAL source (180,000 lines of real code). HP Business BASIC/3000 will be the standard for BASIC on all future HP commercial systems.

HP Business BASIC/3000 is intended to be used in developing business applications and utilities. Its easy subsystems access makes it convenient to write large applications and its rich language features and interpretive environment make it easy to write quick utilities. HP Business BASIC/3000's features allow the programmer to spend time on WHAT should be done and not on HOW to do it.

There is a conversion package to be used in moving HP260 applications to the HP3000. The conversion package will allow the transfer and conversion of BASIC/260 source programs, data files, databases and forms files. The run-time behavior of each HP Business BASIC/3000 statement has been carefully designed to duplicate, as closely as possible, the behavior of the corresponding BASIC/260 statement.

The specific details for the conversion from BASIC/260 are described in the BASIC/260 to HP Business BASIC/3000 conversion guide. It should be read before attempting a real conversion. This manual describes the mechanics of doing the automatic conversion. However, it does not describe many of the little tricks which can be used to make the conversion easy, nor does it describe what to do about the incompatibilities that do exist. This paper will try to do both of these. It will begin with a quick overview of the conversion process, and then will go into more detail supplying the user with hints to make the process easier and

pitfalls to avoid. The sections dealing with the manual conversion, and enhancement and optimization go into detail about how to get your application up and running, and running well. Also, hints will be given to those programmers with advanced skills who will be converting large applications.

Overview of Conversion

Before you start you should make sure that this application will be successful on the HP3000. Was it written many years ago and is now out of date or are there already other applications on the machine which do just what yours does. Perhaps only some of your applications need to be converted. Perhaps some of the applications can be converted to Phase I instead of waiting for Phase II to convert all of the applications at once. Also, keep in mind what you are going to be doing with new applications.

In general, there are 5 steps in converting an application. These are site preparations, transferring the files, automatic conversion, manual conversion, and enhancement and optimization. Site preparations deals with making sure everything is ready to transfer the files, and to do the conversion. Transferring the files from the HP260 to the HP3000 can be done in several ways: using a .DS line or a terminal line between the two systems. The automatic conversion does most of the needed conversion. The manual conversion is the remaining work necessary to get the application up and running. The enhancement and optimization portion of the conversion involves making the application run well, and letting it take advantage of the features of HP Business BASIC/3000 and the HP3000. The first three steps are fairly easy. It is the step of manual conversion in which most of the work will be done.

Before the conversion process is explained, some expectations should be set. First, some parts of HP Business BASIC/3000 are very compatible with BASIC/260 (i.e. exactly the same). Other parts are different or do not exist at all. Fortunately, most of the language is compatible, but how much work will be needed depends on the mix of features that the application uses. Some applications will be very easy to convert; others will be very difficult. This paper and the conversion guide will help you figure out how difficult the conversion is. Second, the HP3000 is a different machine. Even though much of BASIC looks the same, things are different and hopefully better. Third, the highest level of compatibility is in the interpreter because many applications use non-compilable features such as GET SUB and COMMAND. The compiler is many times faster than the compiler for CPU intensive programs. The proper use of the interpreter is for development, and then compile the application for production use. This will result in greater user satisfaction. Fourth, there are a fair amount of details to be dealt with in the conversion. Programs won't work automatically. However, the more time taken to make the programs better, the more satisfying the end product. Because of the differences in the BASIC, a program which is converted "just so it runs" will not run well. Take the time and do a good job.

Many applications can be converted into the Phase I version of BASIC, however, some may need to wait till Phase II for some features such as forms, keys, reports and some advanced data base features. Even if this choice is made, it is to the user's advantage to get onto HP Business BASIC/3000 during Phase I to learn this version of BASIC and to learn the HP3000 in general. There will be an updated version of the conversion program when Phase II is released.

Site Preparations

The first step in site preparations is to understand what you are going to be dealing with. This means you should know your application, the HP260, the HP3000, HP Business BASIC and any subsystems which will be used. A good way to start this is to read the manuals on these items. You should have up-to-date manuals and listings of everything that you will be using. This means HP manuals (HP260 and HP3000), your manuals, program listings, data bases schemas (from DBMODS), forms layouts (from PFORM) and any internal documentation of your application.

