Maker

Space

Break It reMake It #8

Books	*Double Digit*	*Homeland*
	The Eye of Minds	*Steve Jobs: The Man Who Thought Different*
	Find Me	*Uncaged*
	Double Digit	*Virus on Orbis 1*
Supplies	Computer Tower	Laptop
	Keyboard	Mouse
	2 Belkin 10 Piece Tool Kits	Glue
	Double Sided Tape	Googly Eyes
	Scissors	2 Wire Cutters/Needle-nosed Pliers
	Craft Wire	Pipe Cleaners
	Clear stretch thread	Beads
	Bracelet clasps	Earring hooks
	DVDs	Can lids
	2 Magnetic sheets	Packaging plastics
Documents	Check-out & Return Procedures	Inventory List
	Program Activities & Ideas	40 Developmental Assets for Teens

Updated 11/7/2016

Maker Kit
Check-Out & Return Procedures

- An Inventory List is included. Check before and after use.
- If kit is incomplete, please e-mail or call Melendra Sanders at msanders@nckls.org or 1-800-432-2796 ext. 143.
- Loan period: **1 month**
- Kits will be sent, and can be returned, via courier.
- For those libraries not on courier, transportation can be arranged through the rotating book van. However, since the check-out period is for 1 month, either pick-up or return will be the responsibility of the library.
- Partial kits will not be checked out. Even if you are only utilizing a portion of the kit, the kit will remain as a unit.
- If you have created an activity that goes with the theme, please include a description (and photograph if possible) when sending back the kit. In this way, ideas are shared and everyone benefits. Ideas and activities can be added directly to the folder.
- All copying of activity sheets is the responsibility of the library.
- Copies can be made of all program materials to fill patron requests.
- If you have suggestions on how to improve this service, please share your thoughts with NCKLS.
- Excessive damage to the kit will be the responsibility of the library.
- **Please fill out the evaluation form before sending back.**
- Return all items to the original boxes before packing materials.
- Secure lid to bin using the plastic ties included in folder.
- Do not add packing material to the bins.
- If you have suggestions on how to improve this service, please share your thoughts with NCKLS.
- If you have any questions or concerns, e-mail or call Melendra at msanders@nckls.org or 1-800-432-2796 ext. 143.

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Program Activities & Ideas

Activities on the Computer:

Taking Apart a Computer:
http://www.mrjentis.com/how_to_desolder.html?unique=13532456316989364
How to Dismantle a CRT Monitor: http://www.instructables.com/id/How-to-dismantle-a-CRT-monitor/
Make a Cat Bed from a Computer Monitor: http://www.instructables.com/id/Make-a-Cat-Bed-from-a-Computer-Monitor/
How to Make an ECO Desktop Fan from Old Computer Parts: http://www.instructables.com/id/How-to-make-a-ECO-desktop-fan-from-old-computer-pa/
Keyboard Circuit Sheet Lampshade: http://www.instructables.com/id/Keyboard-Circuit-Sheet-Lampshade/
Ribbon Cable Wrist Bracelet: http://www.instructables.com/id/Ribbon-Cable-Wrist-Bracelet/
Making a Borg Headset: http://www.instructables.com/id/Making-a-Borg-Headset/
Repurposing an Old Computer: http://www.instructables.com/id/Repurposing-an-old-computer/
Dinosaur Age SIMMS Repurposed into Keychains: http://www.instructables.com/id/Dinosaur-age-SIMMS-repurposed-into-keychains/
How to Make Computer Part Monsters: http://www.instructables.com/id/How-to-Make-Computer-Part-Monsters/
How to Repurpose Dead Laptop's LCD: http://www.instructables.com/id/How-to-Re-purpose-dead-laptops-LCD/
Become a Mad Cyborg: http://www.instructables.com/id/BECOME-A-MAD-CYBORG-part-human-part-dead-compu/
Ski Boot Dryer from Scavenged Computer Parts: http://www.instructables.com/id/ski-boot-dryer-from-scavenged-computer-parts/
Computer Bugs: http://www.instructables.com/id/Computer-Bugs/

Other Ideas:

Show a computer related Movie such as *A.I.: Artificial Intelligence, The Computer Wore Tennis Shoes, Iron Man, The Matrix, The Terminator, 2001: a Space Odyssey,* or *Blade Runner.*

Break It reMake It #8

Book Trailers

The Eye of Minds by James Dashner
https://www.youtube.com/watch?v=OdY4PlLJd7o
https://www.youtube.com/watch?v=KYfC1sy_JbY

