

S U P P O R T I N G M I C R O - C O M P U T E R S

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SUPPORTING MICRO-COMPUTERS

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at: NOWRUG May 16-18 1984

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NOWRUG May 16-18

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1.0 EXECUTIVE SUMMARY

Micro-computer acquisition should be done on a cost benefit basis. The hardware should be selected largely upon the software available to support the professional in his job. Micro-computer workstations should be justified over a maximum period of two to three years.

The hourly cost of the professionals using the micro computers will be more than the hourly cost of the machine. The objective of a maintenance plan is to keep machines available to the professional at all time.

The economic cost of a support plan varies according to the location and concentration of the machine population as well as the required turn around time for repairs. The decision to go with either local third party or nation wide contract for maintenance will also affect the cost.

To provide the most effective maintenance plan the hardware options should be limited. There should also be a policy pertaining to the purchase and/or support of "non-standard" configurations.

The level and length of support plans should be defined at the time of each acquisition. A maintenance log should be kept for each work station. The support plans should be reviewed from time to time.

Standardized software purchases will allow more cost effective support of the professionals using the micro-computers.

The guidelines for recommended hardware and software should be reviewed frequently.

2.0 INTRODUCTION

The advent of the personal computer has caused several different aspects of information processing to change. The rapid change in technologies associated with the microcomputer revolution means that the machines bought today will soon be outdated. The obsolescence can be caused by outdating in either the hardware or the software. State of the user software is more important than the latest state of the art hardware. The problem is that although the investment in any one workstation is a fraction of the cost of a larger computer, micros require software, backups, documented procedures, data security, and hardware maintenance.

Micro-computers should always be purchased based upon a quick financial payback period.

Micros are going to become assistants to the professionals and will by the late 1980's be as commonplace on management desks as telephones. The problem to be addressed is simplified when viewed from an economic standpoint.

The process of supporting a group of micros must start with a few assumptions.

- 1) Micros are to be justified over a useful life of 2-3 years.
- 2) Consider a professional working 37.5 hours per week, for 49 weeks a years, this would be 1,837.5 hours. Over 3 years this would be 5,512.5 hours.
- 3) Consider that a micro workstation costs:
\$5,000 for the CPU
\$1,000 for a modem
\$1,200 for a printer and cable
\$ 500 for wordprocessing software
\$ 500 for a spreadsheet
\$1,000 for data package
\$ 800 for additional software
\$2,000 for maintenance for 3 years.
An approximate cost of \$12,000.
- 4) To arrive at the hourly cost of a workstation divide the number of hours in a 3 year period (5,512.5) into the cost of the micro workstation (\$12,000). 12,000 divided by 5,512.5 = \$2.18.
- 5) The hourly cost of the micro is much less than the hourly cost of the professional.
- 6) Micros are to be used only in those areas which the usual data processing methods cannot respond, or respond

as quickly as the end user requires. Most of the applications which fall into the latter category are spreadsheets, wordprocessing, databases, access to information services, electronic mail, and decision support systems.

7) Micros are being used to support the job functions of professionals. Keeping the micro from wasting the professional's time trying to get the hardware or software to work is of prime importance.

8) There are a number of levels of support available the cost of each varies as does the response time.

The problem therefore is to ensure the machine and software are always available to the professionals who are using them. This involves hardware, software, and application support.

The ultimate in hardware support would be to have each workstation completely duplicated. This option however becomes very costly as the ratio of workstations to professionals becomes higher. For software support there would be a computer specialist to assist each professional in applying the hardware and software to his/her job.

The information centre concept addresses this problem by centralizing purchasing, and hardware/software support. Generally the information centre will support up to three brands of micros for the general user with exceptions for user's whose application software does not run off the selected brands. To be able to support the users adequately there are often a limited number of approved software packages and peripheral options (printers, modems, plotters, etc.) which the centre will provide guidance and support for.

3.0 HARDWARE SUPPORT

There are several aspects to hardware maintenance. The cost of hardware maintenance varies for the micro just as it would for the mini computers or mainframes. The cost is a factor of the level of service desired. The level of service should be driven by the requirement to support the professionals using the machines with the minimum of disruption of their normal work. Remember the machine is only a tool to help the professional to do his job.

3.1 COSTS

Cost associated with hardware maintenance are:

- Training
- Labour
- Parts
- Tools
- Travel or Pickup
- Shipping (either parts or machines)
- Loaner Equipment

Training:

Service personnel must be trained to be able to repair the hardware configurations to be supported.

Labour:

When a machine is to be repaired there will a labour cost. There may also be a labour charge for preventative maintenance.

Parts:

Spare parts kits will have to be stocked. The spare part kit might not contain every possible part. Parts are chosen based on failure rates (Mean Time Between Failures - MTBF) and in their absence an estimated failure rate, cost of the part, and lead time to acquire the part.

The spares kit is chosen to fulfill a given service objective. For example if same day service is to be provided all parts would have to be available within 24 hours.

Tools:

The tools and supplies necessary to diagnose and perform the repairs will have to be purchased if not already available.

