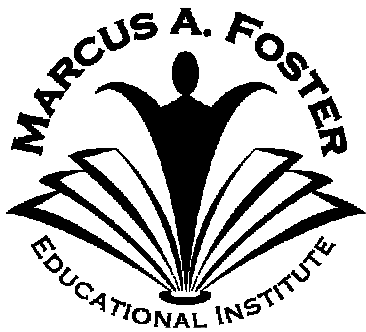


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Building Connections:

Creating a Successful Computer Reuse Program



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Education Development Center Inc.**

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INTRODUCTION

Given the rapid acceleration of personal computer capacity and processing power, many people believe that if a computer is more than two years old it is virtually obsolete. This is a common misconception. The vast majority of us can undertake most if not all of our regular computer-based activities on a five-year-old PC.

The US Environmental Protection Agency predicts 250 million computers will reach obsolescence by 2005 and become part of the 3.2 million tons of electronic waste laid to rest in US landfills each year. This estimation is particularly compelling when reading the latest statistics from the US Department of Commerce: approximately 50 percent of US households do not own a home computer.

In order to provide greater access to digital technology, computer refurbishing programs, (also known as “computer reuse programs,”) such as the Marcus A. Foster Educational Institute’s Oakland Technology Exchange Project (OTX-West) in Oakland, California, efficiently seek, repair, load legal and appropriate software, clean and distribute donated computer equipment within their communities. By providing computers to communities that would otherwise not have access to empowering digital technologies, computer reuse programs are a highly effective means of narrowing the digital divide. By leveraging partnerships with professional technical training programs, schools and other organizations, computer reuse projects can be self-sustaining.

Benefiting the environment and improving educational resources, computer reuse programs go far beyond the distribution of computers. Because many such programs rely on the time and expertise of a volunteer workforce, they provide an opportunity for community members to gain valuable new skills and earn credit toward computer hardware while reinvesting in their community.

If you are closely affiliated to a school, CTC or other non-profit with technology interests and are thinking about setting up a computer reuse program, then you will find this guide and accompanying video helpful.

This practical, “how to” guide can help you make important decisions about how to implement your own computer reuse program. It also outlines all the steps involved in setting up and managing an effective program on a day-to-day basis. The accompanying video succinctly highlights some of the key stages in the computer refurbishing process while bringing to life the key social, environmental and educational advantages of computer reuse

1.0 DEFINING THE PARAMETERS OF YOUR REUSE PROGRAM

If you are thinking about setting up a computer reuse program, here are some important initial issues to consider.

1.1 Your Mission

Before you start out, it is important to define your central mission. Are you most concerned with getting computers out into the community as efficiently as possible? Is your main goal to train the next generation of IT professionals? Is your primary mission to reduce landfill?

One common mistake that people make is to confuse computer reuse with computer recycling. Computer recycling is undertaken by organizations that collect obsolete computer equipment, break it down into constituent parts and distribute it to third parties, such as environmental waste handlers and resellers.

The process of receiving donated computer equipment, repairing, cleaning and testing, and distributing it to a particular client base defines computer reuse. Although computer reuse organizations often partner with recyclers, the recycling of computer parts is not the core mission of a computer reuse program.

1.2 Your Size

Starting small is key. Set a realistic first goal. Work on a project basis, to maximize mobility and manageability. As a project, you can operate very easily under the umbrella of a larger organization such as a school, or non-profit organization.

1.3 Your Customer Base

Identify a modest target audience where there is a genuine need for your service. This could be a community housing project, job training project, YMCA program or other natural constituency.

1.4 Your Expertise

A computer reuse program needs at least one technical expert who is capable of offering wide-ranging technical support and making decisions about software specifications and the quality of hardware donations. If, as the founder of the project, computers aren't your area of expertise, find someone with a technical background.

1.5 Your Resources

At the outset, invest as little money as possible. Draw upon your personal network of contacts to procure initial hardware donations, technical and non-technical assistance and a customer base. Try to find donated space.

1.6 Your Product

Think about the computer first and foremost as an educational or business tool. Define your product specifications carefully at the beginning of the project planning process: decisions you make about what the system will look like, what elements it will contain and how it will perform will affect the nature of the donations you solicit and receive.

With the major needs of your target audience in mind, create a package around a basic Internet-capable CPU, running a widely used operating system and loaded with everyday applications such as a word processor and spreadsheet. As a rule, refurbished computers should be as mainstream, easy to use and compatible as possible. Simplicity is key: the

greater the number of standardized components in your system, the easier it is to clean and repair.