Find Me by Romily Bernard
https://www.youtube.com/watch?v=1BkP8mHBuQg

Homeland by Cory Doctorow
https://www.youtube.com/watch?v=ImNtlgDc0xs

Virus on Orbis 1 by P.J. Haarsma
https://www.youtube.com/watch?v=dCdP0Fe8NR4

Steve Jobs: The Man Who Thought Different by Karen Blumenthal
https://www.youtube.com/watch?v=A2-Y_A2KSVI
https://www.youtube.com/watch?v=1X6I6ANonik
https://www.youtube.com/watch?v=ZE4fe4LccgM
https://www.youtube.com/watch?v=RqhbibFHIeY
https://www.youtube.com/watch?v=X3d1uu4FIyw

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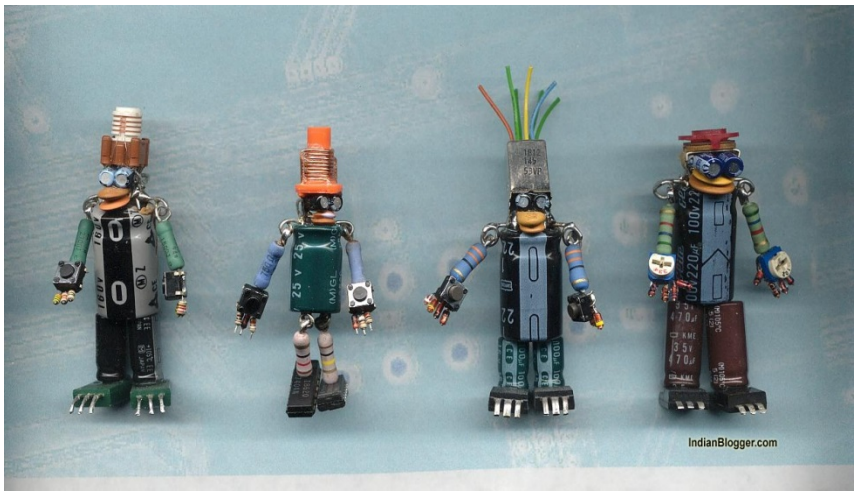
Other Ideas:

Tech Take Apart/Robot Building Days

The simplest tech programming I have ever involved included a two-day workshop. The first day, we took apart a bunch of donated tech we had collected (cell phones, computers, printers, etc.) to explore what they looked like inside. One of our staff members was able to identify the various internal parts for us. The second day, we used the components to make various "robot" creatures. We didn't make actual electronic robots, although with the right tools you certainly could. But this allowed our tweens and teens to tap into their creative side while exploring tech innards. Plus, it was a great way to get rid of all of our outdated or nonfunctioning technology.

Inspiration:



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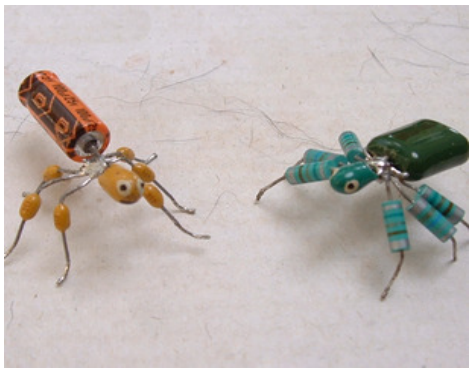

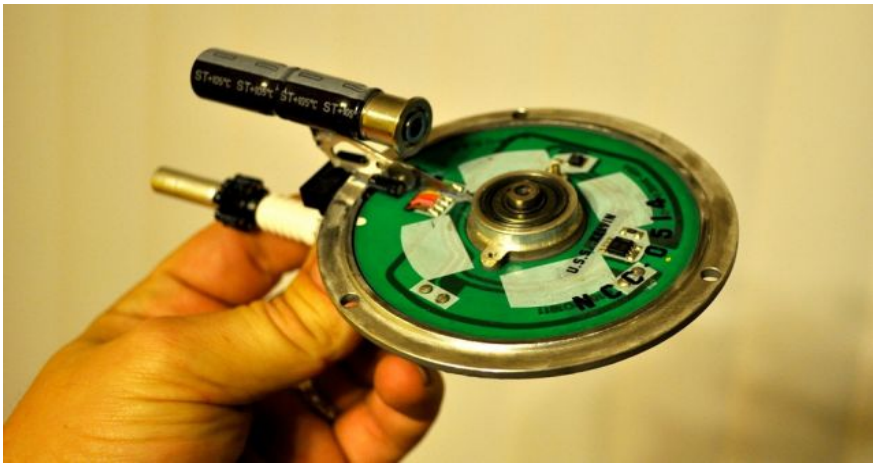

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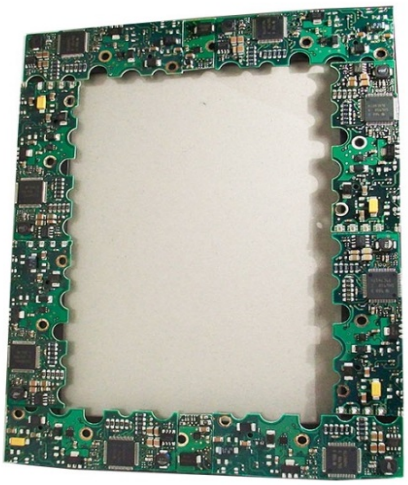

