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# The Computer Buyer's Checklist

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COMPLIMENTS OF

**NIXDORF**  
**COMPUTER**

Hidden Costs? Core? M  
Single Source? Back  
Software? Conver  
Upgrade? Docu  
Demonstration  
Expand? Mu  
IBM? Compatibil  
Control Multiproces  
NCR? IBM? Core? Burrough  
Honeywell Mod  
Nixdorf? NCR? IBM?  
Burroughs? Honeywell  
Control Data? Nixdorf?  
NCR? Burroughs? IBM?  
Honeywell Expand  
Nixdorf Backup? NCR? IB  
Burroughs Conversion  
Control Hidden Costs? Data  
Nixdorf Documentation  
IBM Software? Comp  
Honeywell Demonstration? Ex  
Single Source? Multi  
Modular? Upgrade? C

# A single 'yard stick' for all. A time- and money-saver for you.

Virtually any business person like yourself may be a candidate for a small- to medium-sized computer system.

Textile/apparel wholesalers and distributors, shipping and materials handling firms, food wholesalers, contractors, automotive suppliers, distributors of toys, sporting goods, appliances—name the business, and chances are someone is already benefiting from computer systems of this type.

What's more, no longer are the potential benefits merely those of speeding up "simple" tasks; nor need managers settle for tons of computer-generated paperwork. With proper system selection and programming, extraordinarily timely and meaningful reports on inventory, profitability, sales personnel and much more can be at your fingertips... providing invaluable aid in the day-to-day as well as long-range operation of your business.

## Myriad of firms and terms create confusion.

But when you start to look for a small- to medium-sized computer system, more than 80 manufacturers have something to offer. Considering distributors and various "third party" vendors (such as office supply dealers who also sell computers, "software" houses not involved with purchasing the actual equipment, etc.), any number of firms may be candidates for your business.

And the more you investigate, the more confusing it can get—with each vendor trying to put his best foot forward... using his own terminology, talking his own hardware, software, services... striving to help you while reaching his objective: to sell you a system!

## What the Checklist can do.

The Computer Buyer's Checklist can alleviate these problems, by helping you do three key things:

1. Compare all vendors on the same basis. A true, simple, "apples vs. apples" side-by-side look at each offering. To get you closer to a sound decision.

2. Avoid "hidden costs". Even when you *think* you're comparing everyone on the same basis, a few key questions may reveal important discrepancies.

3. Save time and effort in your selection process. For one, the Checklist can help you *decide not* to talk with some vendors *at all*. And you can move through those presentations and proposals that you *do* accept much more efficiently—while getting more-usable, comparative information at the same time.

## What the Checklist stems from.

How can the Checklist help accomplish all this?

First and foremost, Checklist development is based on detailed analyses of many "successful" as well as "unsuccessful" computer operations in the field.

What some have done right, others have done wrong. Both provide lessons for all of us.

We've tried to call attention to some factors that have most frequently had the greatest effect on a system's success

(or lack thereof). Of course, when you begin comparing companies, other items may be more pertinent to your particular situation.

## What the Checklist includes.

The Checklist contains a section for each topic that you need to consider in depth: Company (Vendor), Equipment (Hardware), Program Services (Software), Installation & Training, and Maintenance/Service.

You'll find specific questions and, wherever pertinent, follow-up questions. We've also interspersed brief explanations of what the *ramifications* of the vendor's answer might be.

A mini-glossary will help clarify any terminology with which you're not familiar.

## How to use the Checklist.

First, review the Checklist for 10 minutes or so... get a feel for what is covered and (of course) those areas in which you're well versed or not-so-well versed.

Next, peruse it in depth—adding, perhaps, your own notes or questions. Then, when arranging vendor appointments, let them know in advance what you want to cover—so they'll be fully prepared, rather than having to come back to fill in gaps. (Having done this, how thorough the salesman is the *first* time may give you an inkling of how thorough his *company* is.)

Before salesmen call, duplicate the Checklist so you'll have a "blank" copy to use for each prospect, and mark special items you want to be sure to cover in detail.

When the representative shows up, simply mark the answers to every question possible. In some areas, of course, you'll also gather supplementary information.