To best serve your target audience, you may wish to develop several different products. For example, if you are providing refurbished computers to local schools as well as student homes, it is advisable to tailor your product for different users in order to maximize resources. For school use, produce the most up-to-date package you can so the greatest number of students and teachers can benefit from the best hardware and software. For home use, consider a more basic system, as most students only require generic applications such as word processing and Internet access in order to undertake assignments.

The product you deliver is more than a bundle of bits and bytes. You should also produce some kind of written support and training guide to help customers set up and get the most from their machines. The guide also serves to minimize the number of requests for technical support—an important saving of time and resources.

1.7 Your Eligibility Pool

Begin by defining who qualifies for your program. If you are serving a housing complex, you may decide that anyone living within a one-mile radius of the community center is eligible for your program.

Beyond that, you need to define the hurdles, if any, customers need to jump in order to earn computers. If your central mission is to get computers out into the community as efficiently as possible, you may want to set a modest barrier to entry. This could be asking customers to attend a morning's basic computer skills training session, or to undertake several hours' volunteer work.

Depending on your core mission, you may decide to set higher expectations. If, for example, your goal is to train technical support professionals, you may require customers to undertake more extensive training or service hours prior to earning a computer.

2.0 SITE PREPARATION

Having carefully considered and defined the parameters of your computer reuse project, you are ready to think about the physical space, equipment and personnel you will need to assemble in order to get the project off the ground.

2.1 Selecting a Site

The best site is one that is donated or shared. Try to partner with an organization that can provide you space at no cost in return for the valuable service you are providing to its constituents. Ideally, the premises should be close to the location of the customers. Ideally, you will want to negotiate a dedicated space for computer use – a computer lab – rather than having to share the room with other activities.

Remember: it is best to start small. You will need an area of approximately 400 square feet to launch a computer reuse program. When you scale up, you can search for larger premises. Similarly, be wary of acquiring too much equipment: only house what can comfortably fit into and be processed within the space.

2.2 Overhead Costs

Keep costs to a minimum. When possible, seek donated furniture and equipment. While many businesses may not be willing to provide financial support to non-profits, they are often happy to provide goods and services at low cost or for free.

Again, try to get donated space. If you partner with a school, the school may be able to cover your utility bill. The project may also fall under the school's insurance policy, which will save you from purchasing a separate policy.

If you process more than 20 computers a year, becoming a Microsoft Authorized Refurbisher (MAR) enables you to obtain licenses to the Microsoft Windows operating system at just \$5 a license. Other software programs known as freeware or shareware can be downloaded from the Internet. See www.techsoup.org/mar

You will also need a vehicle in order to pick up donations and perform other errands. To launch, a large car is sufficient. As you scale up, upgrade to a second hand van or small truck.

2.3 Assembling Equipment and Resources

Here is a list of basic equipment required to launch a computer reuse operation:

- Tables
- Electricity and other utilities
- Broadband Internet connection
- At least one computer in good working order
- One high-capacity hard drive
- Screwdrivers
- Bottles of non-toxic, biodegradable general purpose cleaning fluid
- Cleaning rags
- Van
- Insurance
- Wooden palettes
- Palette jack

2.4 Key Personnel

To launch a computer reuse project, you will need one technical expert to make assessments about donated equipment, put together the technical network, undertake technical support and create the software architecture.

Beyond that, there are numerous other duties involved in setting up and running a computer reuse project. These include dealing with donors, organizing the space, overseeing distribution, developing relationships with customers and partners, (such as recyclers, and technical job training programs,) and volunteers.

Whether at the outset you decide to undertake all of the above on your own or solicit the help of one or more partners, you will need to find an ongoing source of technical and non-technical volunteers to help test, clean, repair and distribute your product.

Remember: community-based computer reuse projects thrive on a volunteer work force.

3.0 GUIDELINES FOR ACCEPTING DONATED EQUIPMENT

When you have thought through space, personnel and equipment issues, you need to think about your donated equipment needs. What you accept in terms of equipment donations is both a function of the final product you are planning to build and also a function of your mission.

If your goal is to provide a product rather than recycling e-waste, aim to get as much equipment as possible from large, reliable companies and government agencies.

If, however, your focus is on recycling e-waste, obtaining one-of-a-kind, non-working machines donated by individual members of the public could work for you. Develop a

good relationship with an e-waste disposal company or it could be a costly and time-consuming exercise.