Travel or Pickup:

To have the machine repaired a technician must travel to the site or have the machine picked up and transported to the repair depot.

Shipping:

Machines may have to be shipped to centralized repair depots. Parts may have to be shipped to the repair depot.

Loaner Equipment:

Loaner equipment may have to be stocked and shipped.

3.2 LEVEL OF SUPPORT

The higher the level of service selected the higher the cost. The level of service should be driven by the requirement to support the professionals using the machines with minimum disruption to their normal work schedule.

The key item when selecting the service option is to ask the question "What does it cost to be without the machine for 1 hour, 2 hours, 1 day, 2 days, etc.?" The answer to this question is commonly known as the allowable Mean Time To Repair (MTTR). Knowing the costs associated with not having the machine available to the professional will assist the budgeting process for the maintenance options. This question should be reviewed for each workstation quarterly as the dependence on a workstation often increases as time goes on.

The first point to consider in choosing hardware support is whether to have onsite or offsite coverage. The decision to go with onsite or offsite coverage is often determined by the availability of warranty service onsite. The turnaround time will also be a deciding factor.

When choosing onsite service the usual service objective is to have the repairs completed within 24 hours. To meet this objective the hours of coverage and response time must be considered. The major disadvantage of onsite service is the cost.

The major disadvantage of offsite service is the turnaround time.

In most cases the use of loaner equipment will provide a alternative to the costs of rapid turnaround or costs equipment down time.

When considering loaner equipment you should first examine the support level objectives for each workstation. In many cases the service objective cannot be fulfilled by offsite service alone. The combination of loaner equipment and offsite service can be compared to the cost of full onsite service.

To determine what equipment should be available for loan the workstation equipment lists will be used. The loaner equipment must provide peripheral equipment such as:

- printers
- plotters
- modems
- monitors
- disk and tape drives
- expansion units and boards

in proportion to the number installed or proposed.

Loaners should be located in proportion to where the devices themselves are located, centralizing where there is not sufficient quantities to justify onsite loaners. The centralized loan equipment will be shipped as required. An allowance for shipping should be included in the budget. not sufficient quantities to justify onsite loaners.

A procedure should be established for "What to do if a hardware fault is suspected?" These procedures should include how to requisition and ship the loaner equipment as well as how to initiate the repair process.

A log book should be kept on each piece of equipment to aid in analysis of repair frequencies and costs. This log book can be reviewed to see if the Mean Time Between Failure (MTBF) and Mean Time To Repair (MTTR) objectives are being met. It will also provide an accurate history of the costs associated with supporting any particular configuration.

A measure of how well the support is going is a machine availability statistic. Another might be the number of failures and the average length of failure.

3.3 CONTRACTING FOR SERVICE

Based on the level of support required services must be contracted for.

There are three kinds of service arrangements. Warranty, time and materials, and fixed price.

WARRANTY

When a unit is warranted a decision must be made on whether or not to abide by the warranty. Factors to consider are:

- length of warranty,
- authorized service locations
- whether both parts and labour are covered
- what the turnaround time is
- whether or not loaner units are provided.

The deciding factor will be the turnaround time. If it is lengthy it may be more beneficial and cost effective to disregard the warranty.

TIME AND MATERIALS

Time and materials contracts are billed according to the time and materials used, often resulting in a lower priority service level than fixed price contracts. It is necessary to specify whether the service company must provide the spares. If spares are not stocked the service objective for maximum repair time allowed may not be met.

FIXED PRICE

The service company will bill a regular monthly rate to provide service on specified machines. This cost may include preventative maintenance. The fixed price contract will usually include the cost of all parts. The longer the contact period the more time the service company has to spread the cost of the spare parts and training of personnel over.

ONSITE VERSUS OFFSITE

Onsite Costs	Offsite Costs
Turnaround Time	Turnaround Time
Response Time	
Hours of Coverage	
Travel	Shipping
Cost of Spares	Cost of Spares
Time and Materials	Time and Materials
or Fixed	or Fixed
Number of Units	Number of Units

At present there are several different agencies which will repair and maintain various micro computers on a Canada-wide basis. These organizations will offer service on both a time and materials basis or a contractual basis. On-site service will cost different amounts depending the distance from the suppliers depot. Most service is provided

on a "zone basis" where the travelling time is allowed for by a variance in rates. The contract will vary according to where the repair depot is, thus a nationwide contract with any one company has to take into account the possibility of zone charges in each city. The service companies always charge depending on the response time requested, 4 hour response is a standard. The charges for the service in under 1 hour, 2 hours, 4 hours, 8 hours are the first stage. Then the next question is what hours will you want your service on call for 8, 10, 12, 18 and 24 hour coverages all cost different amounts.

If the service company does not currently service the machine (or peripherals) you have selected then it will have the cost of purchasing spare parts and training. That cost will have to be spread over the number of contracts it expects to service from that location over the expected useful life of the spares kit. If the only one being serviced from the depot belongs to your organization you will pay for the spares kit. Long term service contracts are usually better under such circumstances.

