Hartmann Neuron

Technical Hints & Tips
(based on own experience and on Surroundsfx Forum threads)

01.06.2011

Written by **TOKABLN**

Caution:



Caution: Opening the Neuron can be dangerous.



The content of this document has been written based on my own experience and on Surroundsfx forum threads. It may contain wrong information.

I'm not responsible for any harm, fatal injuries through electrical shock or to the destruction of your device!

If you unfamiliar in technical aspects, ask an authorized service centre to do it for you rather then doing it by your own. This instruction is only for those who are familiar with electrical devices and appropriated repair processes.

You are warned... everything you do... you do it at your own risk!!!

History	History	History	History	History
V1.0 – 17.05.2008	V1.1 – 22.11.2008	V1.2 – 01.03.2009	V1.26 – 25.09.2010	V1.27 – 01.06.2011
TOKABLN	**TOKABLN**	**TOKABLN**	**TOKABLN**	**TOKABLN**

Introduction

This document has been written to summarize technical hints and Tips experienced by my own or Forum members in trying to recover their faulty Neuron.

Because Hartmann doesn't exist any-more, there is a strong need to fix problems by yourself if you don't like to put your Neuron to waste or to scrap it.

Some of the problems that need to be fixed can only be done by opening the Neuron. I advise you to read the following section (in red) carefully. If you don't accept this leave your fingers from your Neuron and try to find someone who is familiar in repairing electronically devices.

17.05.2007 - TOKABLN



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2 Were to find Software Updates

The latest software and all existing documentation for the Neuron can be found here:

http://neuron.audiodsp.net/

3 How to install USB Maintenance Update via MIDI

(based on original thread from tokabln; 05.06.2006)

If you are connecting a USB<>Ethernet Adapter (see "Ethernet Adapter" topic in this document) to your Neuron and experiencing problems (network not working or the FTP up-/download function doesn't work as expected), it's possible that the latest USB Maintenance patch isn't installed at your Neuron. So, here's a procedure how to install the patch.

First you need to download the **MP_USB002** (Neuron USB Service-Pack 2) Patch from here:

http://neuron.audiodsp.net/neuron_mp_USB002.mid.zip

It's a Midi file which needs to be transferred to your Neuron. To do so use for example a sequencer software e.g. Cubase and enter into the following steps:

3.1 Transmitting a bulk dump to your Neuron

1. Make sure the MIDI track with the System Exclusive data is routed to the Neuron (you may want to check your device's documentation to find details about which MIDI channel should be used, etc.). Hint... you should switch off all other midi devices that are not needed.

2. Solo the track at your sequencer. (This might not be necessary, but it is a good safety measure.)

3. Make sure the Neuron is set up to receive System Exclusive data (often, the reception of SysEx is turned off by default). This was not true for my Neuron, because normally the Neuron processes the incoming data autonomously.

4. I setup my Neuron to a SysExID of 7F (omni) – see Neuron's „Basic Setup" Menu.

5. Start your sequencer to play back the data.

6. The Neuron will automatically receive the data and after round about 1 minute (you can see the progress at the main display) the Neuron will reboot on it's own.

7. Manually reboot your Neuron to make sure everything works as expected.

Please consult the Neuron handbook and read the chapter "So empfangen Sie SysEx-Daten" / "How to receive SysEx Data". You should also read the appropriated section within your sequencer's manual, to make sure what you need to do. The above steps are taken and slightly modified from the Cubase SX3 manual "MIDI_Devices_and_Features.pdf"

In case of a missing Sequencer you might using **MIDI-OX** http://www.midiox.com/ (a free Windows MIDI Monitoring Tool with SYSEx capability) to transfer data to/from your Neuron.

4 Ethernet Adapter

(based on original thread from tokabln; 25.02.2008)

Because you won't be able to get an original Hartmann USB adapter... I use the following one from Belkin "**Belkin F5D5050 Networking-Ethernet-Adaptor**" which was also recommended by Hartmann and it works fine for me.

But this one is no longer produced by Belkin so you need to find some offerings at ebay or Amazon (US).

If you could manage to get such a device you first need to install the "Maintenance Pack USB002" to your Neuron (if not already done in the past)... otherwise it will not work.

It's a Midi file which needs to be transferred to your Neuron.

To do so see previous chapter „**How to install USB Maintenance Update via MIDI**" and chapter „**Transmitting a bulk dump to your Neuron**".

Afterwards you're Ethernet adapter should work at your Neuron and depending on your network setup you

a) might need a Crosslink Ethernet Cable to connect it directly with your Computer. Such a cable should be available from your local PC Dealer.

   or

b) connect you're Neuron with/to your computer network

To communicate with your Neuron your computer's Ethernet port needs to be setup (example computer network setup):

Computer setting example
IP Address : 192.168.001.001
Netmask : 255.255.255.0

The Neuron has the following IP Settings by default (if not changed in the past):

Neuron setting example
IP Address : 192.168.001.024
Netmask : 255.255.255.0

Make sure, that the IP Address of your Neuron correlates with your computer network settings (above is just an example).

The Neuron settings can be checked / changed by pressing the "**Basic Settings**" button and afterwards you need to use the Joystick to scroll down to "**IP Address**"

Please consult your Neuron handbook for more information.

5 How to open your Neuron

- To open the Neuron, the following tools are needed:



  - Phillips screwdriver PH 2 x 100 or Phillips screwdriver PH 1 x 80
  - Allen wrench Size 3
  - Allen wrench Size 2
  - Optional jaw wrench to remove Circuit Boards

- Used Screw Types (Picture shows Cover screws only).



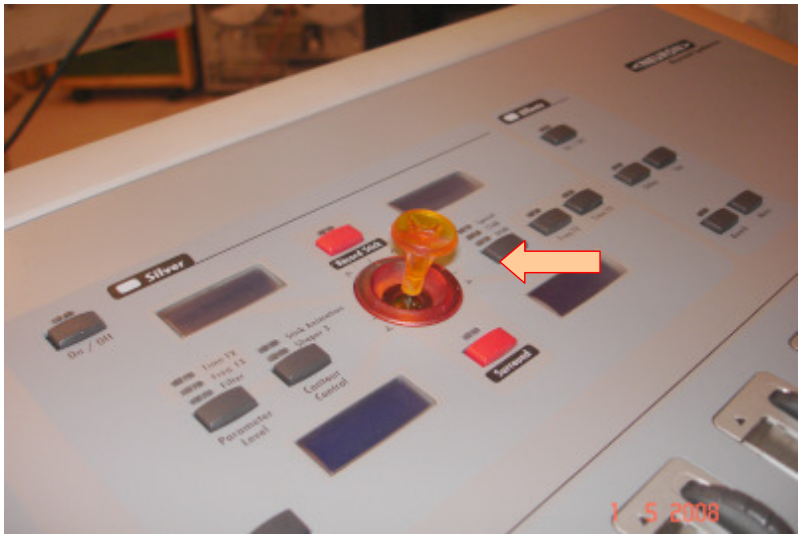
  - 7 x Phillips Screw M3 x 6
  - 7 x Self-Cutting Screw 3.5 x 10
  - 5 x Allen Screw M4 x 30
  - 3 x Allen screw M3 x 10

Hint: If you do plan to remove any Circuit Board I advice you to use a Wrist strap (for example from 3M) to avoid electrostatic discharges against the boards.

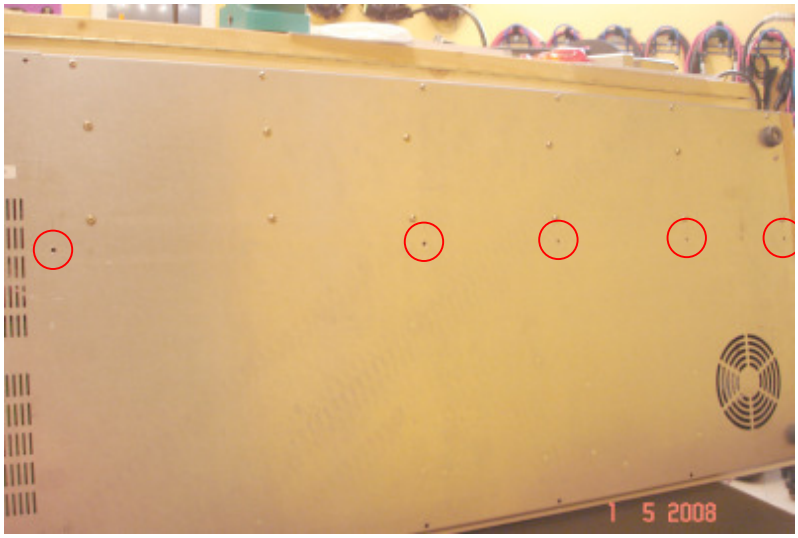


- Disconnect the Power cord and any other connection from your Neuron.
- Ensure the device is set up in a stable, level position on a stable workbench with enough space to work at.