Decide carefully what you are willing to accept and try not to clutter the workspace with unusable equipment. As waste disposal companies can charge up to \$50 per monitor in e-waste disposal fees, it is best to avoid having to dispose of unwanted equipment. On the other hand, many recyclers will pay you for your e-waste.

Make sure all the parts you accept from donors are compatible with the architecture of your system.

Here is a checklist for assessing donated equipment to help you make decisions about what to solicit and accept:

3.1 CPUs

- Work with the most generic package possible; PCs running Microsoft Windows are more widely used than systems such as the Mac or Linux operating systems.
- PCs are also more useful to computer reuse programs because Microsoft offers a high level of support for computer refurbishers. In the past year, Microsoft has made it easier for computer refurbishers to obtain legal licenses to their operating systems. Windows XP Professional is still the most used operating system in the world, and this is available through the MAR program.

- As a rule, accept only Pentium III 500 MHZ processors as an absolute minimum. You will need minimum of 384mb of memory for acceptable performance. 40Gig hard drives will generally suffice.
- Do not attempt to recoup individual applications from donated machines. The hard drives you process **must** be wiped clean and loaded with a new operating system and software applications.
- Try to solicit bulk donations from reputable companies and government agencies.

3.2 Monitors

- Clean, 17-inch SVGA monitors in good working order are good monitors for general use. As of February, 2010, LCD monitors are not available to refurbishers in any quantity.
- Avoid less monitors that you can't use. Some states have recycle programs for monitors, others don't and can be very costly to get rid of due to the lead in the glass.
- Avoid monitors with cracked or yellowing cases.
- Monitors are classified as e-waste because they contain toxic, non-recyclable substances such as lead. Just like television sets, it is illegal to throw computer monitors in the trash. Monitors have some recyclable parts, but as a general rule, try not to accept donations of anything you don't think you will use—waste disposal companies might charge for monitor disposal.
- Do not accept monitors without systems to go with them.

3.3 Keyboards

- Source PS/2 and USB and mice. Usually, you can find donation of PS/2 mice and keyboards. Newer computers might not have PS/2 ports. Make sure the keyboard outputs match the computer inputs.
- Accept keyboard donations on the premise that if a keyboard looks clean and all the keys are in place, it is probably in good working order.

3.4 Mice

- Look for PS/2 mice that are compatible with Windows. If a mouse looks clean, both buttons click and it rolls smoothly, it is probably in good working order.

3.5 Ethernet cards

- Most computers these days have ethernet cards built in. If they don't, there is a ready supply of standard 10/100 ethernet cards available either from recyclers or other refurbishers.
- If a computer is unusable, salvage its usable cards before you scrap the machine.

3.6 Power cords

- Use three-pronged power cords. Make sure you package two power cords with every computer you distribute.

3.7 Wireless

- Increasingly, families want wireless connections to place computers away from the broadband modem. Wireless cards are available for under \$15 each if you buy in bulk. 802.11 b, g or n will work. Remember to tell clients that they will also need a wireless router.

3.8 Printers

- Obtain working, clean printers with parallel or USB ports. Printers are difficult to test because you need to keep a supply of ink around to do this. Unless you want to set up a sideline cartridge refill business, make your customers aware that they must buy their own ink.

- Source a range of printers for different customer-types. For example, if you are supplying equipment to schools and student homes, distribute laser printers to the schools and Ink Jet printers for student homes.
- Decide whether to include printers in your basic package or not. It may be more worth your while to consider printers a “luxury” add-on, to be offered in exchange for service hours. New printers are quite cheap.

3.9 Creating an Inventory of Donated Equipment

The first rule of inventory-keeping is to define your receiving group – the customers you are distributing your product to – before you start building your inventory.

Expect a turnaround time of two to three months from the moment a piece of equipment reached your premises to the moment it is picked up by a customer.

Decide where you are going to store particular computer parts before you receive them. Maintain and clearly label designated areas for incoming and outgoing parts. Maintain a designated area for recycling.

The most efficient way to manage inventory is to perform triage on (i.e. filter) incoming equipment and push it through the testing process as soon as possible after it reaches your premises.

As you can reasonably expect 85% of donated equipment to be usable, maintaining up to date written records of your inventory is time-consuming, and not strictly necessary. Keep all paperwork that comes with donated equipment. If you have the urge and the resources to keep records, create a simple paper or computer-based tracking system.