Also, you need to have solid equipment and software. Make sure that you are using a fully supported system. Both the HP260 and the HP3000 should have the latest software releases. A link must be established between the two machines. This can either be a DS (Dis-trusted Systems) line or a regular terminal line. The DS line is recommended. Both machines should be completely backed up.

It will help if you set up an account on the HP3000 to be used for the conversion. It should have groups in for files just transferred, files from the conversion program, reports from the conversion program, files which need hand conversion, files which are fully converted, documentation files and miscellaneous files. The names of these groups could be HP260, CONVERT, REPORT, HALFCVRT, FULLCVRT, DOC and MISC. Some users may find if they only have a small number of files to be converted that they can use one group with letters appended to the end of the file names to distinguish what version the file is. Since the maximum number of characters in an HP260 file name is 6, and the maximum number of characters in an HP3000 file name is 8, this should be no problem. Remember that only letters and numbers can be used in HP3000 file names, that they must start with a letter, and that the case of the letters has no meaning.

PROGRAMS	: unprotected, unsecured, unrunonly, DATA (SAVE) files
DATA FILES	: unprotected DATA files created with the CREATE not the FCREATE command
FORMS	: unprotected FORM files
DATA-BASE SCHEMAS	: unprotected DATA (DBMODS) files
DATA-BASE DATA SETS	: unloaded, unprotected BKUP (DBUNLD) files
KEYS FILES	: cannot be converted

If you have a large number of files to prepare, you may wish to use the PERFORM statement and write some small programs to build scripts. For instance, you could use the CATLINE statement to get a list of all of the PROG files on a disk and use this to build a script which would do a SCRATCH P, LOAD "PROG" and SAVE "DATA" for each program file. This can also be useful in any of the other tedious tasks which must be done for a lot of files.

If you have the opportunity, you may wish to change your application on the HP260 to not use features which are not available in HP Business BASIC. This is true if you are planning to enhance it and will be changing it anyway. Sometimes the choice of features is arbitrary and now that you know that it makes a difference you

will choose features which are easily converted. Also, whenever you write new code you should use features which are easily converted. See the section on manual conversion and Appendix C in the BASIC/260 to HP Business BASIC Conversion Guide.

Transferring Files

The next step in converting an application is to transfer all of the files used in the application from the HP260 to the HP3000. There are two suggested means of transferring the files: the preferred method DSM/DS/260, and a program based on LK3000 called TRNSFR. Put all files in the HP260 group on the HP3000.

On the HP260, files of characters are just regular DATA files, but on the HP3000 these files are called ASCII files and are different from BINARY files. You must know what kind of file you wish to use on the HP3000 when you do the file transfer, and there is a different style of transfer for the two file types. Here is a table of the correct styles:

PROGRAMS	:	DATA FILE TRANSFER of the saved program
DATA FILES	:	ARCHIVE FILE TRANSFER
FORMS	:	ARCHIVE FILE TRANSFER
DATA-BASE SCHEMAS	:	DATA FILE TRANSFER
DATA-BASE DATA SETS	:	ARCHIVE FILE TRANSFER of the UNLOADED file
Documentation files	:	DATA FILE TRANSFER
Miscellaneous files	:	DATA FILE TRANSFER

For information on DSM/DS/260 see the DSN/DS/260 manual. For information on TRNSFR/260 see appendix A of the Conversion Guide. As to which of the two means of transfer to choose, there are some good points and some bad points to each.

1) DS/260 uses a distributed systems line between the two systems. This line takes care of any errors that occur between the systems. TRNSFR/260 gets confusing if there is any noise on the line.

2) DS/260 runs at 9600 baud. The fastest supported speed of TRNSFR is 4800 baud and all bytes are transmitted in hex and, as a result, take two characters each on the transmission line. Therefore, the fastest speed of TRNSFR is really 2400 baud, which is 4 times slower than DS/260.

3) DS/260 makes ARCHIVE transfers directly from the file. In the current release of TRNSFR, a separate file is made which contains hex. The extra writes and reads to and from this file have a serious negative effect on the performance of TRNSFR. This file is 2 to 3 times the size of the original file which may create disk space problems.

4) TRNSFR/260 uses regular terminal lines and therefore doesn't require the extra board in each system that DS/260 requires resulting in a cost savings. DS/260 needs to be installed by an SE. For TRNSFR to be used, file BBCTHEX.PUB.SYS needs to be present on the system.

