Linking Capabilities of Commercially Available Microcomputer Software Facilitates Management Operations

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By J. Stephen Collins

Today's practicing accountants, as well as the business executives and managers with whom they work, have a growing interest in microcomputers and related software packages. However, when it comes to purchasing and effectively using this hardware and software, either alone or in combination with a larger computer, uncertainty about the features of the various micros and the capabilities of the software is common.

Micros and their accompanying software products have an extraordinary range of tasks for which they may be used. Word processing and electronic spreadsheets are probably the two most popular applications, but data base, graph/chart, statistical, and graphics/design packages have proven equally valuable to many users. Specific tasks are limited only by the imagination of the user and might include accounts receivable and accounts payable, inventory control, fixed asset and project management, cash budgeting, sales forecasting, report preparation, mailing lists or directories, and numerous specialized projects.

Microcomputer software packages are not only useful and powerful in their own right but, in many cases, can also be linked with each other to give the user even greater flexibility. Linking is a valuable feature which allows the capabilities of more than one type of software (e.g., word processing, spreadsheet, data base, graphics, etc.), usually from the same manufacturer, to be brought to bear on a specific project. For example, data from a sales forecast prepared with a spreadsheet package could be transferred through the microcomputer to a report being prepared with a word processing package, or could become the input data for a graph/chart package which expresses the sales forecast in the form of a graph. Similarly, as will be illustrated later, financial data prepared within a data base package could be transferred to a spreadsheet package as a basis for generating depreciation and amortization schedules, comparisons of budgeted vs. actual cost, and related reports.

As an alternative to the linking of individual software packages, a single integrated package (e.g., the new *Jazz* software by Lotus), might provide the same capability. Some users will probably find, however, that the word processing, data base, spreadsheet, and additional applications in a single in-tegrated package are not as powerful or flexible as those which are purchased individually and linked with other compatible software as needed.

Accountants need to become familiar with the opportunities offered by commercially available microcomputer software for both their own benefit and that of their clients or employers. To this end, the discussion and illustrations below cover an example designed to increase awareness of the many favorable features of such software, including substantial cost savings over more sophisticated customized products.

A Model System

This section discusses the development of a hypothetical fixed asset and project management system for a business of moderate size, and contrasts the system with two alternative options which are considered less desirable. Although any number of examples could have been used, a fixed asset management system was chosen because of its anticipated familiarity to the reader and because it provides a clear illustration of the use and the linking of two of the most popular types of software, a data base package and a spreadsheet package.

The Problem. Most business organizations, regardless of their size, have considerable resources invested in fixed assets. This is particularly true of those entities which own their own facilities. Buildings are costly and complex, because they include not only a primary and secondary structure (foundation, exterior and interior walls, floors and roof, etc.) but also a variety of additional components such as electrical, heating/cooling, and plumbing subsystems.

In order to obtain maximum service from buildings and other fixed assets, they must be maintained in good working order. This means incurring ordinary repair and maintenance expenses as well as planning and implementing major capital projects (renewal/replacement, renovation, alteration, etc.).

To facilitate these activities, a business of even modest size must have a system to monitor its fixed assets and plan for repair expenses and capital expenditures, either as needed or as company policy dictates. For new companies, or those without an adequate fixed asset system, an in-

dependent or company accountant will need to develop such a system or to assist in its development. In a typical case, the system will include procedures to measure and record the condition of fixed assets, assign priorities to the many tasks which are under consideration, and follow the progress of the work itself. Similarly, there is a need to record and follow the expenditures made on these activities and, over the long run, to estimate the funding required and explore alternatives as to how such funding might be obtained and repaid.

While some of these actions obviously require judgments and decisions by management, the recordkeeping portion of the activity has been made substantially easier by the computer "revolution" of the last several years and the availability of relevant software products. However, there are still several alternatives to be considered.

Alternative Solutions. At least three solutions are available to the company: (1) a prepackaged fixed asset system, (2) a customized system, or (3) a system developed internally by the company using commercially available software. Although the first two choices are often quite effective, they may have some built-in disadvantages. For example, prepackaged fixed asset systems, usually priced at $2500 and up, are often written for only certain types of hardware and thus the user may be faced with the additional cost of purchasing the appropriate unit. In addition, these software systems may not completely address the user's needs or may be adapted to these needs only with great difficulty. A customized fixed asset system, i.e., one which is specifically tailored by the vendor to the client's needs, usually has none of the above problems but may be extremely costly to buy or maintain ($25,000 and up for the initial cost of a very sophisticated system is not unusual) and thus beyond the reach of many organizations.