3.10 Identifying Resources for Donations

Government agencies and corporations are frequently the best sources for donation as well as law firms, insurance companies and banks. Private sector companies are often looking for ways to contribute to their communities, and may be interested in partnering with your computer reuse program in a number of ways. From managing the transportation of donated equipment to your premises to encouraging their employees to come and volunteer a few hours of their time to your program, it is often of great benefit for both parties to have the people behind the material donation meet the very people they help. Contrary to expectations, technology companies do not necessarily make the best sources of donated equipment.

Be wary about accepting one-of-a-kind donations from individual members of the public.

The best way to find donors is to start with your own network of contacts and build from there. If you have friends in corporations and government agencies solicit their help first.

Although you should not spend a lot of money advertising the fact that you are soliciting donations, placing a small ad in a local newspaper can be helpful. Take advantage of free advertising opportunities – community web sites such as www.craigslist.com are a great place to let potential donors know about your project.

Be aware of government regulations concerning the acceptance of donations. It is more advantageous for donors to enter into a relationship with you if your computer reuse project is affiliated with a school or 501c(3) non-profit, than if you are operating completely independently, because companies get tax-breaks when they donate resources to non-profits and schools. Before you think about setting up a non-profit, consider approaching a non-profit that will act as your fiscal agent for a fee. This can save a lot of administrative headaches, particularly as you start.

Finally, do not hesitate to reject donations that do not meet your specifications. It is better to politely refuse a donation than to clutter up your premises with unusable equipment.

4.0 WORK ENVIRONMENTS

Before you start processing and distributing computers to your customers, you need to build the prototype computer system(s) upon which all your products will be based and develop the engineering, production and distribution environments to most effectively serve your customers.

4.1 The Engineering Environment

The model you create needs to fulfill the following criteria:

- It needs to serve your customers needs. If you are serving two or more markets, you may decide to build more than one model.
- It must be free or as low-cost as possible to reproduce.
- The software you supply with your system must be legal.
- It needs to match your skills and expertise (i.e. do not build a system that is too complex for you and your colleagues to troubleshoot easily).
- The software must match the hardware (i.e. the software you plan to load on the machine should conform to recommended hardware requirements).
- The software can be easily updated.

When you have decided what hardware and software to use, assemble one CPU, monitor, keyboard and mouse for each model you plan to reproduce. Load the software onto the system and test it thoroughly to make sure it works. Consider placing the operating system's Read Me file on the hard drive, so the customer has easy access to all the information about their system.

4.2 The Production Environment

The production environment needs to be one in which your engineering model(s) can easily be cloned. The idea is to be able to produce as many “cookie cutter” systems as possible, as efficiently as possible.

There are several methods by which you can load the software.

- If you are starting out, are including a CD-ROM drive with your package and do not have a high output demand, a portable and cheap way to load software onto the systems is to burn your software package onto a CD and load it onto each individual machine.
- If you are starting out and are not including a CD-ROM drive with your package, you could simply load the software onto a hard drive and move it from machine to machine.
- If you have the resources to set up a network, select a hardware cloning program and use multicasting to load software quickly and easily onto multiple machines. Multicasting is the process by which software can be loaded on to multiple machines at the same time via a network connection. Programs such as Clonezilla and Filezilla can be useful. For low volume startups, loading individual machines can also work.

When deciding what option to use, remember that your time is valuable. Loading software onto individual machines, one at a time, takes time. So the CD-ROM and hard drive options outlined above are less efficient if you are dealing with many machines.

The time you allocate to the processes of testing, loading software onto and repairing machines is dependent on your priorities.

If your goal is to distribute as many working machines as possible to your customers, your repair time limit may be lower than if your mandate is to train computer technicians. If training is a central part of what you do and you have a group of willing trainees to work with, it is worth allowing them the time to work extensively on faulty machines.

4.3 The Distribution Environment

Distributing from an external location

The main advantage of the external distribution model is that customers get to set up, train on, dismantle and take away the same machine. Disadvantages include having to transport computers from your headquarters to the training lab and the need to have

exactly the right numbers of working machines for the numbers of customers who arrive for the training session. Also, if a piece of equipment turns out to be faulty on the training/distribution day, you may be without a replacement part.

4.4 Distributing from your headquarters

The main advantage of the internal distribution model is the ability to keep the manufacturing, service and distribution environments all in one location, so if a piece of equipment doesn't work, it can quickly be exchanged. Also, computers don't need to be transported to an external location as the training lab is already set up. The disadvantages of distributing computers this way include the need to set up and manage separate training and distribution days.