Having done this with all prospects, you'll be well along toward the sound, solid decision you seek.

## Why Nixdorf provides the Checklist.

One more point: You may think Nixdorf provides this Checklist because we'll gain something by it. Right?

Right.

In the long run, we expect the Checklist to help us gain many more satisfied customers.

Because our business computers and terminal systems (over 50,000 installations in 23 countries), our proven software programs and Total One-Stop Responsibility approach, all rank among the best—anytime, anywhere.

We're not right for everyone. Nobody is.

But helping you compare computer companies on an equal basis, might help us get our foot in the door. And we're confident we'll get our share of business.

Remember, too, the Checklist works both ways, helping *us* decide if we'll be happy together.

So look it over. Use it. Benefit from it. Whether a first-time buyer or experienced, you'll find The Computer Buyer's Checklist a most helpful tool.

# COMPANY (Vendor)

## 1. Are you buying from...

- a manufacturer?  a distributor?  a third party?

You can find qualified firms, people and equipment among all three. But when your line is direct to the manufacturer, neither you nor he has anyone else to blame!

## 2. How long has the Vendor been in the computer business?

- more than 20 yrs.  11 to 20 yrs.  5 to 10 yrs.  
 2 to 5 yrs.  Less than 2 yrs.

The longer, the better. Especially if a firm has been in business less than two years, you're taking big chances on equipment and services you expect to maintain for years to come.

## 3. Are 100% of the Vendor's resources committed to the computer industry?

- Yes  No

Dealing with a "computer-only" firm places you in an excellent position to benefit from equipment advances, new program packages and the like.

## 4. Is the computer Vendor a subsidiary of a non-computer parent company?

- No  Yes

If "yes", the long-term support, system improvements and such that you want from your Vendor may fall far short. Because typically, top management attention—not to mention priority on R&D and other corporate spending—goes where "the big bucks" are.

## 5. Over the past three years, has there been an increase in the Vendor's sales?

- Yes  No

## 6. Does the Vendor provide worldwide coverage?

- Yes  No

If the scope of your market is also worldwide, this can be an important benefit.

## 7. How many computers has the Vendor installed?

- Over 50,000  20,001 to 50,000  5,001 to 20,000  
 1,000 to 5,000  Less than 1,000

Better to buy experience than be the experiment in the computer business with *your* business.

## 8. How many branches and service locations does the Vendor have in the U.S.?

- Over 150  76-150  26-75  
 10-25  Less than 10

When it comes to service locations, none is more important than the one serving you, or the ones needed to serve multiple company locations.

## 9. How many small- to medium-sized business computer systems has the Vendor installed in your industry?

- Over 500  201 to 500  51 to 200  1 to 50  None

The more your local Vendor representatives know already, the less you have to teach them (or hope they learn) in order to get the *results* you want.

## 10. Does the Vendor provide a full line of peripheral products (printers, disc, CRT's, etc.)?

- Yes  Partial  No

"Made for each other" has its place in business computer systems, too. Especially if your Vendor is also the manufacturer, you can figure on perfectly matched equipment—right from the start and as you expand.

## 11. How much of your total on-going system will the Vendor himself provide?

- Equipment  Installation  Program Services  
 Training  Support  Service

Call it what you will: single source, one-stop responsibility, total service...getting it all from one party is tough to beat. Generally speaking, a Vendor who is working with you all the way can provide more efficient, more effective service... more economically. What's more, you always know to whom to turn, without getting the runaround.

## 12. Will the Vendor quote all costs separately? (Hardware, software, supplies, service, training, etc.)

Yes  Some  No

Everything—including costs—should be in writing! The last thing you need is to discover “hidden costs” when it’s too late to turn back.

## 13. Does the Vendor accept full responsibility for the following?

Pre-sale system analysis	<input type="checkbox"/> Yes	<input type="checkbox"/> Some	<input type="checkbox"/> No
Post-sale detail system analysis	<input type="checkbox"/> Yes	<input type="checkbox"/> Some	<input type="checkbox"/> No
System design	<input type="checkbox"/> Yes	<input type="checkbox"/> Some	<input type="checkbox"/> No
Programming	<input type="checkbox"/> Yes	<input type="checkbox"/> Some	<input type="checkbox"/> No
System installation	<input type="checkbox"/> Yes	<input type="checkbox"/> Some	<input type="checkbox"/> No

Though it may prove worthwhile, dealing with more than one party is inevitably more complex, more of a hassle, more work for you.