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Make a Wallet from a Keyboard: https://www.youtube.com/watch?v=dZSq2F_p1Is

Seven Ideas (Including Picture Frames, Valentines, and Cufflinks):
http://www.redesignrevolution.com/upcycle-this-7-ways-to-reuse-an-old-computer/

Keyboard Magnets: http://craftingagreenworld.com/2012/07/27/reader-question-cool-crafts-with-old-computer-parts/4/

Keyboard Jewelry: http://thriftyninja.net/wp-content/uploads/2011/08/keyboard-necklace.jpg

How to Assemble a Desktop PC:
http://en.wikibooks.org/wiki/How_To_Assemble_A_Desktop_PC/Assembly
Contains information about the internal pieces of a computer.

Building a Personal Computer: a Hands on Encounter:
http://www.authorstream.com/Presentation/ms.hersh-1220420-computer-disassembly-reassembly/

Basic Guide to Laptop Disassembly
From: http://www.laptop-repair.info/take_laptop_apart.html
This is a guide on how to take your laptop apart, it's based on one particular model and won't tell you how to take your laptop apart exactly, it's meant to be used as a general guide on how to disassemble a laptop and should be used to get an understanding of how they're put together.

This page has step by step instructions with quite a few images, it may take a few seconds to load so please be patient. Remember not to undertake this sort of thing unless you are confident you can see it through. Please begin by reading the safety instructions below.

Before You Begin:
Look over the procedures in this section and familiarize yourself with the disassembly and reassembly steps. Always begin by removing the AC adaptor and the battery pack.

Points to note:
1. Do not take your laptop apart unless it is operating abnormally.
2. Use only the correct and approved tools.
3. Make sure the working environment is free from the following elements whether you are using or storing the laptop.

Dust and contaminates
Static electricity

Extreme heat, cold, and humidity

4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary troubleshooting and diagnostics tests.

5. As you take your laptop apart, place any removed components in a safe place away from the computer so they will not be damaged and will not interfere with your work.

6. You will remove and replace many screws as you disassemble your laptop. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.

7. When assembling the computer make sure you use the correct screws to secure the various pieces. Screw sizes are listed in their corresponding figures.

8. After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

This guide explains how to take your laptop apart and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. Always start by removing the battery pack, next remove optional items such as the PC Card, then follow the chart downward removing only those FRUs necessary to reach the one you think is causing the computer to operate improperly.

Maker Space

Refer to the diagram below:

<table>
<tr><td colspan="6">Battery pack</td></tr>
<tr><td rowspan="3">Expansion Memory Module</td><td>HDD</td><td>Keyboard</td><td colspan="2">Wireless LAN</td></tr>
<tr><td>ODD</td><td>Modem</td><td colspan="2">Display Assembly</td></tr>
<tr><td colspan="3">Top Cover</td><td>Display Mask</td></tr>
<tr><td colspan="2">System Board</td><td rowspan="3">Direct Play Button Board</td><td rowspan="3">Speakers</td><td rowspan="3">Touch Pad</td><td>LCD Module</td></tr>
<tr><td colspan="2">Fan & Heat Sink</td><td rowspan="2">FL Inverter Board</td></tr>
<tr><td colspan="2">CPU</td></tr>
</table>

The diagram below shows FRUs to be removed before the Direct Play button board can be removed and repaired or replaced. The Direct Play button board is overlapped by the top cover which must be removed before the Direct Play button board can be reached.

The removable HDD, keyboard, wireless LAN, ODD, modem, and display assembly in turn overlap the top cover. Before you begin to take your laptop apart always start the disassembly process by removing the battery pack.