  Hint: Before opening the Neuron I advice you to carefully remove all the fragile orange Sticks (can be done by turning them counter-clockwise and lifting at the same time)



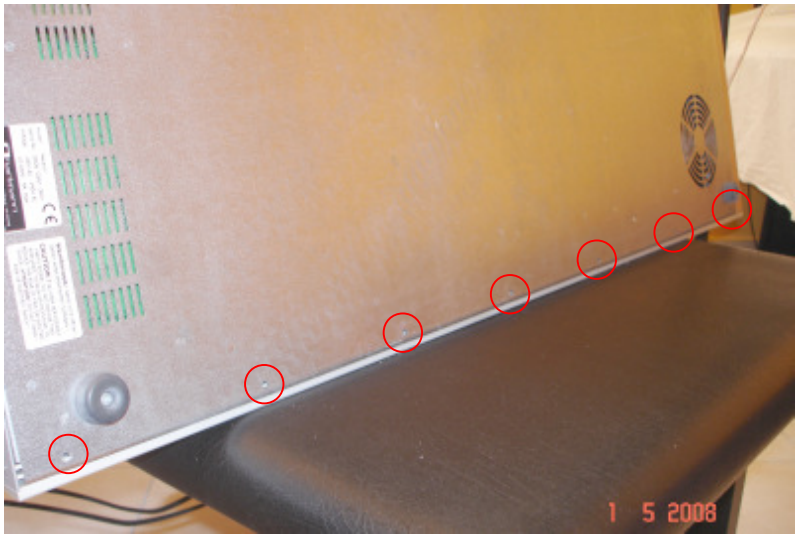
- Now let's start opening the Neuron as follows
  (make sure that no objects make their way into the device interior when it's open).
- Lift your Neuron by 90° so you can see the bottom plate.
- First remove the 5 Phillips screws (marked with a red circle) from the bottom plate.



- Then remove the 2 Phillips screws at the upper left corner.



- Now remove all 7 Self-Cutting screws located at the bottom.



- Put your Neuron back into it's normal position
  (take care to hold the top cover with your hands so it want open by itself right now).

- Now remove the wooden panel by removing the 5 Hexagon socket screws
  (using an "Allen wrench Size 3").





- Then remove the 3 Hexagon socket screws located at the left side (using an "Allen wrench Size 2").



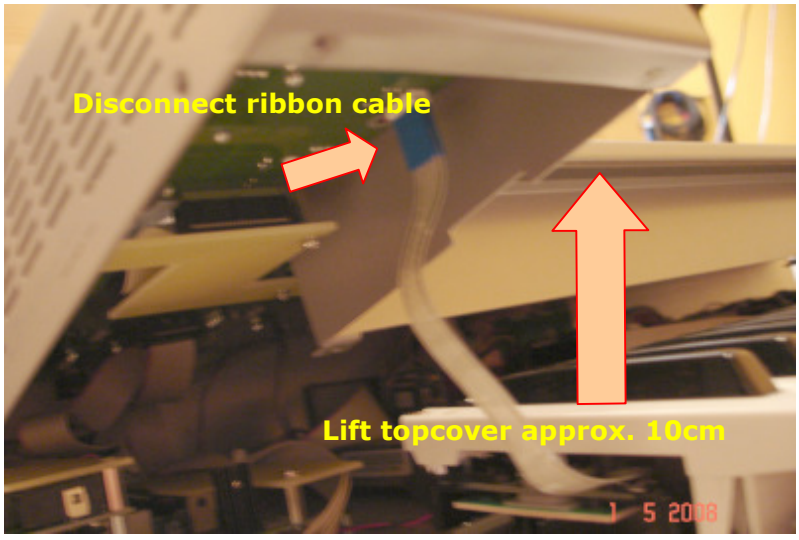
- Until all screws are removed carefully move the top cover of your Neuron to the left side (approx 2-3 cm).



so all the left side connectors are no longer covered by the left metal plate.



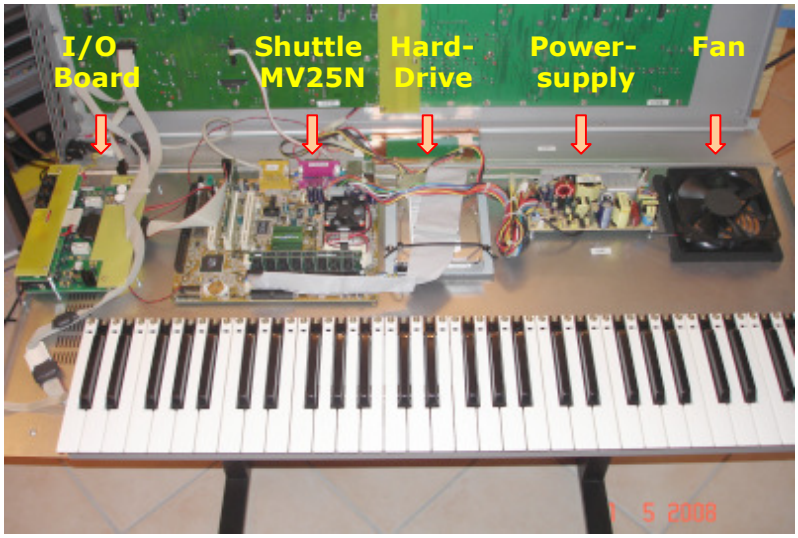
- Carefully lift the top cover about 10 – 15 cm and disconnect the blue connector of the keyboard ribbon cable (located at the left side) from the upper installed PCB.



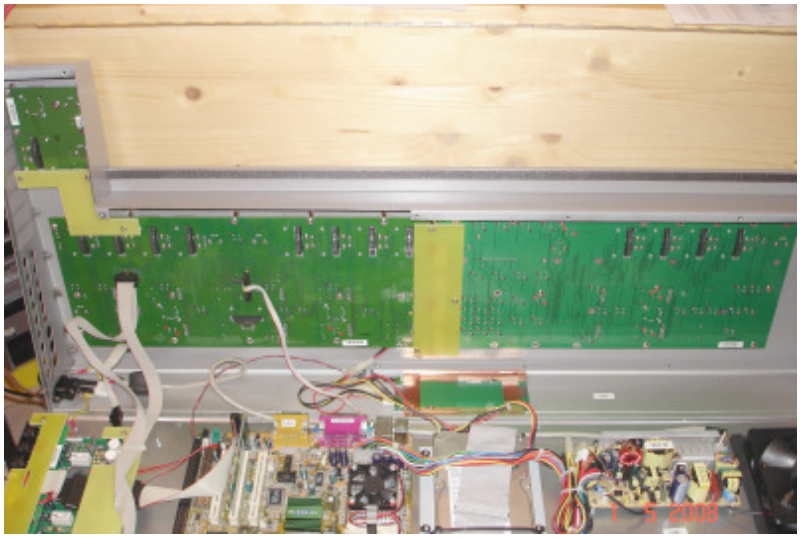


- Now lift the top cover (don't lift it more then 90°, otherwise you will probably damage some wired connections) and make sure that it doesn't crash back.

- The following picture will show you the installed parts at the base plate.



- The next picture shows you the upper PCBs installed at the top cover.



- Now return to the previous chapter from where you came from.

6 New Neuron KB Final HD Image

(Based on the original thread from Neotrope; 22.03.2009 „New Neuron KB Final HD Image Posted")

Hint: During the installation of a new Hard Drive based on below Image you do need to enter the serial number from the keyboard case bottom (it's a 12 digit number). If you don't have such a serial number for your keyboard it doesn't make sense to build a new Hard Drive as described below, because it will not work for you.

- **What's needed... short abstract:**

  Neuron OS Image File (**build by Christopher Simmons aka Neotrope; thanks for that**). This image contains the final Neuron OS 1.5 and the latest Sound-/Modelset Rev4. It's available as download using the following link:

  http://neuron.audiodsp.net/ see **<Data> Section** and find a link named:
  "**Neuron Internal Harddisk Image for use with Acronis 9" 1.8GB, .RAR file**

  Because this image isn't serialized it should work on every Neuron except you don't have a serial number from your keyboard (see above hint).

- A program like **WINRAR** which is able to handle/unpack **.rar** files
  "**Acronis True Image 9.0 / Acronis True Image Home 9.0**" or higher
  One 80 GB PATA Hard Drive to restore the downloaded Image.
  Neotrope mentioned to use the following Hard disk:

  Western Digital 80GB IDE, Model #: WD800JB
  8.9 ms; U-ATA100; 7200RPM; 8MB Cache

  because his Image is based on that. This one can be purchased for example from newegg.com (U.S. folks) using Item #: N82E16822144122 or from Amazon.