## 14. Will the Vendor provide—and commit to—a full implementation schedule?

Equipment delivery	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Installation	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Software delivery	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Training	<input type="checkbox"/> Yes	<input type="checkbox"/> No

A one-source Vendor should not hesitate to commit to dates. If you are dealing with several parties, it’s understandable that some might want to “hold back”; all aspects of the total system are interdependent... and no single party has much control over how the others perform.

## 15. After the system is installed, how much on-going responsibility (such as software maintenance) will the Vendor retain?

Total  Minimal  None

How much on-going help will you need? For how long? Hopefully, your Vendor is willing and able to assume as much or as little as your situation calls for, and for as long or short a period as you require.

Save yourself some time. If a Vendor can’t answer the majority of these questions and some of your own satisfactorily... the questions in the remaining sections are superfluous. ■

Your computer system needs and costs must be based on the results you require... now and as your company grows. This is often referred to as the costs/results ratio... cost versus effective performance of specified processing requirements. To equitably evaluate physical hardware components, you need to first determine, based on job requirements, which of two types of systems you need:

A. A hardware system that can process just one job at a time (e.g., “order processing, followed by invoicing, followed by accounts receivable,” etc.). This is a Batch system.

B. A hardware system that allows you to process many jobs simultaneously. But with some of these systems, you must add more “memory” (see following section on CPU) to the system as you add jobs; whereas with other systems, you can add jobs without adding memory.

Another difference to check for:

Some systems will accommodate application programs that provide “current” (up-to-the-second) data. (E.g., the instant a product is sold, the sale is reflected in inventory, accounts receivable, sales analysis, etc.)

Other systems don’t update information at the same time the activity is taking place.

As you compare and consider these various options and their costs, be sure to think “down the line” a few years. Because one of the big potential advantages of computerizing your operation is to install a system that’s flexible, that you can grow with and do more with, as time goes on. Typically, a system that handles multiple jobs simultaneously offers a high degree of flexibility and provides substantial growth capability at minimum cost.

Whichever type of system you need, your setup will consist of four basic components:

- Central Processing Unit (CPU)
- Mass Storage Unit (Disc Storage)
- Video Display Work Station (or terminal, input station or CRT)
- Printer

Let’s cover each of these in order.

## Central Processing Unit (CPU)

The Central Processing Unit (CPU) is the heart of the computer system. Its central memory and arithmetic capabilities control the other parts of the system. And, since it does control, it must be very fast in initiating commands to other units in the system. It should also be protected from unauthorized use and from power failure.

**1. Is the CPU cycle speed quoted in...**

- Nanoseconds    Microseconds 1 to 1.5  
 Microseconds more than 1.5

Typically, all CPU's on the market today are fast enough to handle your job. Specific cycle times have little effect on system thru-put; in fact, any CPU doing business processing spends most of its time *waiting* for input/output tasks to be completed!

**2. What type of memory does the CPU have?**

- Core    MOS

Each has distinct advantages. Core or MOS (semi-conductor) are the two commonly used types of CPU memory. But here, Core scores higher because of one key difference: A CPU with Core memory does not lose data in the event of a power failure or power loss to the system. MOS memory will lose data—unless there is power protection such as a "battery pack". However, MOS is typically less expensive than Core.

**3. If the system has MOS memory, is there a power "battery pack" protection feature?**

- Yes    No

**4. Does the CPU have automatic restart logic in the event of a power failure?**

- Yes    No

**5. How much memory is available in the CPU?**

Minimum \_\_\_\_\_ K   Maximum \_\_\_\_\_ K

Any type of CPU has a limited amount of memory available. Of course, the more memory available, the more flexible, expandable—and expensive—your system is. The nature of your applications, however, and the manner in which the system *uses* memory (some use it more economically than others) are more important than mere capacity in numbers.