5.0 ORGANIZING INCOMING AND OUTGOING EQUIPMENT

Before donations start to roll in, carefully plan processes for filtering, testing, cleaning, storing and distributing equipment.

As a general rule, use one side of your premises for incoming equipment, and another side for outgoing (i.e. ready-to-distribute) systems.

It is important to keep the different types of equipment separated and carefully labeled, so you and your team can distinguish “newly received monitors – to be tested and cleaned,” from “tested and cleaned monitors – ready to go”. Create hand-drawn or computer-generated labels and come up with a system that clearly identifies different pieces of equipment and the stage they have reached on the production line.

5.1 Filtering (Triage)

Deciding what equipment to keep and what to throw out is the first step of the production process. Try to undertake triage as soon as possible after having received a donation. In general, if a piece of equipment is in poor condition and looks like it is going to take more than thirty minutes to test and repair, it is worth putting it on the recycling pile.

5.2 Testing

It is only worthwhile testing CPUs and monitors. Test monitors and CPUs throughout the working week. Designate special areas on your premises for testing this equipment.

5.2.1 CPUs

CPUs undergo a rigorous testing and software-uploading process. Reliable technical personnel, such as trainee computer technicians undergoing work experience with the computer reuse program, should undertake the testing of CPUs.

Set up a special CPU-testing area, with access to a power supply and an Internet connection. This will take the form of a workstation with at least one monitor and keyboard in good working order. As you scale up, you will want to test multiple machines in one go, so install a row of keyboards and monitors in good working order on a long work surface.

It is important to be systematic about testing CPUs, particularly if you are dealing with multiple machines in one session. Complete one step of the process for all the machines before moving onto the next step.

There are four steps involved in testing CPUs:

- i) Display test: turn the unit on. If there is no power, send the machine to scrap. If there is power, move to the next step.

- ii) Floppy drive test: insert the system start-up disk and boot the computer from the floppy drive. If there is no power, this could be for three reasons – a faulty floppy drive, diskette or cable. Keep a good working diskette and cable on hand and by process of elimination, figure out if the floppy drive is responsible for the lack of power. If the floppy drive is found to be faulty after exchanging the cable and diskette, send the machine to scrap. If there is power, move to the next step.
- iii) Hard drive test: reset the unit. If there is no power, send the machine to scrap. If there is power, move to the next step.
- iv) Memory test: If the memory is faulty, exchange the memory cards until you get a good result.

When you are satisfied that the CPU(s) are working fine, you can begin the process of cleaning the hard drive and installing the new operating system and software.

You should always wipe the hard drive before you start. This is not only a good test of the drive, but a way to destroy any personal data. This is very important. Programs such as DBAN are free and downloadable.

There are six steps involved in the software loading process:

- i) Connect the machines to the Network.
- ii) Download the operating system and software applications simultaneously from the server. As you do this, the old operating system and software applications will automatically be deleted from the system.
- iii) If any computers crash during the multicasting process, turn off the faulty machines so they don't slow down or crash the rest of the system.
- iv) Pull the hardware (any cards you to save for later use such as floppy drives, network, video and sound cards, memory and hard drives) and power cables out of the faulty machines. This serves as an indicator that the machines need to be swapped out.

- v) When the multicasting process has ended, re-boot the CPUs.
- vi) Install all non plug and play drivers manually. You can download drivers that are not included with Windows from the Internet. Windows XP has a lot of drivers built in for older equipment.

When you are satisfied that all the software has been successfully installed, turn off the computers and replace their covers.

5.2.2 Monitors

Monitor testing is a straightforward process, undertaken with ease by non-technical volunteers.

Set up a special monitor-testing area. Place a monitor on the table and plug it in. If there is no power, if the screen shows a white horizontal or vertical line, if the screen is blurry or shows ghosting or shadows, send it to the scrap pile. If a monitor's case is heavily discolored, it should also be relegated to scrap.

5.3 Cleaning

Cleaning is one of the most important and labor-intensive jobs undertaken at a computer reuse project. While only CPUs and monitors undergo testing, every element of a refurbished computer package is thoroughly cleaned before being distributed to the customer.

Non-technical volunteers can undertake this task, as the majority of the work requires individual computer parts to be wiped with a cloth moistened with biodegradable cleaning fluid.