<table>
<tr><td colspan="6">Battery pack</td></tr>
<tr><td rowspan="3">Expansion Memory Module</td><td>HDD</td><td>Keyboard</td><td colspan="2">Wireless LAN</td></tr>
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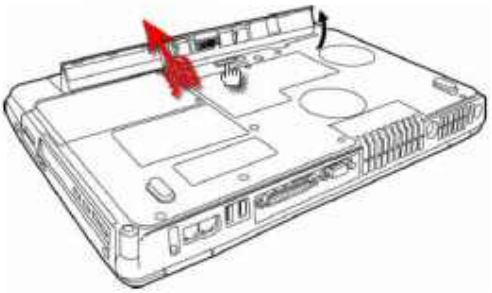
<tr><td colspan="2">Fan & Heat Sink</td><td rowspan="2">FL Inverter Board</td></tr>
<tr><td colspan="2">CPU</td></tr>
</table>

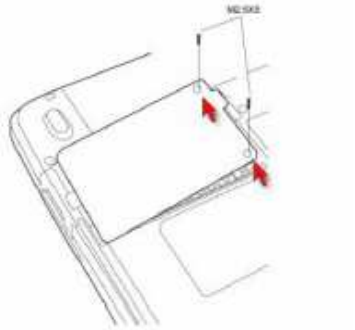
Removing the Battery Pack

To remove the battery pack from the battery bay, follow the steps below.
1. Turn the computer upside down.
2. Unlock the battery double lock and slide the battery bay latch to release the battery pack. Then you can remove it from the bay.



Removing the HDD Module

Follow the steps below to remove HDD module:
1. Turn the computer upside down
2. Remove two black M2.5x5 screws to release the HDD door.
3. Pull out the tab to remove the HDD unit.



Removing the Optical Drive Module

To remove the optical drive module, you need to remove the HDD unit first. Follow the steps below:
1. Turn the computer upside down.
2. Follow the steps above to remove the HDD unit.
3. Remove one M2.5x8 screw and slide the optical drive module from the bay.

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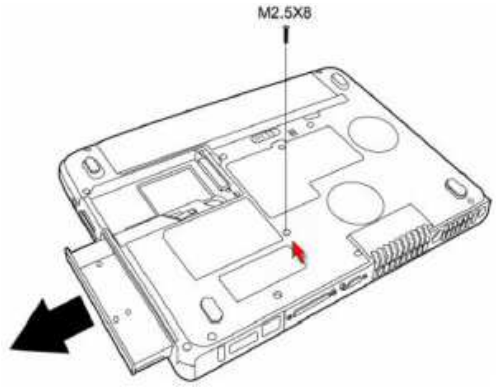
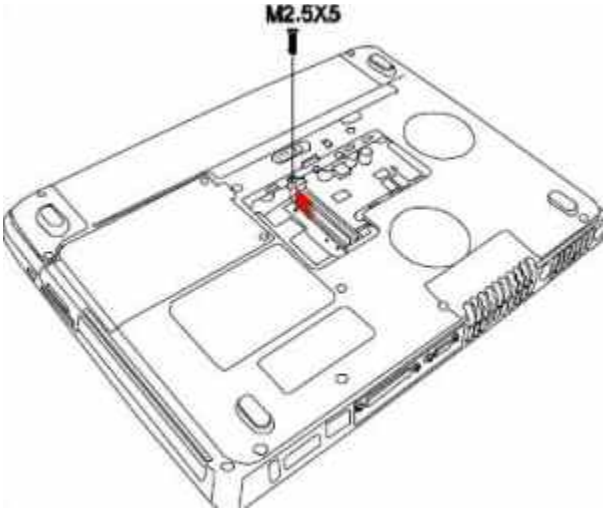


A lot of laptops have a select bay or removable drive not requiring any screw removal, in those cases simply eject the drive.

Removing the Wireless LAN Unit:

1. Turn the computer upside down and loosen the screw securing the wireless LAN compartment cover.
2. Lift off the wireless LAN compartment cover.
3. Remove the embedded screw M2.5x5 securing Mini PCI bracket.
4. Detach the two ends of the wireless LAN antenna.



You may need a Hex or Torq (T7) screwdriver to access the Wifi card.

5. Gently press out on the latches. One end of the wireless LAN unit will pop up.
6. Grasp the wireless LAN unit and pull it out.

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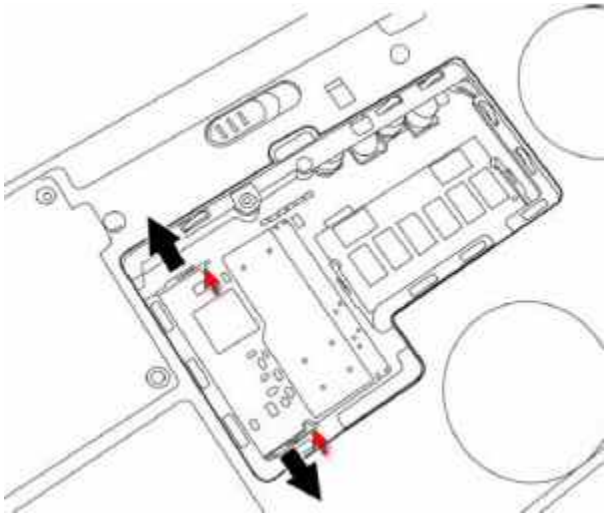
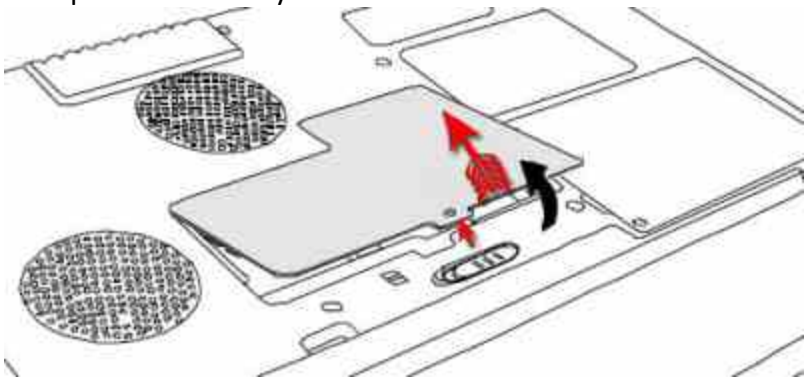