**6. If Video Display Work Stations are added to the system, does each one require a segment (partition) of Core memory?**

- No    Yes

With systems in which this is the case, the amount of necessary memory may be 6K or 8K—and the cost of this memory should be included as part of the cost of adding the Station. This type of setup may also severely limit the number of Stations you can put on a system. With some systems, of course, you can completely avoid such expenses and limitations—because the system allows you to add Stations *without* adding memory.

**7. Can memory be added without replacing the CPU?**

- Yes    No

**8. Does the CPU have the logic or checking ability to warn a maintenance engineer when an electrical component is intermittent or beginning to fail?**

- Yes    No

Often, the operator can't notice that trouble is brewing until the equipment is down. So a CPU with check-up logic can prevent delays, save man-hours or even days.

**9. What electrical power is required to operate the system?**

- 115V    220V

**10. How many clean or dedicated lines are needed?**

- 1    2 or more

Depending upon your current electrical system, you may have to add extra lineage to accommodate the computer system. This can be a "hidden cost". Most current electrical systems can accommodate one clean line.

**11. Does the system require a raised computer floor?**

- No    Yes

Ancillary items like these can really ruin a budget.

**12. Is the CPU protected from unauthorized use or tampering?**

- Yes    No

Password, logic or key lock protection are some of the methods that assure only authorized use of your system.

## Mass Storage Unit (Disc Storage)

*The Mass Storage Unit, called disc storage, determines how much information you can have on-line. Every unit has a limitation, a point at which not one more customer account or inventory item can be added. What are your needs now... five years from now? Consider the ease and costs of expanding the mass storage unit, if your processing needs will continue to grow.*

**1. How many disc drives can be added to increase mass storage, to add customer and inventory items?**

- 3 or more    1    None

**2. What types of mass storage units can be added?**

- disc    diskette

Diskette storage is normally used for smaller volumes of mass data storage.

**3. What is the disc drive capacity?**  
(1 megabyte—MB—equals 1 million characters)

- 10 MB or more    8-9 MB    5-7 MB  
 1-4 MB    Less than 1 MB

**4. If the disc data storage covers multiple disc (not diskette) surfaces, are they ...**

- all removable?    removable and fixed?    all fixed?

Removing the disc makes copying and backing up of data a lot easier. If the disc drive does not accommodate a "split pack" (part fixed, part removable), a second drive or a tape drive is required for backing up data...and that means additional expense.

**5. How long does it take to copy (back up) one disc to another?**

- 15 or fewer minutes    16-25 min.    26-40 min.  
 41-55 min.    56+ min.

Usually a daily function, copy (backup) can take a chunk of computer and operator time. If backup requires one hour of computer time per day, that amounts to more than a full month's usage during a year!

## Video Display Work Station

*The Video Display Work Station (or terminal, input station or CRT) speeds data entry and retrieval. No need to wait for a printed report. Check accuracy of orders or cash entries on the spot; ask about individual account status or inventory items without waiting for a complete report.*

**1. How many video display work stations can be added to the same system?**

- 8 or more    4-7    2-3    1    None

An important consideration, if you plan to grow.

**2. If several display units are operating at the same time, can each be processing a different task?**

- Yes    No

**3. How many characters can be displayed at one time?**

- 1980 or more    1920    960    480    240

CRT's come in many shapes and sizes. For general data processing, the larger the character display the better...e.g., it's better to see an entire invoice rather than four pieces of an invoice—one at a time.

**4. How fast does the display unit transfer data to/from the Central Processing Unit (CPU)?**

- 960 characters/second    480    240    120    less

A slow unit slows down the operator.

**5. Can the video display unit initiate more than one application or task at a time? (For example, can the printer be directed to print invoices while the operator is entering orders? This is called foreground/background capability.)**

- Yes    No

**6. Can the video display unit be located in a different room or building than the basic system?**

- Yes    No

**7. Can the video display unit be located in a different city (using telephone lines to communicate)?**

- Yes    No

## Printers

*Printer features vary greatly... different sizes, speeds, noise levels, costs, etc. But basically there are two different types: character printers and line printers. The volume and time restraints of your printing needs will dictate which is more appropriate. A character printer prints one character at a time; a line printer prints one entire line at a time.*

**1. Does the Vendor offer different types of printers?**

- Yes    No

Your needs may change as your business grows.