- **What's to do...** (more or less Neotropes original thread) which can be found here:
  http://www.surroundsfx.com/forum/viewtopic.php?f=2&t=538

- Neotrope's compressed disk image of the final (Oct/Nov 2008) Schlafhorst "final" disk image for the Neuron keyboards is based on OS 1.5, rev4 models, 80GB IDE/PATA hard drive. This is the raw, non serialized drive, which has not yet been "locked" to the particular keyboard in which it would be installed. So, once you replace this drive into your keyboard, you would need to go through the entering serial number for your keyboard, do hard reboot (see chapter 7 for more details), then it should work.

- **SPECS:**
  - disk image, compressed = Neuron80GB-OS15.rar
  - disk image, uncompressed = Neuron80GB-OS15.tib

- It's an Acronis True Image (Acronis 9, Home Edition) disk image; you would need Acronis Home 9, 10 or comparable to open and do a restore. The built-in wizard in the home edition is simple, you pretty much click the second menu item "restore" find the uncompressed image (see below) image on your HD, then click next, use defaults, and it should work.

- Acronis True Image Home Edition:
  http://www.acronis.com/homecomputing/products/trueimage/

- The file on this board is a .rar image, which is common on servers, and is better than .zip (in my opinion), and basically you can uncompress it using WinRAR (Windows, Linux, MacOSX), here: http://www.rarlab.com/download.htm

- When you use WinRAR it will show the following specs for the rar image are:
  * total length 2,362,286,080 (unpacked file)
  * packed length 1,801,781,442

- You can "burn" the unpacked disk image using a suitable IDE/PATA 80GB hard drive from Seagate (also used in the past by Schlafhorst), or from Western Digital e.g.:

- Western Digital Caviar SE WD800JB 80GB 7200 RPM 8MB Cache IDE Ultra ATA100 Hard Drive – OEM. This one can be purchased for example from newegg.com (U.S. folks) using Item #: N82E16822144122 or you do a search at Amazon.

  WD INFO PAGE FOR DRIVE:
  http://www.wdc.com/en/products/Products.asp?DriveID=32

- Seagate Barracuda 7200.10 ST380215A 80GB 7200 RPM 2MB Cache IDE Ultra ATA100 Hard Drive – OEM. This one can be purchased for example from newegg.com (U.S. folks) using Item #: N82E16822148236 or you do a search at Amazon.

- Neotrope used the WD version, simply because it has a larger cache, and they're faster.

You may want to use Seagate if you want a perfect physical clone to the Schlaforst drive. Either should work fine.

TIPS:

1. when swapping the drive in your Neuron KB, check for the IDE "pin" assignment, which is a little plastic nubbin ("jumper pin") which goes onto a little tiny bit of wires in the section between the power cable and IDE cable connectors. The motherboard for the Neuron will be looking for the drive either as a master/single, or cable select setting, or no pin. So, check the drive you take OFF the keyboard mounts, and see if it has a pin setup of "master/single" or there is no pin at all, which the two most likely settings are. You can also look at the printed "legend" on top of the new drive which shows the pin assignments. Basically, if the plastic piece is on the "master pin" you should do that on the new drive, too (or if unclear, start with this setting); or if no plastic pin setting, remove it from your new drive as well. If the drive won't boot up, you would likely check the pin assignment first. Setting it to "master/single" is best bet in most cases (it doesn't come this way from WD, you need to move the little plastic bit over on the pins using fingernail or tweezers... you will understand when you see it, if this is new to you). Look at the drive; you might need to pull off the jumper pin and to set it as a master drive.

   WD IDE INSTALL GUIDE (for PCs) PDF:
   http://www.wdc.com/en/library/eide/2079-001026.pdf
   INFO ON WHAT THE HECK PINS ARE PDF:
   http://www.wdc.com/en/library/eide/2579-001037.pdf

2. if you plan to setup a drive as a storage backup copy for rainy day, or to include with the sale of a Neuron to somebody for proof there is a backup option for longevity, you should be aware that long term storage of hard drives (oh 2.5-3.5 years, let's say) may, in fact, cause the drive mechanisms to lock up or freeze from lack of movement, internal lubrication and whatnot. This has become an issue with folks using HDs to do long term backup in lieu of DVD/Blu-ray since the cost per GB is now cheaper with SATA HDs than anything else (I saw a 1TB drive the other day for $79!). SO, what this means is that, if you're paranoid, you would likely do what I do and use a bit of masking tape or blue painter tape, and put a piece on the top of your drive with the date you burned an

image... then, pull out the drive in 2 years, and the run a disk check scan using the Western Digital utilities, and an external USB-to-IDE drive connector (lets you scan the raw drive without putting it into a PC): example unit:
http://www.newegg.com/Product/Product.a ... 6812156101

- The above is also useful for burning the backup image to the HD in the first place!
- To run a "scan" of your Western Digital HD every couple of years, you would use the Western Digital "data lifeguard" application here (note: WD has specific versions for IDE/PATA vs SATA, or external devices):

  http://support.wdc.com/product/download.asp?groupid=502&lang=en

- Start the Restore process and if this has been finished you can take the new Hard Drive and install it to your Neuron. To do so proceed with chapter 7.

6.1 Like to clone your own Hard Drive ?

- You could also clone your original Hard Drive by using a second Firewire <-> PATA or USB <-> PATA Adaptor connected to a second (empty) Hard Disk with the same capacity (or greater), but this depends on the Backup/Restore program you use. For example Acronis is able to do so and I chose this option, because there wasn't a downloadable Image File available at the time I wrote this document.

- I build my own image by connecting my original Neuron Hard Disk to my Windows PC using an external FireWire<->PATA adaptor (while a USB<->PATA adaptor will also work) and using „**Acronis True Image 10**" installed at my Windows PC.

- The Image File needs to be transferred to a new Hard Drive and I advice you to use a 80 GB PATA Hard Drive to restore the downloaded Acronis Image.

- Connect your Hard Drive to your Firewire<->PATA or USB<->PATA Adaptor and restore the Image to the new Hard Drive.

- After I build my own new Hard Drive, it doesn't boot my Neuron, because the Gentoo Linux (which is used by the Neuron) doesn't know from were to boot and I need to tell him.

- To do so it might be possible to use any Linux. I used a historical ones from here:

  http://adelie.polymtl.ca/releases/historical/x86/1.2/livecd

  and I downloaded the 135MB file called: ***gentoo-i686-1.2.iso***

  - I decided to use the Gentoo version, which is also used at the Neuron, to be most compatible. I'm not sure if a newer release will also work, but I assume it will. The reason why I assume this is, we only use a command called **grub** to tell the Neuron OS from were to boot and this should also work using a newer version or another Linux. Anyhow...

- Transfer the downloaded Image onto CD using your favourite Burning Program.

- Use an old PC (486 is okay) with an installed CD ROM Drive and connect the new Hard Drive (you've just created with the Image) to the PC. Take care, that the Hard Drive is the only ones installed and that it is the Master Drive.

- Make sure that the PC will use the CD ROM as first Boot Device (probably you need to change the BIOS settings) and then boot the PC from CD ROM.

- The downloaded Gentoo will ask you a view times to press <Enter> or to type in a number to choose the used Keyboard Type (for example German) connected to your PC.

- If everything works fine the last <Enter> will activate a console and will show the Linux Command Prompt which is **#**.

  You now have Linux root access and we are ready to do the last needed steps.

- It's time to configure the Bootloader **grub** (**G**rant **U**nified **B**ootloader), which is used at the Neuron Hard Drive to boot the Neuron OS (Gentoo Linux). Type **grub** at the prompt (**#**) and press <Enter>. Now enter the following grub commands always followed by <Enter>:

  root (hd0,0)
  setup (hd0)
  quit

- Each of the above commands will show some messages... these should always state that the job has been done successful.