Removing the Expansion Memory:

To remove the memory module, make sure the computer is in boot mode then:

1. Be sure the power is off and all cables are disconnected from the computer.
2. Turn the computer upside down and remove the battery and the screw securing the memory module socket cover.
3. Slide your fingernail or a thin object under the cover and lift it off.
4. Push the latches to the outside to release the module. A spring will force one end of the module up.
5. Grasp the module and pull it out.
6. Seat the cover and secure its screws.
7. Replace the battery.



Remove the memory bay cover:

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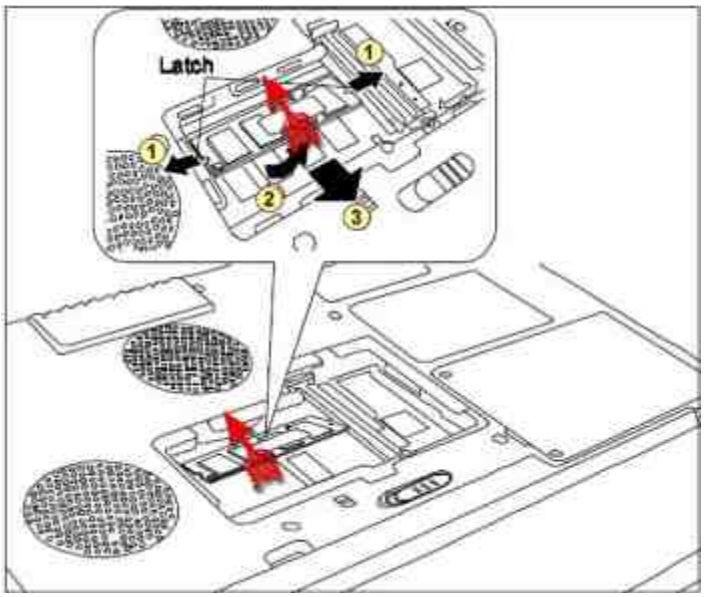

Removing the Keyboard:
Laptop keyboard repair is one of the more common jobs performed on laptops, it's also one of the easier repairs to carry out providing nothing has spilled on it. A spill of anything but water on a keyboard will 9 times out of 10 leave you in a situation that involves replacing the keyboard all together. Keyboards are manufactured in such a way that leaves little to no room to clean out messy spills. Basically any liquid containing sugar (soft drinks, beer, wine, coffee or tea) are bad news. . .

A couple of laptop keyboard repair do's and don'ts in the event of a spill:

1. **DON'T** panic. Panic makes us do stupid things, think before you react.
2. **DON'T** use a hairdryer to dry out a spill. . .melted keys are hard to type with.
3. **DON'T** tilt the machine upside down or on its side (if you do feel the need it's better to tilt it to the side that houses the CDROM as the CDROM area inside the machine has less components on it than the mainboard).

DO switch the machine off immediately and resist switching it back on until you're certain the spill has dried. Survey the damage after you've dried it out. At this point you could remove the keyboard and try the machine using an external keyboard to see if anything else has been affected.

This diagram shows what a basic keyboard looks like, the ribbon cable which connects the keyboard to the motherboard is indicated by the red arrow.