**2. Can more than one printer be incorporated into the system at the same time?**

- 3 or more    2    No

**3. If the Vendor suggests a single character printer, how fast will it print characters per second?**

- 150 or more    80    45    30    10

If your data operation is basically input and transmission, you may not need an extremely fast printer. Below 45 characters per second is very slow, however.

**4. Does the printer function as a feedback display unit as well as a printer?**

- No    Yes

If this is the case, you won't have access to computer information while the printer is tied up printing payroll or invoices, etc.

# PROGRAM SERVICES (Software)

## EQUIPMENT (Hardware), cont.

5. If your printing needs increase, can you unplug the slow printer and plug in a faster model? (Can you replace a character printer with a line printer, for example?)

Yes  No

6. If you change printers, are there any costs beyond the price of the new printer?

No  Some  Yes (How much?)

7. Can the printer provide multiple copies?

6 or more  2-4  No

8. Does the character printer have both upper and lower case characters?

Yes  No

9. Does the line printer have both upper and lower case characters?

Yes  No

### Options

1. Can you add industry-compatible magnetic tape to the system?

Yes  No

2. Can you attach a card reader?

Yes  No

These options may be important during installation. They can speed up loading customer or inventory items into the system. You may want a service bureau to keypunch cards to load the system while other installation activities are taking place. ■

Software is the part of a computer system that directs the hardware—"tells it what to do"—in order to accomplish your tasks. In essence, software is the "brains" of the system.

Basically, there are two types of software:

*Systems software: the control program which coordinates the various "hardware" elements of the system—sometimes referred to as the "operating system".*

*Application software: those programs which are developed to accomplish your specific jobs.*

Support and maintenance for all software requires a high degree of expertise—not to mention financial investment—by the Vendor.

1. Will the Vendor's own staff support and maintain the operating system?

Yes  No

Herein may lie a critical difference between a Manufacturer/Vendor and a distributor or a third party: A manufacturer will make all hardware modifications; a distributor may or may not; a third party is even further removed. This poses no problem—*until* some *new* software comes along. Because then, if your hardware has not been updated, the software simply won't work!

2. If there's a future problem ("bug") with the operating system, will the Vendor correct the problem at no cost?

Yes  No

3. Is this part of the written contract?

Yes  No

If you're dealing with a "third party" Vendor, your chances of a "yes" are slim. In that case, check to see if the system manufacturer underwrites such "debugging".

4. Is the Vendor proposing Custom or Standard ("packaged") software for your applications?

Custom  Standard

Your specific needs, budget and installation schedule all have a bearing on which is the better choice:

*Custom software is designed to meet all current requirements—including unique ones—of your particular business operation. But, because it must be developed from scratch, it (a) is much more expensive, (b) takes much longer to install on your computer and (c) may take longer to "shake down" (eliminate all bugs).*

*Standard software is low in cost, offers quick installation, and relatively bug-free operation right from the start—if, that is, the package is field-proven. Standard's drawback, of course, is that it might not be able to accommodate certain considerations unique to your business.*



That brings us to an important difference between "Standard" packages—because some degree of program modification will almost certainly be needed to accommodate your operation.

A. There are "Industry/Standard" packages... comprehensive application programs specifically developed with a broad spectrum of users in mind, to meet the needs of a given industry or type of business. Generally, these packages require only minor modifications to fulfill the particular needs of each user.

B. There are "one-customer/Standard" packages... programs initially developed for one particular user, which the Vendor tries to use as the basis for other users. Experience has shown, however, that such one-user programs usually cannot accommodate another user's needs without extensive modifications. And the more you modify it, the more it costs.

**5. Which type of "Standard" package does the Vendor offer?**  
 A  B

**6. Will the Vendor survey and analyze your application requirements and submit a written proposal outlining the necessary modifications of his package to meet your needs, along with a fixed-price quote for the modified package?**  
 Yes  No

**7. Will he do this for each proposed application?**  
 Yes  No

Beware the Vendor who makes sweeping statements about the capability of his software, while taking little time to learn and evaluate your needs. Too often buyers have acquired "free" software "as is"—only to discover it won't do the job without extensive, expensive modifications. Such "hidden" software costs can be shocking and substantial.