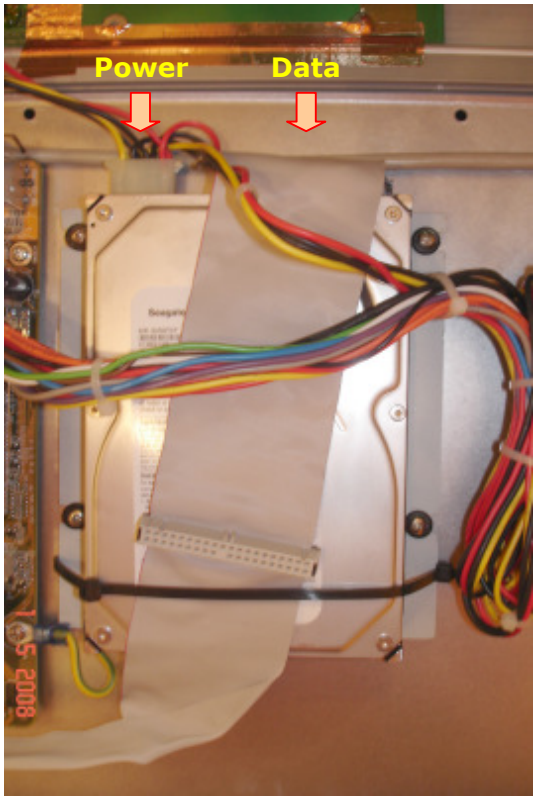
- That's it... all you need do to is... Power down the old PC, install the Original or your new Hard Drive into your Neuron and it should work as ones before. Store the other Hard Drive as Backup Drive.

7 How to exchange a faulty Hard Drive

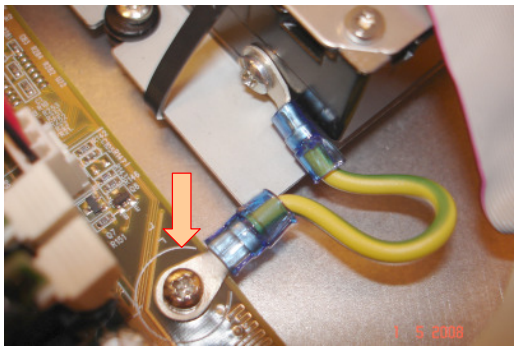
(based on original thread from tokabln; 18.04.2008)

Short abstract of what to do:
Take out the old HD and put in your replacement; boot up; enter your serial from keyboard case bottom (it's a 12 digit number), enter date and time, reboot.
If you don't have the serial number for your keyboard, this will NOT help you!

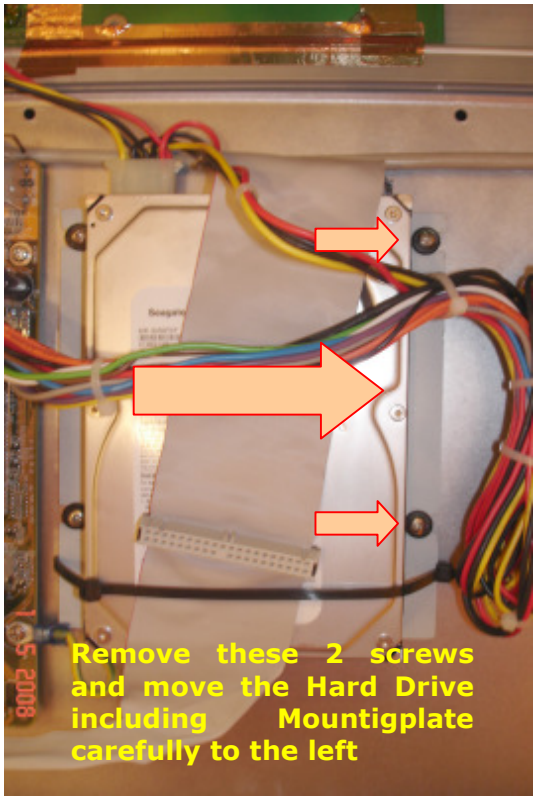
- Buy a new Hard disk as described in Chapter 6.
- Then proceed as described in chapter "**How to open your Neuron**".
- Disconnect all cables from the old installed hard drive (power / data).



- Disconnect the Ground jumper (short green/yellow jumper) which goes directly to the Hard Drive and comes from the Main board.



- Unfasten the Hard Drive Mounting plate (I have done this at the right side only) and move the Hard Drive to the right side.



- Safely remove the old Hard Drive including the Mounting plate from the open Neuron.
- Unfasten the Hard Drive from the Mounting plate and also un-mount the attached Ground jumper from the old Hard Drive.
- Set the jumper of your new Hard Disk so that it will be the Master drive (if not already done).
- Mount your new Hard Drive in reverse order as previously described (take care that the Ground jumper is properly attached at both sides (Main board and Hard Drive).
- Take care that the ribbon cable is attached to the hard drive so it can't move any longer. I used two cableties (see above picture).
- Reassemble your Neuron.
- Reconnect Power chord.
- Switch on your Neuron.
- Your Neuron should now show the "***Welcome to <Neuron>***" message and boot normally. If not, power down the neuron immediately and check your work.
- After doing all the internal tests the Neuron should show the "***Initialize [o]***" message. After a short time you are prompted (by the Main LCD display) to enter your Neuron's Serial Number which can be found at the bottom of your Neuron (it's a 12 digit number).

- Use the Numeric Keypad at the Programmer section to enter the requested serial number and press Enter (by pressing the knob next to the Main Display).

  (**if you don't have the serial nbr. of your keyboard, you will struggle here!**)

- Now you will be asked to enter Date and Time. Again use the Numeric Keypad at the Programmer section to enter the requested data and press Enter (by pressing the knob next to the Main Display).

- Your Neuron should now finish the initialization and you are ready to use it as before your Hard drive fails. Neotrope mentioned, that you might need to do hard reboot.

- (Hint: My support doc is stating, that the OS will come up after entering the serial number from the bottom of your keyboard case; on Neotrope's unit it would just keep looping asking for the S/N; So after he did the S/N procedure from front panel, and completed it, he had to do a hard reboot and then it came up perfectly. Maybe this is also needed at your unit.)

8 How to exchange BIOS battery

(based on original thread from Sylvain Kepler; 16.08.2007)

- The installed PC main board uses a CR2032 battery type (Li-Mn 3V) to hold the BIOS settings during Power off period. The only occurance to change the battery might be...
    - your Neuron won't boot any longer. This can be a hardware defect
    - that the BIOS settings are no longer valid because of an uncharged battery

- To keep BIOS settings vital during battery exchange I advice you to use a self-made Battery Backup Tool which delivers additional 3V (for example a battery holder soldered with 2 wires and each attached with a little clip (or anything else to grip the nodes at the lithium cell emplacement) at the other end (one @ +, the other @ gnd) so you input 3V in parallel to the installed lithium battery during it's replacement.

8.1 How to build a Battery Backup Tool ?

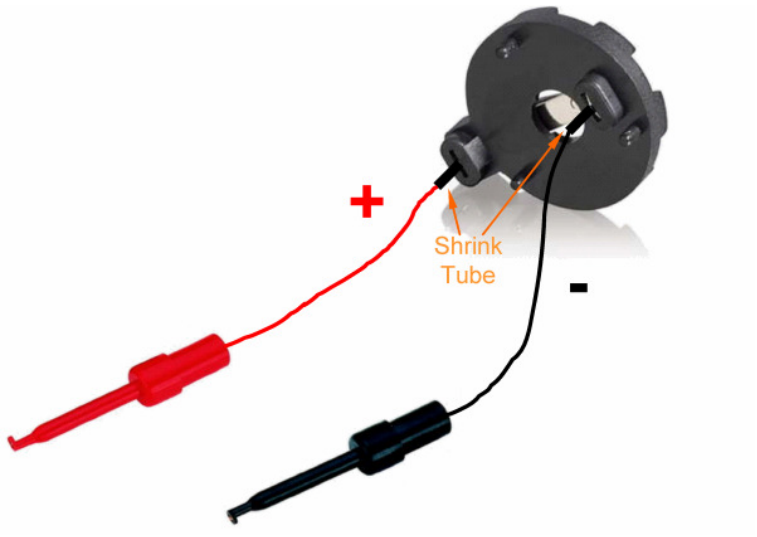
Following parts from Radioshack (US) or similar are needed:

2 pcs. of CR2032 Battery (Radioshack Catalog Item#: 23-162)
- one to replace the Board (BIOS) battery
- one to source the board during the replacement action

- 1 pcs. of CR2032 Battery Holder (Radioshack Catalog Item#: 270-009)
- 1 pcs. of Mini-Clip Jumper Wires (Radioshack Catalog Item#: 278-016)
  It should contain a black and a red clip including already attached cable, but I'm not sure. So if no wires are already attached you additionally need
  - 1 black stranded wire 31 AWG / 0.08mm² or a similar wire that fits to the black clip
  - 1 red stranded wire 31 AWG / 0.08mm² or a similar wire that fits to the red clip
- 2 pcs. of Shrink Tube (that fits with the wires and Battery Holder leads) to cover the soldered leads of the Battery Holder
- 1 Solder Iron and some solder
- 1 Hot-Air gun