5) TRNSFR/260 is slightly easier to use for transferring several files one after another. The PERFORM DROM must be used to do this for DS/260 and because of the need to push softkeys to do the transfer, this is a bit tricky. However, this is described in Appendix D in the HP260 to HP Business BASIC Conversion Guide. TRNSFR some decisions about the number of records and the size of them for ASCII files on the HP3000. The decision about the record size makes it a little easier but sometimes it is very inefficient. The record size TRNSFR uses is 160 bytes in a record. This is correct for program files with long lines, but if all of the lines in the program are shorter or you are transferring documentation, your file probably takes up twice as much space as it needs to.

Regardless of the method of transfer, here are some hints. If you have a large number of files try to write a script for use with PERFORM or BATCH to let the transfer run unattended. This lets the programmer spend his or her time doing something productive instead of watch a terminal. If the transfer is to run overnight, be aware that you will not be able to create new files when the HP3000 is being backed up.

Automatic Conversion

The core of the automatic conversion is the file BBCT250.PUB.SYS. However, there may be a few extra steps necessary for the conversion depending on the file type used. To use this program RUN BBCT250.PUB.SYS and type CONVERT <in file name>, <out file name>, <report file name>. The file type of the conversion can be used instead of the word CONVERT to avoid confusion. It is suggested to make a report of all of the files converted. Here is a list of how the conversion is done. This list has been paraphrased. For a detailed description, see the Conversion Guide.

PROGRAMS:

```
:RUN BBCT250.PUB.SYS
=> PROG MYPROG.HP260,MYPROG.CONVERT,MYPROG.REPORT
=> EXIT
:BBASIC
>COPY ALL OUTPUT TO MYPROG.MISC
>GET MYPROG.CONVERT
>SAVE MYPROG.HP3000
: EXIT
```

DATA FILES:

```
:RUN BBCT250.PUB.SYS
=> DATA MYDATA.HP260,MYDATA.FULLCVRT
=> EXIT
```

FORMS:

There are two kinds of forms in HP Business BASIC. One is based on VPLUS and one was written from scratch to provide a higher level of compatibility with the HP260. Here is a description of the conversion to a VPLUS form. The conversion and use of the other forms file type is described in the Conversion Guide.

```
:RUN BBCT250.PUB.SYS
=> FORM MYFORM.HP260,MYFORM.FULLCVRT,MYFILE.REPORT
=> EXIT
```

DATA-BASE SCHEMAS:

```
:RUN BBCT250.PUB.SYS
=> SCHEMA MYSCHEMA.HP260,MYFILE.FULLCVRT
=> EXIT
Create the data base in the correct account with
DBSCHMEA.PUB.SYS
```

DATA-BASE DATA SETS:

```
:RUN BBCT250.PUB.SYS
=> DATASET MYDSET1.HP260, name of database
=> DATASET MYDSET2.HP260, name of database
=> EXIT
```

DOCUMENTATION AND MISCELLANEOUS FILES:

Move these to the group DOC and MISC. This may be a simple file copy or you may wish to change the record length.

After all of this is done you should make an offline listing of the names of your files using the LISTF,2 MPE command, print of all the files and make sure a backup is done soon (perhaps that night). The files to be printed include programs, reports, schema and documentation.

There are some options in doing the conversion. These are OPTION INPUTLOOPS and OPTION REAL. OPTION INPUTLOOPS places loop around INPUT statements in converted programs. It is described in chapter 3 of the Conversion Guide. OPTION REAL converts all decimal values to real values during the conversion. There is no direct hardware support for DECIMAL data types and so they are slower than REALS, however, they are more accurate.

Manual Conversion

Although it may be tedious, everything that has been discussed so far has been rather straight forward and easy to do. The remainder of the work to be done may be easy or may be difficult, depending on your application. This is the place where technical expertise is most needed. Manual Conversion is that part where you take a program and change it so that it syntaxes, and then runs correctly. Normally this is the bare minimum that must be done, but there may be a lot of room for improvement in the application. The resulting programs should be placed in the group FULLCVRT.