So insist that *each application* offered by the Vendor be accompanied by a set of functional specifications, required package modifications and a fixed-price quote.

**8. Will the Vendor warrant the application software installed on your system to perform as specified?**  
 Yes  With time limit  No

Here's a case where dealing with a single source will likely reveal advantages—both in willingness to warrant, and to what degree—because there's no worry about other suppliers' mistakes.

**9. Will the Vendor demonstrate live, installable application programs before you sign a contract?**  
 Yes  No

**10. Will the Vendor install the exact same programs he's demonstrating—if they fulfill your requirements?**  
 Yes  No

Be sure to cover both questions specifically, because some uninstallable "canned" demonstrations can look like the real thing.

*After the contract is signed, and assuming you do not already have your own programming staff...*

**11. Who is responsible for the systems analysis and design work?**

Vendor staff  Third party

**12. Who is responsible for the actual programming?**

Vendor staff  Third party

**13. Who is responsible for application program installation?**

Vendor staff  Third party

Don't assume anything. Here again, you'll find that dealing with a single source is tough to beat!

**14. Will you see the entire system and applications demonstrated using "live data" (your own customers, inventory items, etc.) prior to taking delivery?**

Yes  No

Some Vendors may want to demonstrate using similar "sample" data; but there's no substitute for the real thing.

**15. Prior to equipment delivery, will the conversion of data (customer files, inventory items, etc.) to your new computerized system be...**

-scheduled; firm dates in writing?

Yes  No

-with costs quoted (also in writing)?

Yes  No

-and with responsibility for handling it all specifically assigned?

Yes  No

"Hidden delays" can sometimes cost more than "hidden costs" in dollars. Make sure you and your Vendor reach agreement on these.

**16. Does the Vendor fully document the applications so that they are understandable to you or another party?**

Yes  No

This is an extremely important (and often slighted) part of the installation. Be sure to see documentaton examples from other Vendor customers. A typical program documentation should include an application (system) flowchart, program description, program flowcharts, input/output layouts, *unique* processing requirements, source program listing, operating instructions, test data and test results.

**17. Does the Vendor quote the cost of all software—including custom modifications—separate from the hardware costs in his proposal?**

Yes  No

Knowing specifically what costs what, from whom, will not only help you compare Vendors—but can save you plenty in budget "surprises" later. ■

# INSTALLATION & TRAINING

**1. Who will be responsible for system installation and operator training?**

Vendor  Third party

**2. Are shipping and delivery charges quoted separately from each other, as well as from the computer purchase price, etc.?**

Yes  No

**3. Are any other "extra" charges quoted—charges due, perhaps, to an unusual delivery requirement?**

Yes  No

Check closely for any hidden costs that can take a sizeable bite out of your budget—renting a crane, for instance, to lift the computer through a 6th story window (an actual case history).

**4. Does the Vendor provide an Installation Reference Manual?**

Yes  No

This can be an indispensable tool in alerting you to those items that are necessary or recommended for a successful installation—from power requirements to floor space.

**5. Does the Vendor separately quote the cost of "starter supplies" in his proposal (disc packs, ribbons, paper, etc.)?**

Yes  No

**6. How many specific installation personnel will the Vendor assign, once the system is delivered?**

2 or more  One  None

**7. Will you have the same installation personnel for the duration of the installation?**

Yes  No

If a constant parade of different people is assisting in the installation, the process can become very slow. It takes time for both customer and Vendor personnel to adjust to new people and their methods.

**8. Are the installation personnel experienced—how many of these systems have they previously installed?**

10 or more  Under 10  None

Better to "buy experience" than "be the experiment", whenever possible.

**9. Will the Vendor provide and commit to a written implementation schedule—a phased plan for installing the system?**

Yes  No

**10. Is the installation schedule realistic in terms of your work requirements and work schedules?**

Yes  No

If you're dealing with multiple suppliers rather than a single source, don't be surprised if the Vendor hedges on this. Press for a firm commitment, however, because delays cost money—particularly considering that your personnel typically do not operate at 100% work efficiency during the learning phase of installation.