5.4 Storing

When you start out, you will probably only be dealing with a few computers. Several long tables should suffice as clean dry surfaces for storage. Use cardboard boxes and wooden crates for other computer parts. Keep finished products as near to the distribution area as possible. Allot designated areas for scrap and recycling.

As you begin to process larger donations, the best way to store parts is on standard wooden pallets. Boxes and crates can also be used to store smaller parts. You will need a pallet jack to move the pallets around your premises.

Store different parts at different stages of the production process on separate pallets and/or boxes. Separate CPUs and monitors by model and size. Label everything clearly. Stack monitors and CPUs neatly. Aim to stack up to 60 CPUs on a single pallet. It is dangerous to stack bulky monitors too high, so limit the storage of monitors to four layers per pallet.

5.5 Distributing

Schedule a time-slot for customers to come and pick up their machines, preferably on weekday evening or over the weekend. Alert your customers to upcoming distribution days at least a week in advance. Make sure you have plenty of volunteers on hand to help carry out and assemble equipment. Volunteers can also help carry out administrative tasks including managing paperwork.

6.0 SOFTWARE LICENSING

Be legal. Although it might be tempting to take advantage of pirated software, endeavor to work with legal versions obtained from legitimate sources.

6.1 Operating Systems

The Microsoft Windows operating system is ideal for community refurbished computer programs. It is the de facto global standard, and there are a great- number and variety of free software applications available. Since late 2002, Microsoft's partnership with Techsoup has made it possible for CTCs to obtain licenses to Windows 98 Second Edition and Windows 2000 virtually for free.

A non-profit organization that processes more than 20 computers per year can apply to become a Microsoft Authorized Refurbisher (MAR). Following approval, Microsoft donates its software for free, so the only cost to your organization is CompuMentor's \$5 per license handling fee. Visit www.techsoup.org/mar for further details about how to become a MAR.

6.2 Software Applications

Take advantage of the wide variety of reliable freeware and opensource available on the Internet, particularly for Windows users. Visit software websites such as

www.tucows.com to view and download many different software applications.

Stick to freeware and opensource. Avoid shareware and applications that are in test mode or that have a timer.

The basic components of your package will include word processor, spreadsheet and antivirus applications. You may also like to include typing and graphics programs.

Here are some examples of good, low-cost free sources of software available on the Internet:

6.2.1 Office Packages

Microsoft Office

Microsoft Office is still the industry standard. Just as it does for Windows, Microsoft makes Microsoft Office available at virtually not cost through the MAR program.

Google Docs

More applications are available online, minimizing the load on the computers. Google offers a free compatible office suite through the web called Google Docs, with a wordprocessor, spreadsheet and presentation program compatible with MS Office. You must have a broadband connection, but there are many other benefits.

OpenOffice

This powerful package, which is compatible with Windows, Linux or MacOS, is ideal for more powerful computers. The newest versions even have features that MS Office don't have.

6.2.2 Anti-virus application

Security Essentials from Microsoft and AVG free are both good anti-virus and spyware options.

Choose one.

6.2.3 Typing program

There are a lot of free typing programs available. Try them out and use one you like.

6.2.4 Graphics program

The Gimp

Windows-compatible is a very complete opensource graphics program. Easier to use programs are also available. See <http://www.guidetoartschools.com/tips-and-tools/free-photo-editing> for some good comparisons.

6.2.5 Internet Service Providers (ISPs)

While broadband is necessary to achieve the benefits of the computer and the Internet, many legacy users still have dial up. ISPs offer specials from time to time. New users are usually satisfied with the entry offerings. They can always upgrade later. Cable is often faster but more expensive. DSL is a good entry. Check out alternatives such as dslexreme.com and sonicnet.com.

Go to the www.otxwest.org/links page for more information on free Internet resources

7.0 MANAGING THE DISPOSAL OF ELECTRONIC WASTE

Any computer reuse project generates a certain amount of electronic waste. Rather than letting piles of it clutter up your premises, forge partnerships with recyclers and waste disposal entities who can help you deal with it in an efficient, cost-effective and environmentally-sound way.

Monitors are the biggest source of e-waste in the computer reuse arena, so pay them special attention.

Monitors are classified as e-waste because they contain toxic, non-recyclable substances such as lead. Just like television sets, it is illegal to throw computer monitors in the trash. Monitors have some recyclable parts, but as a general rule, try not to accept donations of anything you don't think you will use as waste disposal companies charge for monitor disposal.