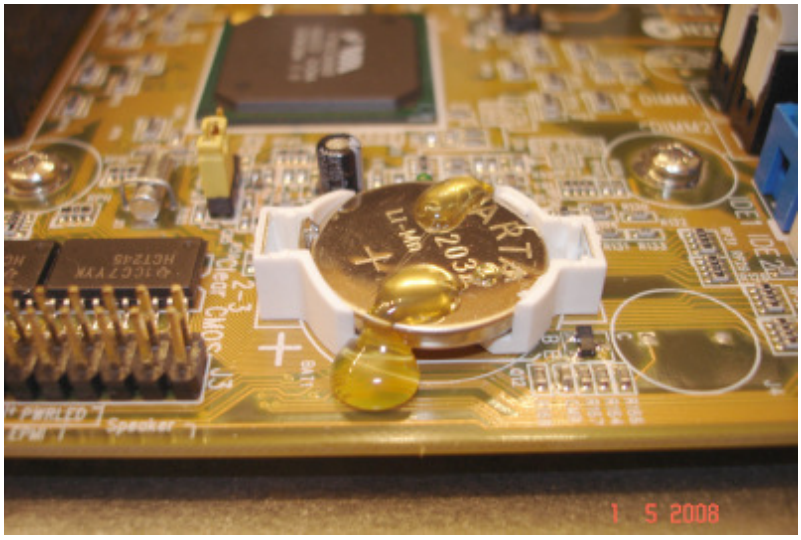
- Solder one side of the red wire to the clip and the other side to the Battery holder. Don't forget to place the Shrink Tube over the wire before soldering. Do the same with the black wire. After soldering move the shrink tube towards the metal leads of the battery holder and shrink it using a Hot-Air gun.

- It should look like the following picture:



8.2 How to connect the Battery BackupTool and to exchange BIOS Battery

- Proceed as described in chapter "**How to open your Neuron**".
- Locate the BIOS Battery at your Neuron Board (see following picture)
- **First carefully remove the glue from the battery not from the PCB because this may damage the Board**



- Connect the clips of your tool to the right connectors of the Neuron Battery holder (the red one @ +, the other @ gnd). **Take care about the polarity (and that they are connected very well... so not disconnecting by themselves when removing the BIOS Battery)**
- Place a CR2032 Battery to your tool **(take care about the polarity).**
- Now you can remove the Board Battery and replace it with the new Battery **(take care about the polarity and that it is fitted correctly)**.
- If this has been done remove the tool in reverse order as described above and your BIOS settings are kept.
- Re-assemble your Neuron.
- Reconnect Power chord.
- Switch on your Neuron.
- Your Neuron should show the "***Welcome to <Neuron>***" message and should boot normally. If not, power down the Neuron immediately and check your work.
- After doing all the internal tests the Neuron should show the "***Initialize [o]***" message.
- If you're Neuron won't boot, then the BIOS setting has probably gone. Proceed as described at "**What needs to be done if BIOS settings are lost**" in this document.
- Your Neuron should finish the initialization and you are ready to use it as before you've changed the battery.

9 What needs to be done if BIOS settings are lost

(based on original thread from slava; 16.08.2007)

- When you start your Neuron and it shows the "***Welcome to <Neuron>***" message but didn't boot up it might be that the BIOS setting of your Neuron is gone because of an uncharged BIOS backup battery.

- So the following needs to be done if the BIOS settings are lost... e.g. your battery is uncharged and you didn't realize this or you haven't used the Battery Backup Tool (see chapter 8.1) during a regular battery exchange to prevent BIOS setting loss

- I recommend you to exchange BIOS backup battery after two (2) years latest. If you don't you might loss BIOS settings.

- Proceed as described in chapter "**How to open your Neuron**".

- Connected a monitor to the VGA connector and a keyboard to the keyboard connector of the main board. Now you are able to change BIOS settings after Power On.

- Connect Power chord to the open Neuron. **Take care: high voltages are now reachable more then easily while the Neuron is open.**

- Switch on the Neuron while it's open and press the "***DEL***" key immediately (on the temporarily attached keyboard), or when the message "***Press DEL to enter SETUP***" is displayed to enter BIOS setup.

- If you press the key too late the monitor will show a message like: "CMOS Failed floppy drive not found". Then switch off and on again and try again.

- Now load the Default BIOS settings first, because these are the most reliable one for the Synth. Afterwards following changes must be done at:

  BIOS Settings - Standard CMOS Feature Menu:
  Drive A [None] / Drive B [None]
  Halt on [No Errors]

  BIOS Settings - Advanced BIOS Feature Menu:
  First Boot Device [HDD-0]

- Now you need to save your BIOS settings and your Neuron should be able to boot from the installed Hard Drive.

- Switch off Neuron and disconnect the Power chord carefully (don't touch the power connector pins inside the Neuron).

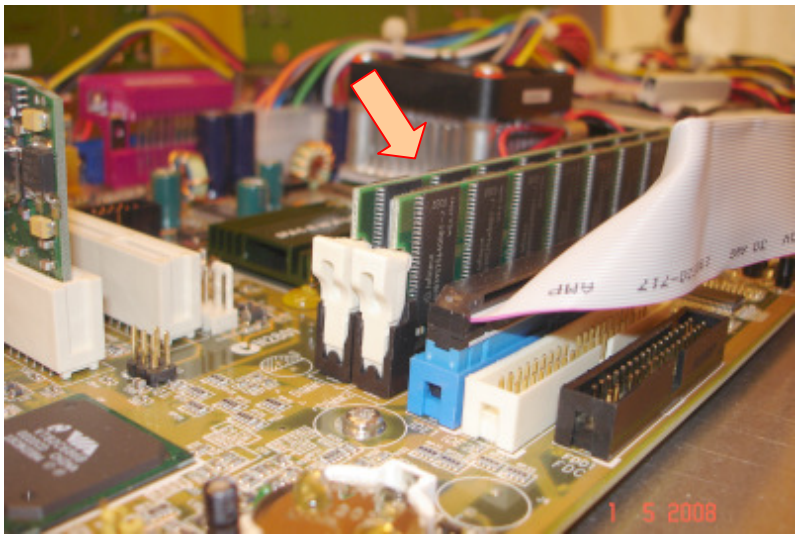
- **BIOS setting is done.**

- Return to the previous chapter where you came from.

10 How to upgrade the RAM

- Proceed as described in chapter "**How to open your Neuron**".

- The Main board installed in your Neuron uses 168-pin DIMM PC-100 or PC-133 SDRAM (either will work, but don't mix). The Neuron will accept RAM sticks of 16,32,64,128,256 or 512 MB so the maximum is 1 GB. ALWAYS use a symmetrical RAM configuration (RAMs of the same size in both slots, i.e. 2*256mb). You should also make sure that you use high-quality RAM, like Kingston or Infineon, and if possible use CL2 or CL2.5 grade modules.



- Re-assemble your Neuron.

- Reconnect Power chord.

- Switch on your Neuron.

- Your Neuron should show the "***Welcome to <Neuron>***" message on his Main LCD display and boot normally. If not, power down the Neuron immediately and check your work.

- After doing all the internal tests the Neuron should show the "***Initialize [o]***" message on his Main LCD display.

- Your Neuron should finish the initialization and you are ready to use it as before your add more RAM.

11 Neuron hangs at the "Welcome to Neuron" message and is always doing a light show

(based on a request from tim71725084; starting at 21.05.2008 10:05)

Maybe the following tips will help you to solve the problem.

- Proceed as described in chapter "**How to open your Neuron**".
- Connect a VGA monitor to the Onboard VGA connector and also connect the previously disconnected Power cord. Be very careful.... high voltages are now reachable easily.
- Start your Neuron. If the following message is the last one which appears at your VGA monitor:

  PCI: Probing hardware on bus (00:00)

  then you might have a connection problem.
- Just check every cable connection by disconnecting and reconnecting them.
- This is also true for the connected PCI card. Please un- and replug this, too.
- Now start your Neuron again. If your Neuron now boots up and you get a message saying:

  .....
  Entering Runlevel 3
  Starting Neuron
  .....

  then your problem should be solved. Otherwise you may have a real hardware problem (probably a defect main board, PCI card or any other PCB – and I'm sorry but I haven't any idea or hint how to help here!)
- Switch off your Neuron and disconnect the Power chord carefully (don't touch the power connector pins inside the Neuron).
- Disconnect the attached VGA monitor.
- Reassemble your Neuron.
- Reconnect Power chord.
- Switch on your Neuron.
- Your Neuron should show the "***Welcome to <Neuron>***" message on his Main LCD display and should boot normally. If not, power down the Neuron immediately and check your work.
- After doing all the internal tests the Neuron should show the "***Initialize [o]***" on his Main LCD display message.
- Your Neuron should finish the initialization and you are ready to use it as before the problem occurs.