Fortunately, another very viable option exists and should be considered seriously by businesses and the accountants who serve them. The availability of microcomputers and the variety of accompanying software packages may represent a very practical and far less costly alternative which will be quite acceptable for many situations. Most of these packages can be linked together (by as-

sembling and transferring data) or otherwise used to record and track information on fixed assets, major capital projects (e.g., alterations or renewal/replacement), routine repairs, and the like.

Commercial software packages are considerably less expensive than the two other choices discussed above and are available for all of the major types of hardware currently on the market. Furthermore, although they must be adapted by the user to a specific situation, and may lack some of the sophistication and detail of their more expensive counterparts, they offer at least two offsetting advantages. First, they are very user friendly and quite easy to set up or modify, even for the novice. Second, they are adaptable to a wide variety of uses *other* than fixed asset recordkeeping (e.g., they can assist with inventory control and reorder, accounts receivable and payable, budgeting, mailing lists or directories, and a number of additional tasks). Thus, although there may be tradeoffs involved, inexpensive commercial software packages employed with any well-known microcomputer unit are a very attractive alternative.

Commercial Software Capabilities. An example of an internally developed fixed asset system which uses commercial software will be presented and discussed in the following paragraphs. The sample documents and reports were designed and tested by the author using a basic Apple Macintosh computer with 128K of primary memory and a single disk drive (a second disk drive is helpful but not required). The software utilized included Microsoft File (a data base package) and Microsoft Multiplan (a spreadsheet package), each of which sell at retail for approximately $175. *Comparable results can be obtained using hardware and software from other major companies.* It is hoped that accountants and other potential users in many types of organizations will discover that such a system is not only well within their capability to develop and maintain, but also more than adequate for their needs.

Data collection. Since the information provided by the system is only as good as the data available, the format and content of input documents must be considered carefully. Exhibit A shows one example of an input docu-

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EXHIBIT A
Sample Data Collection Form and Computer Screen
Approval Date January 2, 1986

Approved by VP   Responsible Person Adams

ID No. 101   Type Renewal & Replacement   Priority 1

Location Main   Floor 2   Room 201   Related Proj. 103

Description Replace old deteriorated windows with new double paned variety; replace frayed wire and old electrical outlets along south wall to accommodate microcomputer units.

Project Summary:

Bud. Cost 15000   Est. Start 2/1/86   Est. Finish 2/9/86

Act. Cost 14000   Act. Start 2/3/86   Act. Finish 2/10/86

Funding Source Debt

Project Detail (Budget or Estimate):

Elec. $1000	Carp.$ 14000	Plumb.$	Other$
Start 2/1/86	Start 2/4/86	Start	Start
Finish 2/5/86	Finish 2/9/86	Finish	Finish

Open Orders:

Item	Vendor & Address	Cost	Ordered	Needed
Window Units	Acme Window & Door 1265 Post Rd. Spring Hill	8000	1/3/86	1/10/86

EXHIBIT B
Projects by Priority, Showing Cost, etc.

Priority	ID Number	Budgeted Cost	Actual Cost	Type	Location	Estimated Start	Estimated Finish
1	101	15000	14000	R&R	Main	2/1/86	2/9/86
1	105	25000	20000	Alt.	Annex	2/1/86	2/15/86
1	106	1800	1750	R&R	Annex	3/10/86	3/18/86
2	103	50000	55000	Alt.	Annex	2/5/86	3/10/86
2	104	500	450	Repair	Main	2/20/86	2/25/86
TOTAL		$92300	$91200				

EXHIBIT C
Projects by Starting Date and Other Info

Estimated Start	ID No.	Actual Start	Estimated Finish	Actual Finish	Priority	Type	Location
2/1/86	105	2/2/86	2/15/86	2/15/86	1	Alt.	Annex
2/1/86	101	2/3/86	2/9/86	2/10/86	1	R&R	Main
2/5/86	103	2/4/86	3/10/86	3/4/86	2	Alt.	Annex
2/20/86	104	2/20/86	2/25/86	2/23/86	2	Repair	Main
3/10/86	106	3/10/86	3/18/86	3/20/86	1	R&R	Annex

ment which might be used to collect information important to management. While the document itself would probably exist in paper form, a corresponding computer screen can be prepared using data base software to facilitate the input of all the data contained on the form. The purpose of Exhibit A is to gather all relevant information about capital or maintenance projects involving fixed assets.

Most of the information can be recorded before the project is started, but some data will not be known until the project is in progress or actually completed. The design and timing of reports must take these factors into consideration. Although all of the data elements shown would probably fit within the physical dimensions of most microcomputer screens, much more information can be stored if necessary by using the horizontal or vertical scrolling capability of the software.

The sample form as constructed in Exhibit A contains a considerable amount of data about scheduled projects, including ID number, type, designated priority, description, responsible person, approval source and date, location, budgeted vs. actual total cost, and source of funding.