Waste disposal companies will often buy unwanted monitors, but they can charge anything from \$10 - \$50 per monitor in disposal fees.

A word of warning: monitors can sometimes be a great way to generate income. Some resellers will buy good monitors for as much as \$15 a monitor. However, you need to think carefully about your priorities – if you end up selling all your highest-quality monitors, you will be left with inferior stock to fulfill the needs of your community.

It is difficult to get rid of Mac, monochrome, terminal and Sun monitors. Avoid accepting donations of these models or partner with a reseller or waste disposal organization that can take them off your hands, preferably for free.

Unlike monitors, hard drives are easy to recycle. As mentioned previously, it is always a good idea to build a relationship with an electronics or metal recycler at the outset of your project.

Shop around carefully for partners to help you manage your e-waste disposal and recycling efforts. Try to perform background checks on companies to ensure reputability. With its comprehensive database, the website of the National Recycling Coalition, <http://www.nrc-recycle.org/> is a good place to start your search for recycling companies, reuse organizations and municipal programs that accept old electronic equipment.

8.0 IN-TRAINING SERVICE MODEL

One of the key issues to consider when setting up a computer reuse project is your business model. Grants and donations will no doubt make up part of your income plan. However, it is unlikely that these income sources will sustain your operations.

Computer reuse projects rely to a large degree on the time and expertise of technical and non-technical volunteers. Seek out volunteers and set up a regular schedule of times during the week when people can come and help out at your computer reuse project.

By creating a business model that both sustains production levels and gives volunteers something tangible in return, your computer reuse project can be mutually beneficial.

8.1 Recruiting Volunteers

Try to recruit volunteers from your customer base. Customers already have an investment in your organization and are likely to be one of the largest sources of volunteers.

Place an ad in a local newspaper outlining volunteer benefits as well as the schedule. Make sure you include a phone number and/or email address for people to contact to sign up.

Contact a few large local businesses about undertaking employee team-building days with your organization. Companies that donate computer equipment to you might also be interested in sending their staff your way.

Advertise your program in the places where your customers are based. If your target audience is the local school district, enlist the help of teachers to advertise your program.

8.2 Rewarding Volunteer Service

Because non-technical tasks such as cleaning and distributing computers are amongst the most labor intensive processes undertaken within a computer reuse program, finding incentives to attract non-technical help is essential to recruiting, maintaining and enthusing a strong volunteer pipeline.

Reward service by offering your volunteers the chance to upgrade their computers by adding such enhancements as extra memory, a larger screen, a CD-ROM or a color inkjet printer in return for a few hours service.

8.3 Developing an in-service training model on site

There are many advantages to locating your operations on the same site as your customer base, especially in terms of developing an in-service training model for your project. Your labor market is right there, making it easy to take advantage of word-of-mouth advertising of your program and attract a steady stream of volunteers. If you are both serving and operating out of a school, you can conveniently combine community service and internship opportunities.

9.0 TRAINING

Even if training technicians is not a central component of your activities, setting up training sessions for your customers is a great way to educate people in basic computer skills. Learning about such things as how to connect to the Internet to saving documents in files on the desktop may inspire customers to feel a greater investment in your program than they might otherwise feel if they simply turned up and claimed their computers. It also has the added benefit of answering many typical technical questions, potentially saving you technical support time later on.

9.1 Suit Your Customers

Set up at least one short mandatory training session for customers to attend prior to collecting their machines. Check out the OTXWest training guide at www.otxwest.org/downloads for a sample curriculum, handout and guide to useful applications and training.

The quality of the training you offer is important, especially if your customers are only attending one session. Hire responsible, well-qualified trainers. Consider running training sessions in different languages, to suit the needs of your community. If you are running a training session for school students, consider asking them to attend with their parents. This way, at least two household members will gain knowledge of how to set-up and operate the refurbished system.

Develop a training curriculum that fits your customers needs and covers all the major topics associated with getting to know the system. The training must be standard, scaleable and replicable. Produce a printable training reference guide that outlines the curriculum. If you are running training sessions in multiple languages, you should translate the guide.

9.2 The Training Lab

Build a computer lab in which the training instructor and the customers can meet. The best site for a training lab is a school (or other similar organization) where computers can be installed and used by the school during the day and by your project in the evening.