12 Neuron sound has lots of zipper noise and is played delayed

(based on a request from tim71725084 and a hint from neuronaut; starting at 28.07.2008 12:47)

Problem Description:

When you turn joysticks there is a long time lag while the variables change and the sound has lots of zipper noise or goes silent while the value "catches up". Same issue occurs while you play notes very quickly or using keyboard aftertouch – to summarize it seems to be that the system becomes overloaded with controller data.

Problem analysis:

To check if this is the fact connect your Neuron to your sequencer or a MIDI Tool like MIDI-OX (which can be found at the Internet) to check if it continually sends MIDI cc's (by using MIDI Monitor functionality of your sequencer or MIDI-OX). If this is true and one of the controllers is sending messages to the OS without using it by you, then the system might run out of memory. Especially aftertouch can be a problem and the stick controllers on some machines are known to be "verbose".

Now you need to figure out which controller is sending these messages and probably you are able to fix the problem by contacting an Electronic Repair Centre which may can help with the information's you've figured out. Following is a list of Controllers and there associated cc: numbers

cc: number	Description # 1	Description # 2	Controllername
B0 01 xx	Control #1	Moving upward	cc:Modulation
B0 02 xx	Control #1	Moving downward	cc:Breath
B0 03 xx	Control #2		
B0 04 xx	Control #3		
B0 08 xx	Blender		
B0 0C xx	Shaper #1 Section		Depth Knob
B0 0D xx	Shaper #2 Section		Depth Knob
B0 14 xx	Resynator #1 Section		Stick
B0 15 xx	Resynator #1 Section		Stick
B0 1E xx	Slicer Section		Depth / Spread Knob
B0 1F xx	Slicer Section		Rate Knob
B0 23 xx	Resynator #2 Section		Stick
B0 24 xx	Resynator #2 Section		Stick
B0 31 xx	Mod Section		Amount Knob
B0 34 xx	Silver Section		Stick
B0 35 xx	Silver Section		Stick
B0 46 xx	Shaper 1/1		Wheel
B0 47 xx	Shaper 1/2		Wheel
B0 48 xx	Shaper 1/3		Wheel
B0 49 xx	Shaper 1/4		Wheel
B0 4A xx	Shaper 2/1		Wheel
B0 4B xx	Shaper 2/2		Wheel
B0 4C xx	Shaper 2/3		Wheel
B0 4D xx	Shaper 2/4		Wheel
B0 6E xx	Shaper 3/1		Wheel
B0 6F xx	Shaper 3/2		Wheel
B0 70 xx	Shaper 3/3		Wheel
B0 71 xx	Shaper 3/4		Wheel
B0 72 xx	Shaper 3		Depth Knob
E0 xx xx	Control #1		Pitch Shift left / right

13 Neuron OS and Soundset

The Neuron uses a:

Gentoo gnu/linux
Kernel 2.4.19-gentoo-r7 dated 18.10.2002

The installed Hard Drive is partitioned as follows (according to Acronis True Image 10):

Device	**Mountpoint**		**Partition**		**80GB HD**	**40GB HD**
/dev/hda1	/mnt/std	active	pri. Partition 1	ext3	517,7 MB	517,7 MB
/dev/hda2	/root		pri. Partition 2	ext3	15,69 MB	15,69 MB
/dev/hda3	swap		pri. Partition 3	swap	512 MB	512 MB
/dev/hda4	extended		Partition 4		73,52 GB	36.7 GB
/dev/hda5	/var		log. Partition 5		73,52 GB	36.7 GB

Using a Hard Drive with more capacity e.g. 120GB Hard Drive, the last partition will be partitioned using the remaining capacity.

I'm not sure whether the installed motherboard will handle a Hard Drive greater then 128GB and for me it doesn't make sense to have such high capacity... because the installed Model- and Soundset is around 2.2GB in size.

13.1 Directorystructure:

Partition 1:

```
/
|_....                                          Some other directories
|___etc/                                        Directory /etc
|       |_.serno.    User Access Mode set to "0000"   holds Neuron serial number
|       |
|       |_ ….
|       |
|       |_passwd                                UserDB
|       |_passwd-                               UserDB backup
|       |
|       |_ ….
|       |
|       |_shadow
|       |_shadow-
|_ ….                                           Some other directories
```

Partition 2:

```
/.bash_profile                                  contains only this file
```

Partition 5:

```
/home/neuron/                                   Directory /home/neuron
            |___NeuronDB/                       Directory (holds all data)
            |           |_Models/               Directory
            |           |_SetUps/               Directory
            |           |_Sounds/               Directory
            |           |_Temp/                 Directory
            |           |_ModelNames            File
            |           |_SetupNames            File
            |           |_SoundNames            File
            |           |_neuron.globals        File
            |
            |_________bin                       Directory
            |           |_neuron                Neuron OS ? (executable)  1.1 MB
            |
            |_________ftp/                      Directory
            |           |_FromNeuron/
            |           |           |_Models/   Directory
            |           |           |_SetUps/   Directory
            |           |           |_Sounds/   Directory
            |           |           |_Software/ Directory
            |           |
            |           |___ToNeuron/
            |                       |_Models/   Directory
            |                       |_SetUps/   Directory
            |                       |_Sounds/   Directory
            |                       |_Software/ Directory
            |
            |_@neuron                           Link to ./bin/neuron
```

14 Passwords

Admin User : root Pwd: **?**
Normal User : neuron Pwd: neuron

15 Neuron Serial Number when using an Image File

If you use an Imagefile coming from another Neuron rather then the one you own, you probably need to change the serial number in the above mentioned file… otherwise your Neuron won't boot. If you use the above mentioned Acronis Image there is no need to change the Serial Number, because this Image isn't serialized, so you can stop here, otherwise please try the following.

The Serial number of the Neuron is stored in a file called **.serno.** (see chapter „**Directorystructure**").

Because the Neuron uses Linux as OS normally all files do have User Access Modes set to for example "0755" but this file has **no** User Access Mode set which means the User Access Mode is set to "0000". I'm not sure what happens when you change the Mode to "0600" as root to be able to change the content.

And I'm also not really sure if this will work as expected, because I didn't have a chance to test with another Neuron so far.

16 Enter Neuron Serial Number when using Acronis Image File or a new Hard Drive bought from Schlafhorst.

If you use the above mentioned Acronis Image from Neotrope or a new Hard Drive bought from Schlafhorst you will be asked to enter the Serial Number of your Neuron after you installed the Hard Drive and boot your Neuron. So here is how it works:

- When you boot your Neuron it should show the "***Welcome to <Neuron>***" message and boot normally.
- After doing all the internal tests the Neuron should show the "***Initialize [o]***" message. After a short time you are prompted (by the Main LCD display) to enter your Neuron's Serial Number which can be found at the bottom of your Neuron (it's a 12 digit number).
- Use the Numeric Keypad at the Programmer section to enter the requested serial number and press Enter (by pressing the knob next to the Main Display).
- Now you will be asked to enter Date and Time. Again use the Numeric Keypad at the Programmer section to enter the requested data and press Enter (by pressing the knob next to the Main Display).
- Your Neuron should now finish the initialization and you are ready to use it as before your Harddrive fails.
- (Hint: This support doc stating, that the OS will come up after entering serial number from bottom of your keyboard case; on Neotrope's unit it would just keep looping asking for the S/N; So after he did the S/N procedure from front panel, and completed it, he had to do a hard reboot and then it came up perfectly. Maybe this is also needed at your unit.)

17 Mainboard

Hartmann chose a Micro ATX Board from Shuttle:

Spacewalker Mainboard
MV25N
VIA chipset PLE133T

The board offers two 168-pin DIMM slots to support up to 1GB of PC100 or PC133 compliant SDR SDRAM modules. The board is a Spacewalker MV25N PLE133 µATX. There is also another compatible version called PLE133T. The main board will get the needed voltages via a 20-Pin ATX power supply.

18 CPU and CPU Cooler

(based on original thread from bluecost; 18.01.2007)

CPU is marked "SL656 1200/256/100/1.5" which is a Tualatin core Celeron, at 1200MHz.

The CPU cooler is a generic type, 37mm height above CPU including fan. Take care when trying to exchange that because there is very little clearance between the CPU cooler and the low edge of a PCB installed above. (max. clearance above the CPU is probably around 40mm).

Using a higher one may short-circuit the above display board when the Neuron is reassembled. This may lead to strange characters being displayed or even damaging the board (worst case).