The ID number of a related project can also be specified by the user (e.g., a project involving the same outside contractor) if this type of cross-referencing is desired. Estimated and actual starting and completion dates for the project are recorded along with the estimated starting and completion dates for the various skilled tradesman involved in the project and the cost of these specific services. Finally, for purposes of initiating and monitoring contact with outside vendors, a record of materials or parts to be ordered by the user is provided along with information on the identity of the vendor, the cost of the item, date ordered and date needed.

The information in Exhibit A for each project is known in computer terminology as a *record* and each data element within the record (e.g., ID No., Description, Budgeted Total Cost, Estimated Starting Date, etc.) is called a *field*. In a typical data base package both records and fields can be *created, updated* with new information, or *deleted* from a data file. In addition, fields must be identified as to their contents (text, numbers, dates, etc.). The real power of a data base package, however, comes from its ability

to *search* records for fields which meet criteria specified by the user; to *sort* fields alphabetically, numerically, or chronologically, depending on the type of field; and to display or print a *report* which results from the "search" and "sort" functions as well as from the specifications of content and format by the user. Over and above these features, additional flexibility is possible when the data base package is linked with other software applications (e.g., spreadsheet), as will be shown.

Sample output reports. For illustrative purposes, it will now be assumed that information like that shown in Exhibit A has been obtained for five projects and entered into a data file which has been created to record and monitor capital projects. Once this has been done, the user is in a position to display (and print, if desired) a variety of relevant reports. Examples of these reports are contained in Exhibits B-E below and are discussed briefly. Some of these reports result from using only the data base software, while others are prepared by linking certain data fields in Exhibit A with a spreadsheet package and then designing reports of a more financial nature within that package. After brief descriptions of the

exhibits generated by each type of software have been presented, some suggestions for other possible reports will be made.

The report in Exhibit B will be helpful in assessing the overall magnitude of existing capital projects. It sorts all current projects by priority and then by ID number. Additional data includes budgeted and actual cost for each project, and in total, as well as other identifying and scheduling information.

The report in Exhibit C provides a chronological listing of jobs sorted according to estimated starting date and would be helpful in short run and long run planning activities by management. Other information on the various jobs might be included as shown.

In addition to the reports shown in Exhibits B and C, the system can prepare other informative reports such as the following:

• *Electrical Work by Priority with Dates, etc.*—For purposes of coordinating project tasks which involve a particular trade or skill (e.g., electrical), this report would prioritize the projects and display the electrical component of the job in descending dollar order along with starting and ending dates for the electrical work and related project data. In addition, it could total and average the dollar amount of the electrical tasks within each priority. This type of report would be useful for such activities as coordinating the company electricians' schedules or perhaps soliciting bids from outside contractors on a package of electrical jobs.

• *Open Purchase Orders for Project Materials*—This report would provide a listing of open purchase orders alphabetized by the item to be purchased in connection with scheduled projects. In addition, it could show the name and address of the vendor, date ordered and needed, and related information. The report, which could also be prepared by vendor name, helps to ensure that needed materials are obtained in a timely fashion and may be the basis for negotiating volume discounts from frequently used suppliers.

The reports discussed above are examples of those which can be prepared using only the data base package. Numerous other illustrations could have been given, such as (1) a chronological listing of projects sched-uled for the Annex, or for a range of rooms (e.g., Rooms 200-210) within the Annex, showing priority, cost, dates, etc.; (2) projects scheduled to start between February 20 and March 15; (3) projects whose estimated total cost equals or exceeds $20,000; or (4) all skilled tasks (e.g., electrical, plumbing, carpentry, etc.) scheduled anywhere within a building, including estimated cost, starting date, completion date, etc.

As suggested earlier, however, the value of many software products is that they can be linked to (and from) other software designed for a variety of applications. For example, the data base vendor fields from Exhibit A could be set up as a separate data file so that appropriate vendor information can be merged into a form letter which has been developed by a compatible word processing package. Similarly, information contained within the data base program (e.g., the budgeted and actual cost data contained in Exhibit B) could be transferred to a compatible graph/chart package and displayed in the form of a graph. Additional examples of linking are possible using software manufactured for design or graphics applications.