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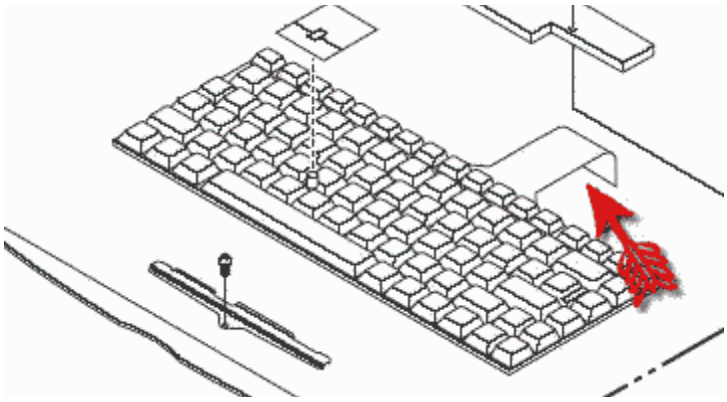
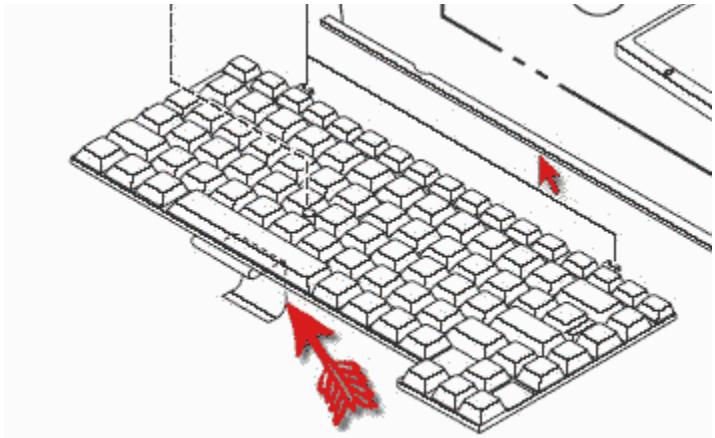


The ribbon cable can also be located on the front edge of the keyboard depending on the age and model of the laptop you have.
Note the keyboard holder (thin strip of plastic) that sits on the top edge of the laptop keyboard needs to be removed to get access to the screws holding the keyboard down.
Most of the current laptop keyboards are like the diagram below.



Keyboard Holder (strip) marked with the small red marker.

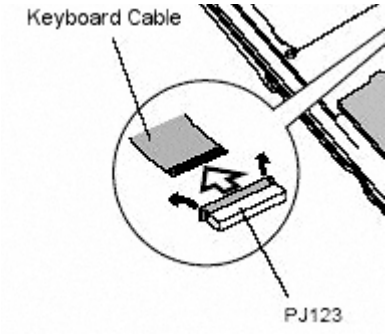
Traditionally a spill will kill a keyboard or at best at least some function will be lost. I have only ever been successful with a laptop keyboard repair that involved a water spill, anything else normally results in a tragic loss and putting your old faithful keyboard to rest.. RIP.

How to replace a laptop keyboard

Keyboard removal is relatively simple, most keyboards are held in place with a couple of screws, and in some models, also a couple of screws that may need to be removed from the base of the unit. A quick call to your local authorized laptop computer repairer should help to determine what screws need to be removed (if they know their stuff).

The keyboard connector is something that needs a little care when unplugging, if you are too heavy handed and damage the connector in any way you may even damage the mainboard also which can cause a world of pain. . .be careful.

See below for the most commonly used connector.



In order to release the keyboard ribbon cable ease the connector edge upwards only about 2 or 3 millimeters, the ribbon should now slip out with ease. The refitting of the keyboard once cleaned or replaced is just done in reverse.

Broken off some keys:
Whoops, these are a difficult one to fix and once again often end in having to replace the keyboard entirely. Some very small plastic mounting arms hold the keys in place and are often broken, either that or the little clips that the mounting arms click into break. It's handy to have or get a hold of an old keyboard of the same type in order to poach the parts you need.

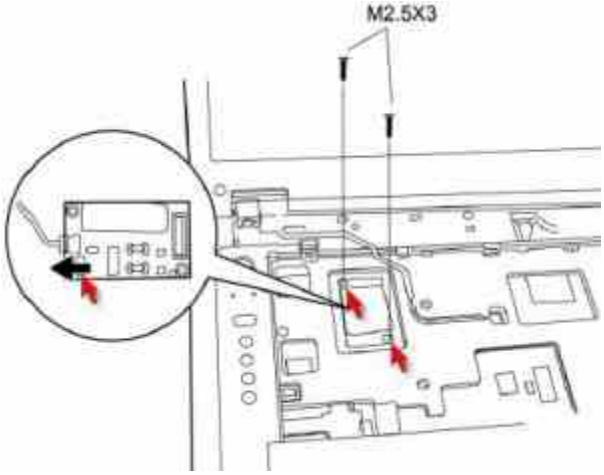
You may need some tweezers and a steady hand to fix these. The best thing I can suggest is to gently remove one of the other keys to see exactly how the mounting arms sit, once you have an idea of how it should look grab those tweezers and be patient, it may take some time.

We will soon have some detailed photos showing how these are assembled, until then remember to be patient and gentle.