Most of the incompatibilities between BASIC/260 and HP Business BASIC are described in Appendix C of the Conversion Guide. However, there are a few to watch out for:

- 1) Programs can be much larger than they were in BASIC/260, however, the individual subunits (main, subprograms and multi-line functions) must be smaller. For a well modulized program this will not be a problem, but you have to break up a large program into multiple subunits, and this can be very time consuming.
- 2) There are certain features which do not exist at all, in which case those portions of the application which use these will need to be rewritten.
- 3) you may find that the problems encountered in manual conversion are with features of your application which can be removed

because these deal with minor features.

4) You may find that the work necessary to deal with the problems encountered in manual conversion is greater than the rewriting portions of the application. If this is the case, rewrite those portions.

Optimization and Enhancements

Now you have an application that runs but there may still be some work to do. There may be some features to be added to the application. The application may not take advantage of some of the features of the language or the system. The cost of optimization and enhancement should not be counted in the cost of converting your application but they can add greatly to the success of your application.

There was a paper presented at the INTEREX'85 conference in Washington, D.C., USA by the author in September, 1985 called Developing Cost Effective Applications and Utilities using HP Business BASIC/3000. It gives many suggestions on performance tuning. These are a few of those suggestions:

1) Get your program to compile. Normally, this will be just removing COMMAND, GET SUBS and DEL SUBS from the program. However, there may be more to it if your subunits are too big. Compiling your program will make the CPU intensive portions run many times faster. If you cannot compile the entire application you may be able to compile portions of your application.

2) There are several compiler options to improve the performance of your application. These are the COPTION NO RANGE CHECKING and COPTION NO ERROR CHECKING.

3) Some part of the application could be rewritten to take advantage of features that did not exist in BASIC/260.

Conclusion

This paper is intended to give the user a better understanding of the how to convert BASIC/260 applications to HP Business BASIC/3000 applications. Hopefully, the hints and discussion of the process will help in the conversion. Please note that this is only one of the sources of information on this topic and needs to be used in connection with the BASIC/260 to HP Business BASIC/3000 Conversion Guide. With the proper preparation and understanding of the conversion process you should be able to provide a successful application on the HP3000.

References

For more information on the conversion process or on any of the features in HP Business BASIC/3000, please refer to the HP Business BASIC/3000 Manual series. This is a set of five manuals which constitute the user documentation of HP Business BASIC/3000. There is also an on-line HELP facility in the interpreter which provides information on syntax and functionality of all of the HP Business BASIC/3000 keywords and statements.

BASIC/260 to HP Business BASIC/3000 Conversion Guide, Part No. 32115-90010

This guide describes how to convert BASIC/260 applications into HP Business BASIC/3000 applications. It also describes the incompatibilities and the conversions which take place.

HP Business BASIC/3000 Programmer's Guide, Part No. 32115-90007

This guide is for those who want to learn how to program in HP Business BASIC/3000.

HP Business BASIC/3000 Reference Manual, Part No. 32115-90006

This manual describes all of the features of HP Business BASIC/3000. It is for those who wish to look up how an HP Business BASIC/3000 feature works.

HP Business BASIC/3000 Quick Reference Guide, Part No. 32115-90008

This is a "Quick Reference" version of the reference manual.

BASIC/3000 to HP Business BASIC/3000 Conversion Guide, Part No. 32115-90009

This guide describes how to convert BASIC/3000 applications into HP Business BASIC/3000 applications. It also describes the incompatibilities between the two BASICs.

The following manuals may also be helpful:

BASIC/260 Programming Manual

BASIC/260 Utilities Manual

HP/260 Console Operators Guide

DSN/DS/260 User's Manual

FORMS/260 Reference Manual

IMAGE/260 Programming Manual

TIO/260 Programming Manual

REPORT WRITER/260 Programming Manual

MPE Commands Reference Manual

IMAGE/3000 Programming Manual

HP3000 Intrinsics Manual

VPLUS/3000 Reference Manual

SORT-MERGE/3000 Reference Manual

Developing Cost Effective Applications and Utilities Using HP
Business BASIC/3000 - Mark L. Hoeft, 1985 INTEREX, Washington D.C.

Biography

Mark Hoeft

has worked at Hewlett-Packard for 6 years and has been on the HP Business BASIC/3000 project for 5 years. Before that, he worked on the HP260 Lab. He wrote the HP260 to HP Business BASIC/3000 conversion package, and worked on the User Interface portions of HP Business BASIC (KEYS, FORMS, etc.) He also presented a paper at the 1985 INTEREX meeting in Washington, D.C. on the topic of HP Business BASIC.