19 Unit Cooler

The large fan is a 120mm NMB 24V fan, but it's only being run at 12V (presumably to quieten it). It is still fairly loud. There are a number of very quiet 120mm replacement fans available that would be quieter, but with correspondingly lower airflow.

Technical Details of original installed Fan

Brand	: NMB Technologies
Part / Model	: 4710NL05WB50
Dimension	: 120 x 120 x 25 mm
Speed (RPM)	: 2550 RPM
Airflow	: 92 CFM (I assume less then 40 CFM at operating voltage of 12V based on the datasheet of the fan)
Noise	: 41dB(A) full speed
Voltage	: 24V DC (operating at 12V)

Anyhow I replaced mine with a Scythe SFlex 800 RPM 120 x 120 x 25 fan which costs roundabout 16 Euro:

Brand	: Scythe
Part / Model	: SFF21D
EAN Code	: 4560143268263
Dimension	: 120 x 120 x 25 mm
Speed (RPM)	: 800RPM
Airflow	: 33.5CFM
Noise	: 8.7dB(A) full speed
Voltage	: 12V DC
Bearing	: Fluid Dynamic

You probably need to solder the original connector to the new fan using shrink tube to cover the soldering points against shortage or you use one of the spare PC Connectors from the PSU to connect the new cooler.

20 Used Hard drive

By default it seems to be that different Hard drives are installed in the Neuron. The latest factory shipment seems to be using a 40GB Hard drives.

HDD's seen so far are:

- Exelstore ESJ640-000, which is 40GB, 7200 RPM (original installed at my Neuron)
- Seagate ST340015A, which is 40GB, 5400 RPM

A replacement unit that I received from Schlafhorst in previous days was a

- Seagate Barracuda 7200.9 3,5"
  ST3802110A, which is 80GB, 7200 RPM
  11 ms / UltraATA 100 / 2MB Cache

This one was originally set up with a jumper placed at "**Cable select**" location. If needed please set the jumper of the unit to be acting as "**Master Drive**".

The following one is a Hard Drive I used to build a Backup Drive which costs roundabout 40 Euro (at the time I wrote these lines). How I made this, see chapter "**How to build a new Hard Drive using a (existing) Image**".

- Maxtor DiamondMax 21 3,5"
  STM380215A, which is 80GB, 7200 RPM
  11ms / UDMA100 / 2MB Cache

21 Used Keyboard

(based on original thread from neuronaut; 25.09.2006)

Neuron uses a Fatar TP 9 keyboard. From what I know, this is a standard keyboard and you should be able to order a replacement from your local music dealer directly from Fatar.

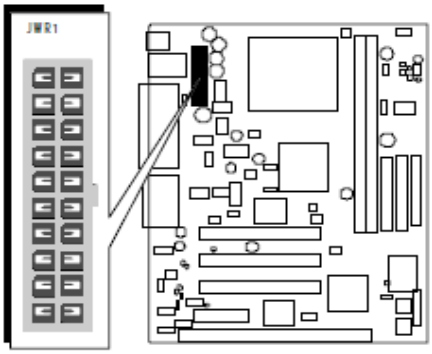
22 ATX Power Supply

The main board get the needed voltages via a 20-Pin ATX power supply.
If your Neuron won't power up you need to do some checks.

- Proceed as described in chapter "**How to open your Neuron**".

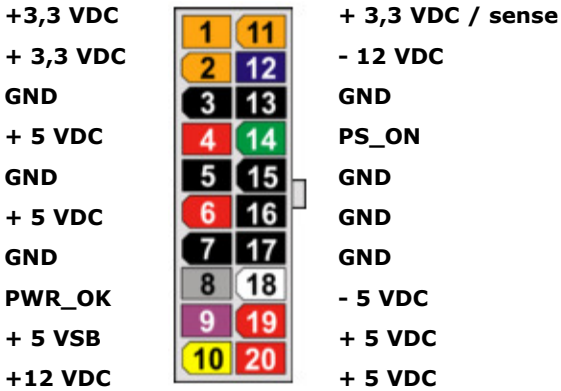
Check ATX power supply fuse first.
The fuse is directly placed at the power supply board (take a look at the right corner of the board. It's directly place left side a white 3-pin main power connector (with 2 wires) and hold in two metal carriers. To identify the fuse just take a look about a white cylinder with two metal ends directly connected into these (fuse) carriers (see also the last picture at page #38). Remove the fuse, and check it using an Ohm-Meter. If it's blown then read all relevant information's and replace it with a new one (with exact the same characteristics) otherwise replace the removed fuse. If everything went well (e.g. the fuse is not broken or has been exchanged by you) but your Neuron didn't power up now you need to check the power supply voltages

Check ATX power supply voltages
- Disconnect the ATX Power Connector from the Main board
  (ATX Power Connector location see below).



Now you should connect PIN 14 (typically a green wire) with GND (typically black wires) of the ATX connector. This needs to be done to make sure the power supply will start-up when you switch on the Neuron and therefore to be able to measure the voltages (as shown below)

ATX Pin assignment



Shown colours are typically used at ATX power supplies but may differ

- Connect Power chord to the open Neuron. **Take care: high voltages are now present and reachable more then easily while the Neuron is open.**

- Switch on your Neuron and measure the voltages at the designated pins shown above.

Voltage Tolerances

Outlet	Tolerance	Minimal Voltage in V	Normal Voltage in V	Maximal Voltage in V
+12 VDC	±5 %	11,4	12	12,6
+5 VDC	±5 %	4,75	5	5,25
+3,3 VDC	±5 %	3,14	3,3	3,47
–12 VDC	±10 %	–10,80	–12,00	–13,20
–5 VDC	±10 %	–4,50	–5,00	–5,50
+5 VSB	±5 %	4,75	5	5,25

The measured voltages must meet the above table and needs to be seen when the ATX Power Connector is disconnected (so called off-load voltage) as well as when it's connected to the Main board. If you find something wrong... the power supply is probably defect. In such case I recommend to ask a person who's familiar in repairing this.

If everything went well, but the Neuron won't power up... then probably the Main board has gone. This might be related to a so called "capacitor plague" problem.

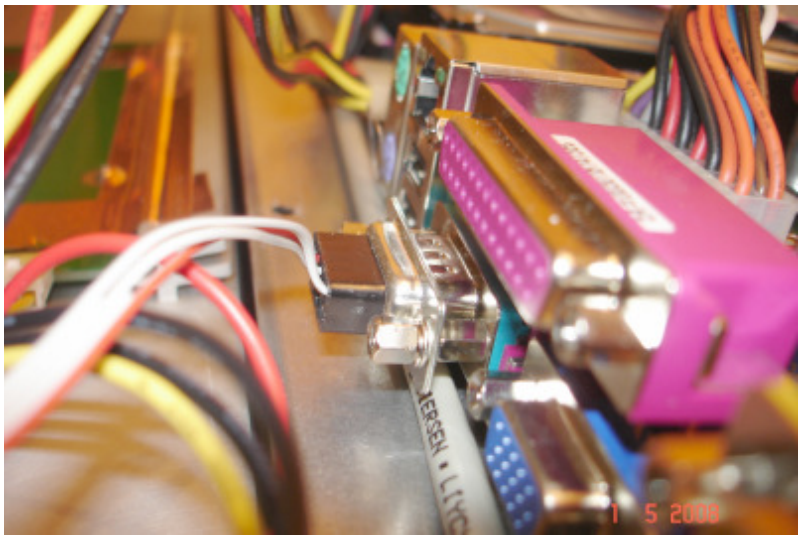
This "capacitor plague" (also known as bad capacitors) is a common premature failure. An incorrect electrolyte formula causes such capacitors to produce hydrogen gas. Based on that such capacitors often do have a bulging or deformation capacitor housing they eventual venting their electrolyte also. In such case... the remaining electronic (for example an effected main board or power supply) might no longer work as expected... and the corrosive electrolyte must be cleaned off the motherboard or PSU to prevent further damage.

Identifying such capacitors which have failed can be done by a visual inspection. If you identify such a component, you might be able to replace them... BUT you'll need access to appropriate desoldering equipment in order to extract the offending parts without further damaging of your motherboard or PSU. Just as importantly, you'll need to identify and source suitable replacements. While this isn't being easy... you need to find replacement parts like a new main board or PSU while the original parts are no longer available. So please contact an electronic service provider which might be able to solve the problems.