**11. Are all operating instructions fully documented and understandable by the operators being trained?**

Yes  No

Examples from previous installations and talks with Vendor customers can give you tremendous insight on what to expect.

**12. Will the responsibility for conversion of your data files (customer accounts, inventory, etc.) be defined and detailed by the Vendor?**

Yes  No

Data files can be put on your new system (a) by your own operators, (b) by the Vendor for an agreed-upon cost or (c) by a service bureau keypunching or taping the data. Besides determining who will do the actual conversion, you must ascertain (1) who will be responsible for the accuracy of the data, (2) when the conversion will be completed, (3) what the cost will be and (4) who will pay for it.

**13. Does the Vendor insist upon controls—such as a "parallel run" or "audit trail"—when installing the system?**

Yes  No

If he doesn't insist, you should. If the new system doesn't perform as required, you still have previous record keeping controls and reporting methods to rely on.

**14. Does the Vendor offer formal classroom training to your personnel in...**

-Systems Operation?  Yes  No

-Application Programming?  Yes  No

**15. Does the Vendor provide training for management and supervisory personnel?**

Yes  No

It's highly important for top management as well as others to be at least somewhat familiar with the computer system and what it can do. ■

# MAINTENANCE/SERVICE

## 1. Who will provide maintenance for your system?

- Vendor  Third party

Having the same firm follow-through on service can make things a lot easier for you. Furthermore, sales and service people will be "in it together", rather than trying to blame one another for any troubles. Things should work even better if you're dealing with a manufacturer/Vendor...since service people should be thoroughly familiar with nuances of the equipment, "factory-trained," aware of "common" problems within the system, etc.

## 2. If maintenance is not supplied by Vendor, does the maintenance group service Vendor's equipment exclusively?

- Yes  No

A "yes" answer is your second best bet (to having the Vendor himself provide the service). Closely scrutinize the maintenance group's qualifications, however, and make sure both you and they clearly understand who's responsible to whom, for what, and when.

## 3. Will your maintenance contract be with this third party, or with the Vendor?

- Vendor  Third party

Placing ultimate responsibility at a single doorstep—the Vendor's—partially compensates for having several firms involved.

## 4. Does the service contract completely, clearly spell out all services to be provided?

- Yes  Some  No

## 5. Will specific Field Engineers be assigned to your installation?

- Yes  Possibly  No

Having "real live" specific people to turn to always helps. Furthermore, they'll be very familiar with your particular system—and may be able to virtually diagnose many problems and ascertain solutions when you first call.

## 6. Is service available locally, under control of the Vendor's management?

- Yes  No

## 7. What's the Vendor's average response time?

- 1 to 4 hrs.  5 to 8 hrs.  1 to 2 days  Over 2 days

Be sure to contact some of his current users—not so much to "check up on" what the Vendor says, but to get a more-complete, realistic "feel" for the way he services.

## 8. What's the Vendor's average time to correct a problem ("mean time to repair")?

- 1 to 2 hrs.  3 to 4 hrs.  4 to 8 hrs.  
 1 to 2 days  Over 2 days

A modular plug-in component system obviously offers strong advantages here, because you can replace the malfunctioning component right away. And conversing with some of the Vendor's current customers can make stated "repair times" much more meaningful.

## 9. How often is preventive maintenance performed?

- Monthly  Quarterly  3X/Year  
 Semi-Annually  Never

Believe it or not, there is a "Never"—from one of the best-known names in the industry. But when you're the person paying for it, no computer system is "too small to be worth" a little specific, regular preventive maintenance. Regardless of how well-made or "dependable" a system is supposed to be, an "ounce of prevention" has its place.

## 10. How much will such "routine" maintenance cost?

- Less than 5% of system price  5 to 10%  Over 10%

## 11. Are there any "extra" maintenance services—not included in the maintenance contract?

- No  Some  Yes

If so, be sure to get a detailed list, with charges spelled out specifically.

## 12. Are add-on components (a new printer, disc, Video Display Work Station, etc.) sold and serviced by the same Vendor?

- Yes  No

Frequent advantages of "one make from one maker" include not only the quality, compatibility and availability of items, but the service organization that is familiar with, involved in and concerned about your firm and its specific system.

