

of ABIIS maintenance routines are available to modify or become aware of the current state of ABIIS software and files. These routines make use of the file handler and terminal interface routines, and are thus machine independent.

### Minimizing Program Development Time

Although a high degree of machine transferability implies little dependence on manufacturer supplied software, it was decided to minimize program development time and cost by making as much use of this software as possible. The dependence is automatically minimized by the program hierarchy, which has the effect of channelling all potential references to manufacturer software through ABIIS routines, primarily the input/output support routines. For example, a user may ask for information regarding a specific blood unit. This request is received by a QUERY program, converted by the QUERY processor into calls on the file handler, which further converts it into calls on the input/output support routines, which finally convert it into a machine-dependent call on the manufacturer-supplied disc read routine to procure the appropriate disc record.

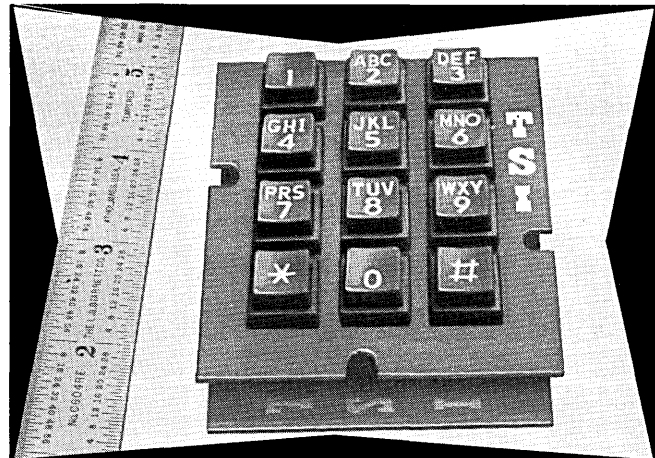
After consideration of factors such as machine availability, time available for program development, and overall development costs, the program development was begun on a commercial IBM 360/50 time-sharing system. This approach also deferred the difficulty of implementing a large software system on a small computer, and enforced adherence to some of the subtler aspects of machine transferability. When the file handler and QUERY interpreter became operational on the IBM 360/50, the system was transferred to the Sigma 2 computer.

The ABIIS is now operational, on a test basis, on the Sigma 2 as a non-resident foreground task under their Real-time Batch Monitor (RBM) operating system. During ABIIS operation, RBM functions primarily as an input/output processor, by initiating all requests to the hardware and processing all hardware interrupts. Since RBM provides approximately 10K words for ABIIS, and ABIIS currently includes over 20K words of program code and constants, the overlay loader capabilities of RBM are used extensively. RBM is also extremely useful during program preparation, serving all the normal functions of a general operating system, and allowing use of the disc file for source and object program storage.

### Conclusion

This article presents some of the considerations which led to the development of a very general and highly machine-transferable programming system for the solution of a specific problem on a very specific small computer. The approach taken entails considerably more effort than coding to a set of rigid program specifications. However, since even "production" business systems are changed almost as much as they are executed, it is felt that the increased ease of modification soon outweighs the additional development effort, and this is particularly true for a prototype system.

Finally, with respect to efficiency, the authors are firmly convinced that an excellent design coded in a higher level language (therefore, "inefficient") is superior to an adequate design coded in machine language (therefore "efficient"), and that this is true even for systems programs such as the file handler and QUERY interpreter portions of the ABIIS. Since there is seldom enough time to do everything perfectly, it is better to spend the time on the design. ☐



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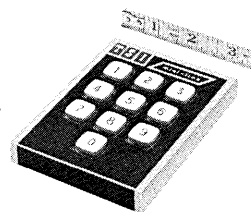
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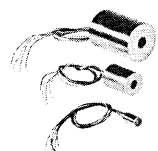
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