If you seek professional advice regarding your laptop keyboard repair, the repairer will probably try to sell you a new keyboard complete with hefty labor charge to fix this for you. With the tips we have given you here, you can do your own laptop keyboard repair, fit it yourself and pocket the savings.

Removing the Modem:
To remove the installed modem, first remove the strip cover and keyboard, then follow the steps below:
1. Remove two black M2.5x3 screws securing the modem module.

2. Carefully lift the unit off its connector.
3. Disconnect the modem cable from the modem module.



Modem removal in a system with the modem mounted under the keyboard, a lot of laptops have an access panel from the underside.

Removing the Display Assembly:

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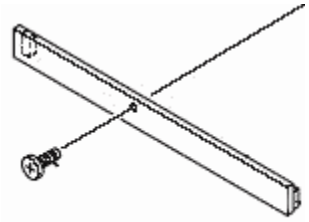
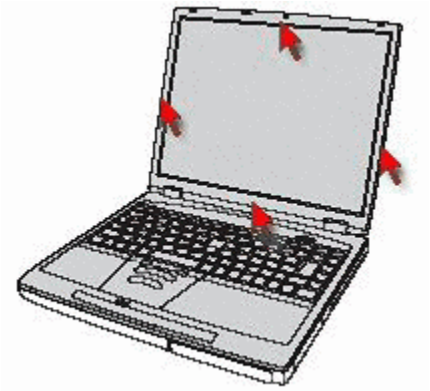
You will need to remove the mask assembly which is the plastic outer border around the screen. If you are the type to be a little heavy handed and impatient, then this is not the task for you. Working around an expensive LCD panel is only for people who have the utmost confidence in what they're doing, the average LCD panel makes up 50% of the overall cost of a laptop and in some cases replacement costs are huge. (Be patient and use minimal force)



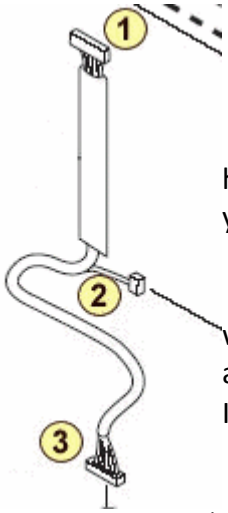
Inverter board



Remove Mask Assembly

Be sure to remove all the screws holding the mask in place, normally expect to see approximately 4-6 screws. In some machines there will be only 2, the mask is also fixed in by snapping type clips that make it fit to the rear cover assembly.

Once you've taken that off, you'll have exposed the LCD and inverter which will both be connected to the LCD harness or wire loom that connects them both to the main board.



1. Connects to the rear of the LCD panel.
2. Connects to the Inverter board or FL inverter.
3. Connects to the main board.

Disconnect the inverter from the harness and from the LCD (the inverter will have a cable plugged into both ends of it) now. . . here's the thing. In a lot of cases your laptop screen repair is just a case of cleaning the inverter pins with some contact cleaner and this will fix the issue for a good while.

The reason is that the pins develop a film on them and lose good connection with the plug that is plugged into them, it's a good idea to clean the harness plug as well.

If you want to achieve a more permanent fix you will need to apply some Glue

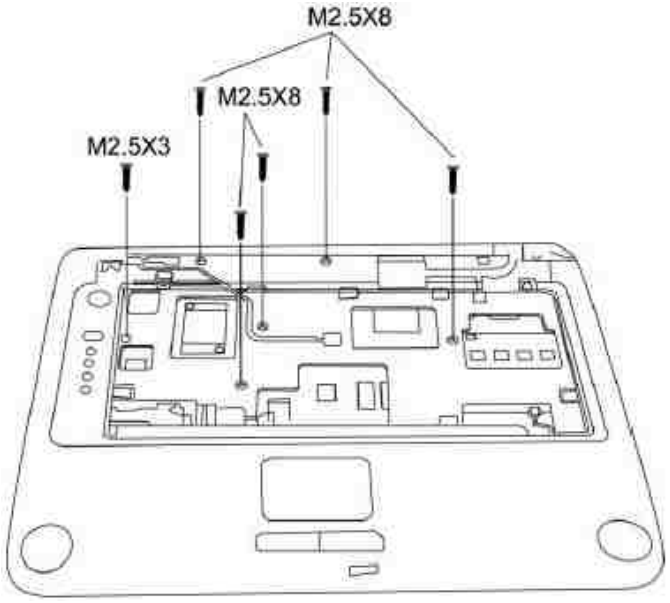
(Threebond 1530B) to the end that the harness plugs into (plug number 2, see left image), this will prevent the dirt film forming again on the pins over time.