The remaining discussion below covers the linking of data with yet another type of software, a so-called spreadsheet package designed to produce a variety of financial and statistical reports. Typical spreadsheet software provides the equivalent of an accounting worksheet which contains as many as several hundred columns and rows and within which a variety of mathematical and logical operations can be completed and labeled. The linking is accomplished by assembling the desired field(s) into one or more records and transferring the records to the memory of the the microcomputer for subsequent use with the spreadsheet package. Brief summaries and sample exhibits which could result from this linking capability are as follows:

The report in Exhibit D compares the budgeted and the actual total cost of the five projects and calculates the difference in dollars and as a percentage of budget. Additional formats could be set up to display and utilize the other dollar amounts contained in the project record (Exhibit A).
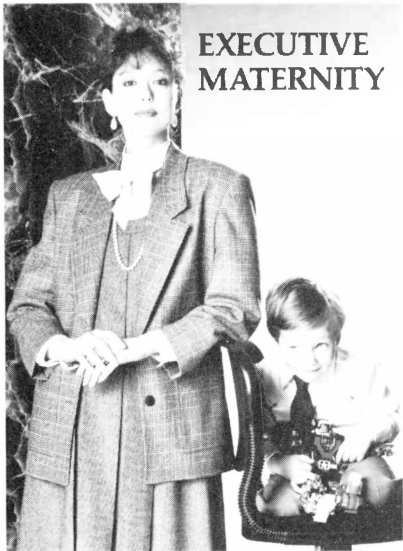
EXHIBIT D
Comparison of Budget vs. Actual Cost

ID No.	Budgeted Cost	Actual Cost	Over (Under) Budget	Over (Under) Budget%
101	15000	14000	-1000	-6.67%
103	50000	55000	5000	10.00%
104	500	450	-50	-10.00%
105	25000	20000	-5000	-20.00%
106	1800	1750	-50	-2.78%
TOTAL	92300	91200	-1100	-1.19%

EXHIBIT E
Pro Forma Depreciation Schedules

Straight Line			Sum of Years' Digits		
Project		101	Project		101
Cost		15000	Cost		15000
Life		5	Life		5
			Denominator		15

Year	Depreciation	Book Value	Year	Depreciation	Book Value
		15000			15000
1	3000	12000	1	5000	10000
2	3000	9000	2	4000	6000
3	3000	6000	3	3000	3000
4	3000	3000	4	2000	1000
5	3000	0	5	1000	0
Total	15000			15000	

Since major projects will ordinarily be capitalized and then depreciated, managers may desire to know the impact of annual depreciation on income. With this in mind, Exhibit E uses the $15,000 budgeted cost of Project 101 and provides a depreciation schedule for the straight line and sum-of-the-years'-digits methods assuming a five-year life.

As in the case of data base software, spreadsheet software can be used to prepare additional reports such as the following:

• *Projected Amortization of Debt*—For projects funded with long-term debt, management may desire to estimate the impact of repayment on cash flow or taxes. This report would present a basic fixed-payment amortization schedule using an annual payment amount and interest rate specified by the user.

• *Pro Forma Balance Sheets and Ratios*—This report would illustrate the effect of the budgeted cost of a project on the balance sheet and on various ratios which might be important to the company. The level of detail in the balance sheet, as well as the choice of ratios, would be at the discretion of the user.

Again, this discussion can provide only a brief overview of the reporting possibilities and it should be noted that many other spreadsheet illustrations could have been given. For example, budgeted vs. actual data could be prepared and analyzed for the work done by skilled tradesmen if the input form (Exhibit A) was expanded to include actual data. Likewise, pro forma income statements are certainly possible, as are inflation-adjusted schedules which project recurring capital expenditures or repair expenses for 25-50 years into the future. Finally, the various items which require a current expenditure of cash could be included among the elements of a traditional cash budget for the company.

Summary and Conclusion

Commercially available microcomputer software is a practical alternative to the more costly and complicated systems which are specially designed to streamline various management tasks. Although the specific model illustrated herein utilized data base and spreadsheet software packages to set up a fixed asset and project management system, other types of software and other management needs could just as likely have been chosen. In fact, the imagination of the user might very well be the major limitation in determining how and under what conditions this software can be employed.

The development of the microcomputer and the proliferation of its related software now offer a wide variety of planning and control applications which were heretofore unavailable at a reasonable cost. Furthermore, the relative ease with which these packages can be operated, and the accessibility of helpful books and mini-courses from retailers and other sources, have brought the successful use of software products well within the grasp of nearly all interested individuals. It is hoped that accountants and other readers will investigate carefully the many capabilities of this software and will begin to identify ways in which it might be utilized to maximum advantage within their own organizations or those of their clients. Ω
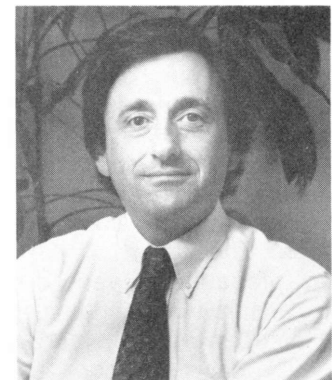
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