Start with one lab. Eventually, work towards creating multiple identical labs in community centers, schools, churches and other community spaces. Even if the space has another use during the day, you need to be able to maintain a mandatory level of control over the space, so that you can make sure that equipment is well looked after and works. In order for your lab to function, you will need the following equipment:

- Electricity
- High speed Internet connection
- Tables
- Chairs
- Computer systems (CPUs, monitors, mice, keyboards etc.)
- Insurance

Try to get the organization that is hosting your lab to help out with providing furniture, insurance, utilities and other peripheral costs.

9.3 Software Configuration

One easy way to ready pre-installed computers for a training session is by using a system protection program like Deep Freeze (www.deepfreezeusa.com). Deep Freeze allows you to freeze the settings that the host organization (e.g. school) uses during the day and substitute them temporarily for the training session settings. At the end of the training session, the host's setting can be restored in a couple of minutes.

Deep Freeze is not freeware. Consider applying for a grant to purchase a number of copies, or persuade the school or other host organization in which the lab is based to buy

some licenses.

A free alternative to Deepfreeze is Steady State offered free from Microsoft.

9.4 Partnering

Developing and sustaining good relationships with partners is essential when setting up and managing a computer-training lab. Try to find reliable hosting organizations that share your mission and are willing to collaborate on implementation costs. Work with whomever is in charge of the organization and formalize the relationship with a standard memorandum of understanding.

10.0 TECHNICAL SUPPORT

Minimize the technical support requests made by your customers. The best way to do this is by ensuring that all your computers are in sufficiently good working order so that they do not need constant attention. Offering basic computer training is another useful way of troubleshooting and saving time during support hours. Including a Read Me file with every system you distribute as well as bundling in a fix disc will also help your customers help themselves.

There are several ways of providing support for your product but the most effective means are on site or via the Internet.

10.1 On Site Technical Support

Asking customers to bring in their computers works well in the community computer reuse field. It allows you to exchange faulty parts quickly and undertaking technical support on a while-you-wait basis prevents you from running into inventory tracking problems.

Designate specific weekly hours for technical support and enlist the help of a few capable technical volunteers. Your time is valuable: if a part takes more than half an hour to fix, consider exchanging it for another part.

10.2 Internet Support

The Web is a powerful tool for computer support. Consider developing a website with a technical FAQ section from the outset of your project. As you scale up, you might consider implementing an email response form, where customers can email you with their problems and await your response. Do not set this system up unless you are certain that you can deal with email inquiries in a timely way.

As many computer reuse programs use similar computer systems, consider pooling resources and developing a centralized customer support site that can be accessed by several different CTCs.

11.0 STRATEGIC PARTNERS

From equipment donors and grant-givers to lab-hosting organizations and software providers, the success of your computer reuse program depends on the effective partnerships that you forge and sustain.

11.1 Looking for Partners

Your personal network and word-of-mouth recommendations are the most effective ways of reaching out to potential collaborators.

Forging links with media, writing letters to specific organizations and putting up posters and flyers are other useful ways of finding partners.

If you operate under a current 501c(3) non-profit such as a CTC, grow out of a non-profit or as part of a school district, your partners will be able to claim tax benefits by supporting the work of your organization.

12.0 LEGAL ISSUES

12.1 Partnerships

It is a good idea to prepare and sign a standard memorandum of agreement at the outset of any partnership. Depending on the complexity of the program, you may choose to seek legal assistance. This will help both you and your partner clarify your expectations and obligations to each other.

12.2 Liability

When a customer collects a computer, attends a training session or volunteers with your project, you should prepare a release form for them to sign, asking the customer to take responsibility for themselves and computer equipment they take away with them. Minors must have their parents sign the release form on their behalf. Make sure your organization has adequate insurance coverage. Ask your host organization if you are covered under their policy or purchase one yourself. Surely there is some more information.

13.0 USEFUL SOURCES OF INFORMATION

Here are some useful resources for you to find out more about computer reuse:

Techsoup

www.techsoup.org

A non-profit organization specializing in technology assistance for community-based organizations and schools

Oakland Technology Exchange – West (OTXWest)

OTXWest provides a rich source of information that might be useful in setting up a reuse program. OTX-West, a project of the Marcus Foster Education Fund (www.marcusfoster.org), provides classroom computers to Oakland Unified schools and home computers to Oakland Unified middle and high school students' homes.

You may access information concerning OTX-West by visiting,

<http://www.oxtwest.org>.

Americorps _ <http://www.americorps.org/>

The national and community service organization

Americorps provides coordination, recruitment, training and support to Americorps members who work in community technology centers around the country.