Once this is done the unit can be reassembled and it should be OK. If you have a faulty inverter that needs replacing the cost will vary from place to place, but study our laptop screen repair guide and use the info to save yourself some money.

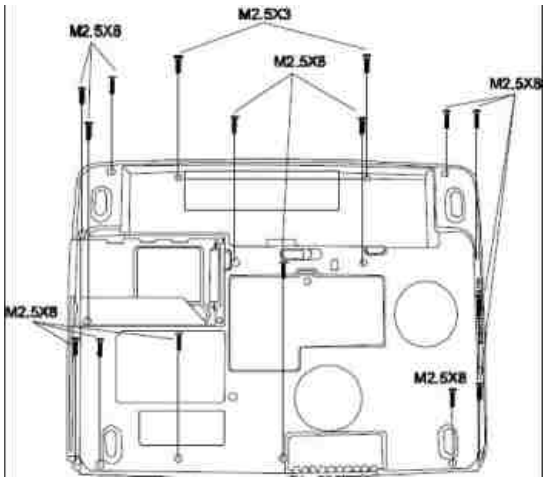
Removing the Cover

To remove the top cover, first remove the battery pack, display assembly, optical drive module, HDD, memory module and wireless LAN, then follow the steps below:

1. Remove five black M2.5x8 black screws and one black M2.5x3 screw securing the top cover.
2. Detach the upper FFC cable and two speaker cables on the top chassis.
3. Remove the two black M2.5x8 screws securing the system board.
4. Turn the computer upside down and remove the following sixteen screws as shown in the diagram below
5. Turn the computer upright to lift off the top cover.



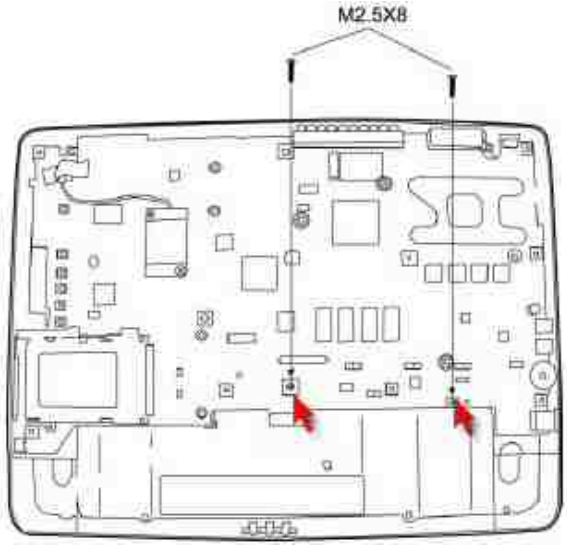
Top cover assembly.



Removing the System Board

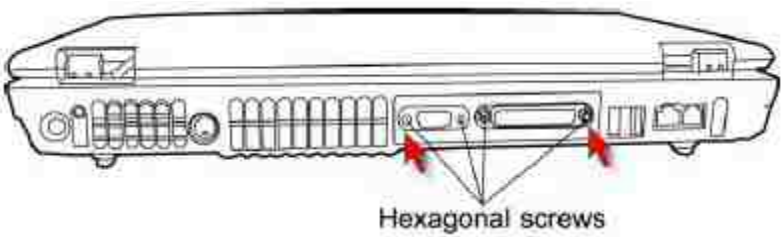
To remove your laptop's mainboard, first remove the LCD assembly and top cover, then follow the steps below:

1. Remove the two black M2.5x8 screws securing the system board to the bottom cover.
2. Remove the two or four silver screws securing the system board to the backside.
3. Remove the system board from the chassis.



Mainboard screws will vary from 1 or 2 up to 10 or more. Remember to disconnect any cables that are connected.

Maker Space



These instructions should be only used as a guide to give you an understanding on how to take your laptop apart. If you're not 100% sure of what you're doing if may be a better idea to pay a technician to take your laptop apart and repair it.

Maker Kit Evaluation
Break It reMake It #8

1. **Please place an X in the column next to any piece of the kit that you used:**

		X		X
Books	*Double Digit*		*Homeland*	
	The Eye of Minds		*Steve Jobs: The Man Who Thought Different*	
	Find Me		*Uncaged*	
	Double Digit		*Virus on Orbis 1*	
Projects	Jewelry			
	Art			
	Picture Frames			
	Magnets			
	Cyborg-Costumes			
Documentation	Check-out & Return Procedures			
	Program Activities & Ideas			
	Inventory List			
	40 Developmental Assets for Teens			

2. **How many programs did you conduct with the kit and how many total people attended?**

   # of programs: _____ # of attendees: _____

3. **Please rate the kit on a scale of 1-5 (1 = poor, 5 = excellent):**

   1 2 3 4 5

4. **Any comments about the kit or suggestions for improvement?**