The computer industry has set up networks to supply and service machines. The manufacturers network, the third party service network and then your own network are the three networks to look at for service for your machine. It may well be that while under warranty the manufacturers network provides the least cost service for the time frame desired. Later it may prove less expensive to use third party service.

The use of the existing service networks should be examined before attempting to build your own. If you build your own you will also have to maintain it, staff it buy, spare parts etc. In a few localized cases where the number of machines in a particular locale is large enough to support it, it may be cost effective to have your own service but in the majority of locations other alternative would be preferable.

Some of the corporations now supplying service for hardware in Canada are:

Xerox	- 12 locations in Canada (carry in service)
Aabex	- 17 locations (Electrohome on site)
Miscoe	- several major cities
Eatons	- 44 locations (2hr service on site)
TRW	- many locations
Dataforce	- Bell locations almost everywhere.
CGE	- also getting into micro software sales and printers

To determine the costs of using any one of these organizations one must first know how many of what brand of machine will be located where? To attempt to determine the strategy at this point in time would not be effective. The best that can be done is to develop a pro-forma breakdown of the expected machine population by location and brand develop support objectives for each workstation, then obtain pricing information from each company.

3.4 SUPPORTED AND UNSUPPORTED

The Micro Centre should provide service to a limited number of hardware and software alternatives. Justification for purchasing a non-standard alternative must be submitted as part of a requirements definition. It is probably that certain engineering packages are only available on certain brands of hardware and therefore if after confirming investigation no supported alternative is available then the purchase would go ahead. The Micro Centre will determine with the user what level of hardware support is necessary for the system and will if requested arrange for the necessary contracts to be negotiated. The Micro Centre has a responsibility to assist the justified non-standard equipment user.

The organization must consider what to do about existing equipment which does not qualify as supported equipment yet serves a useful function. How long will these systems receive support? This decision will be partly based upon the support required by these systems.

By standardizing on the number of hardware and software configurations blanket contracts can be negotiated for service. When negotiating contracts be sure to allow for additional machine acquisitions.

By centralizing the loaner locations there will be less need for individual contracts. The regional and district offices should pay for the service that they contract for or their portion of any blanket contract. This payment should be in advance on a quarterly basis. Blanket contracts should be administered centrally and individual contract regionally.

Unsupported and unjustified equipment maintenance should be the responsibility of the individual regions.

3.5 HARDWARE SUPPORT SUMMARY

The aspects of hardware support (a summary)

1. How fast do you want the problem repaired.
2. What hours of coverage do you want.
3. How many different pieces of equipment do you want covered?
4. Where are you going to locate the equipment?
5. Where do you want the equipment repaired? On-site, local, regional, central
6. How many spares kits are you going to purchase?
7. How many loaners will you need and where will you locate them?
8. What is the procedure if a hardware fault is suspected?
9. How is support handled? local, regional, national contracts; employees; warranty
10. How long is a piece of equipment to be supported for? (eg. 3yrs)
11. Are the non-warranty period economics different from the warranty period.

These factors will change in both importance and cost over time and therefore should be reviewed from time to time.

4.0 SOFTWARE SUPPORT

Training (classroom)- it has been estimated that it takes 100 to 200 hours to master the personal computer for a managers needs. The use of classroom training allows some of the frustration for managers and executives to be cushioned. The trouble is that not every application can get the instant results which are so evident with the simple spreadsheets which are usually the first application the personal computer is used for by managers or executives.

Tutor programs - this allows self-paced learning which is sometimes a less embarrassing way for executives to get familiar with PC's and their uses.

Binders of application notes by software package shipped for installation. - these assist the new users to avoid the same problems other users had. By including templates for the most frequent application of the software package, the learning curve can be shortened.

Organizations hotline - if a user does get stuck there can be someone there on the other end of the phone to help out.

Hints & tip published from time to time - as more and more is placed on personal computers it will become easier for the micro-centre to identify the common problems and let the organization's personal computer users know about how to avoid them.

Manufacturers hotline - to be used by the micro-centre. All major problems should have the micro-centre as a middleman in order that they learn the problems and can collect the answers. In the case of extreme difficulty the micro-centre should set up a conference call with the user and the manufacturer (and listen in), to help solve the problem.

Grassroots - the best form of support will be through the users themselves. Application specialists should be tapped to assist the micro-centre wherever possible.

APPENDIX - Cost of Micros

To understand the economics of having a micro one must understand the costs.

- COSTS - Purchase -
- cpu
 - printer (dot matrix or daisywheel)
 - plotter
 - modem
 - monitor
 - disk drives (floppy or hard disk)
 - cabling
 - software
 - computer magazines
 - training courses
 - conferences/seminars
 - user groups
- Supplies -
- disks
 - paper
 - ribbons
 - printheads/printwheels
 - plotter pens
 - spare parts
- Labour -
- Hardware technician
 - Software or application specialists
 - Trainers
 - end users

Your variable costs should be traded off against each other.