## 13. When the manufacturer/Vendor initiates an engineering change for a system component, will your system be modified free of charge?

- Yes  Maybe  No

Systems *are* modified; but whether or not you're charged, how much or how can vary with the manufacturer, the system itself or the type of change. Watch for "related" service charges (when the modification *itself* is done free) or other possible "hidden costs".

## 14. What type of training do the Vendor's Field Engineers receive?

- Factory  Factory/Field  Reading manuals only

## 15. Is their training updated on a regular basis?

- Quarterly  Semi-annually  Annually or less

Don't hesitate to query Vendors on this. Obtaining a copy of service materials will give you some insight into the computer system you're considering as well. Regular updating is very important, no matter whom you're dealing with. Chances are, however, that service personnel from a manufacturer/Vendor will be more thoroughly grounded, updated more fully and frequently, and be "first with the latest". ■

# Computer Glossary

**Application Program:** A computer program designed to provide data (e.g., inventory reports) or handle specific tasks such as individual invoice printing.

**Batch Processing:** The processing or performing of jobs one at a time.

**BASIC:** Beginner's All-purpose Symbolic Instruction Code; a commonly used, very versatile computer language that is also well-suited for "time-sharing".

**BIT:** Abbreviation for "binary digit", the basic unit in which computers store and process information. Normally, 8 bits form one byte or "character".

**Character:** The decimal digits 0 through 9, the letters A through Z, punctuation marks, operation symbols and others.

**Character Printer:** A printer which prints one character at a time.

**Contiguous File:** A computer file in which each record is physically located on the storage disc next to another record from the same file.

**Core Memory:** A very reliable, widely used type of main memory for all sizes of computers, in which bits of information are stored magnetically. Electrical power failure will *not* cause loss of data in the memory.

**CPU:** Abbreviation for Central Processing Unit. This is the heart of the computer system, which actually processes information. The CPU contains the Main Storage, Input-Output section, and Arithmetic-Logic sections.

**CRT:** Abbreviation for Cathode Ray Tube, used to describe the video display screen.

**Degradation:** A special condition wherein the computer system continues to operate, but at reduced levels of efficiency.

**Disc (magnetic disc):** A mass storage device for large volumes of data (customers, inventory items, etc.) and programs, providing rapid random access. A disc drive may contain one or more discs.

**Diskette (floppy disc):** A disc storage device for relatively small amounts of data and programs.

**Dump:** To print or display the contents of a computer memory.

**File:** A collection of related records treated as a unit, and stored on a disc.

**Hardware:** The CPU and other equipment that physically comprise a computer system.

**Interactive Program:** A computer program whose data entry is carried on by the operator "conversing" with the system via questions and answers.

**K:** Kilo, 1000. In the computer industry, approx. 1000 bytes. "K" is the term often used to express a computer's memory capacity.

**Line Printer:** A printer which prints an entire line at one time.

**Minicomputer:** A small computer system, capable of handling large volumes of data and performing a wide range of Data Processing functions.

**MOS Memory:** Metal Oxide Semiconductor. An electronic form of computer main memory; newer and typically less expensive than Core.

**Multiprocessing:** The interleaved or simultaneous execution of two or more jobs by a single computer.

**Off-Line:** Not under control of the CPU.

**On-Line:** Under control of the CPU.

**Operating System:** A set of programs designed to supervise, monitor, interpret, execute and support computer operations.

**Random Access:** A method of data storage whereby any specific data can be recalled from memory in any sequence. Access time for obtaining any unit of data is constant and very rapid.

**Real-Time:** When communication between operator and computer is virtually instantaneous... where any intermediate processing does not cause noticeable delay.

**Software:** Programs, routines and data associated with a computer.

**Source Language:** The original language used to write a computer program (e.g., BASIC, FORTRAN, etc.).

**Terminal:** An input and/or output device (Keyboard, CRT, printer, etc.) designed to communicate between the operator and the computer system.

**Time-Sharing:** Several operators using the same computer during the same interval of time.

**Virtual Memory:** A technology that permits the user to treat disc storage as an extension of Core memory, thus effectively eliminating the need to add Core memory when expanding the system (adding CRT's, etc.).

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