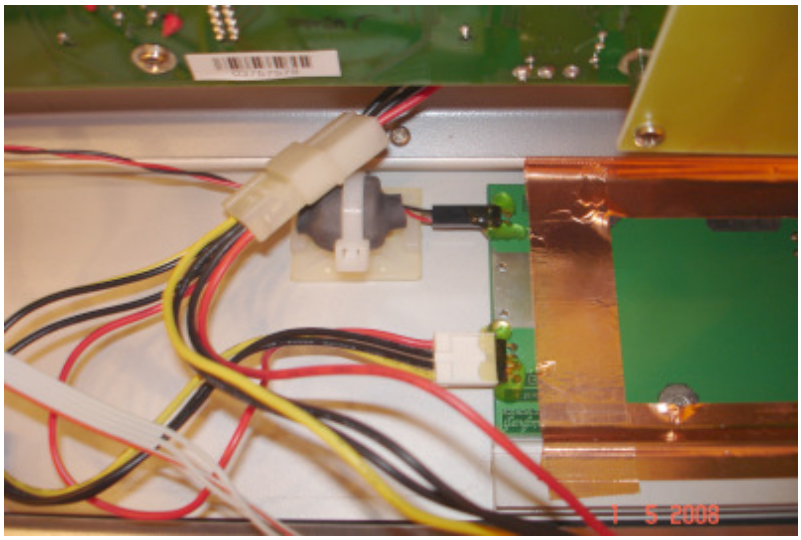
23 Other PCBs

All other installed Boards seems to be custom designs for Hartmann by Schlafhorst. I'm not aware of any documentation so far.

24 Some Pictures of the Neuron



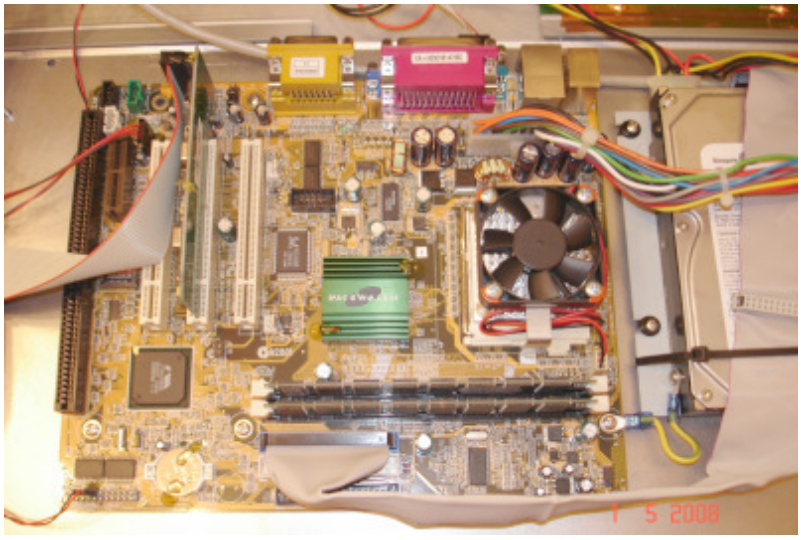
On top RS232 Connector, below VGA onboard connector



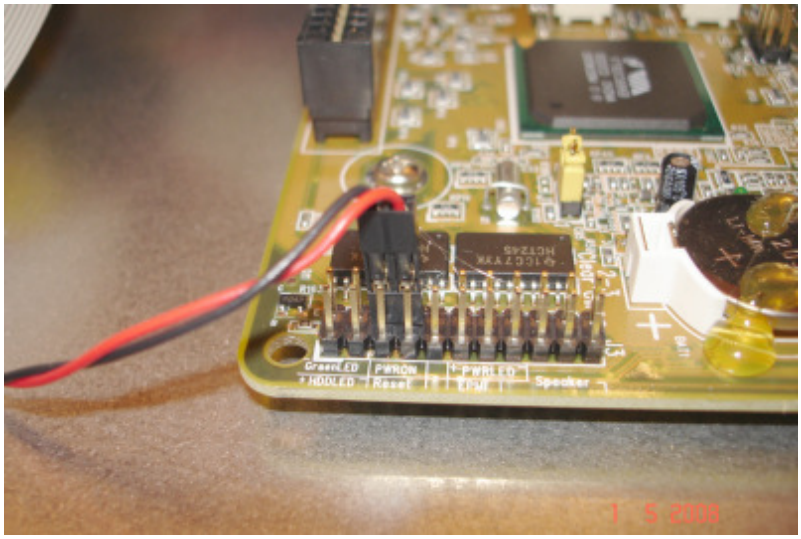
Power Switch connections



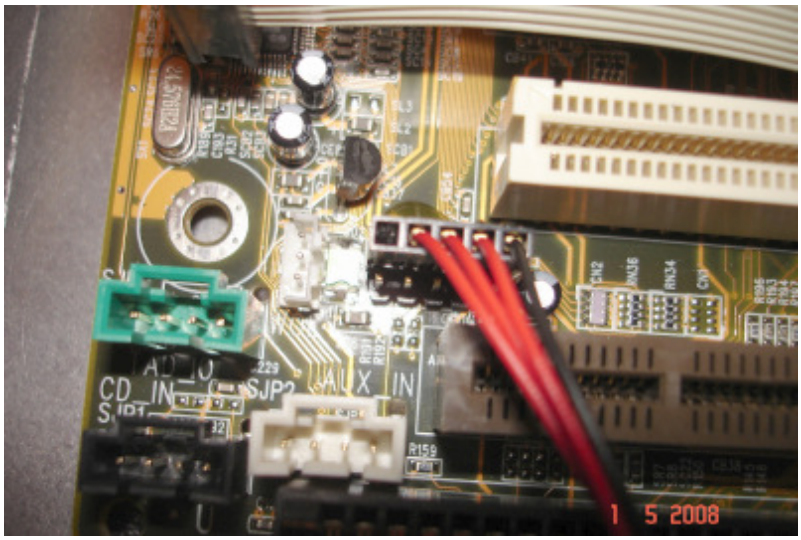
I/O Board



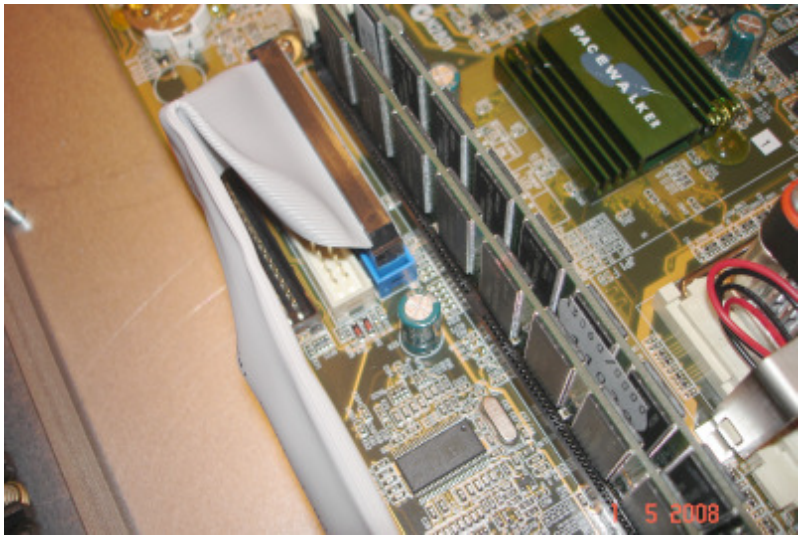
PC Board Connections (1 of 6) - Overview



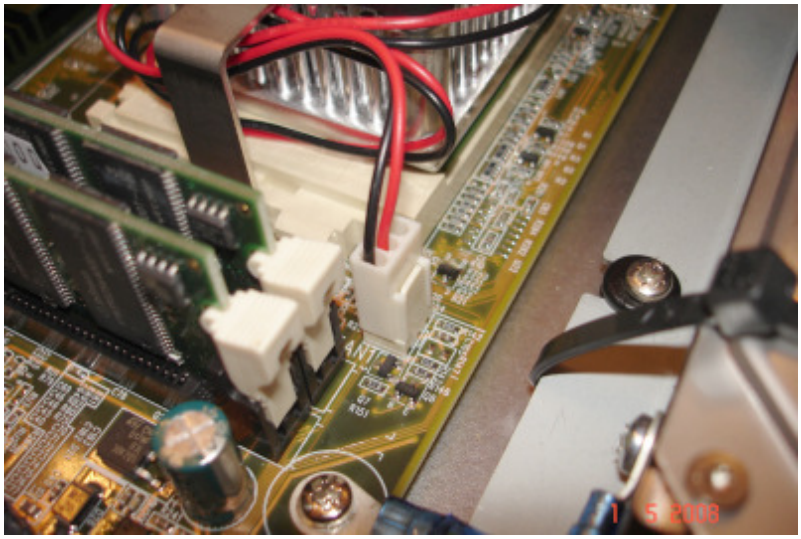
PC Board Connections (2 of 6) - Power On Cable coming from Power Switch



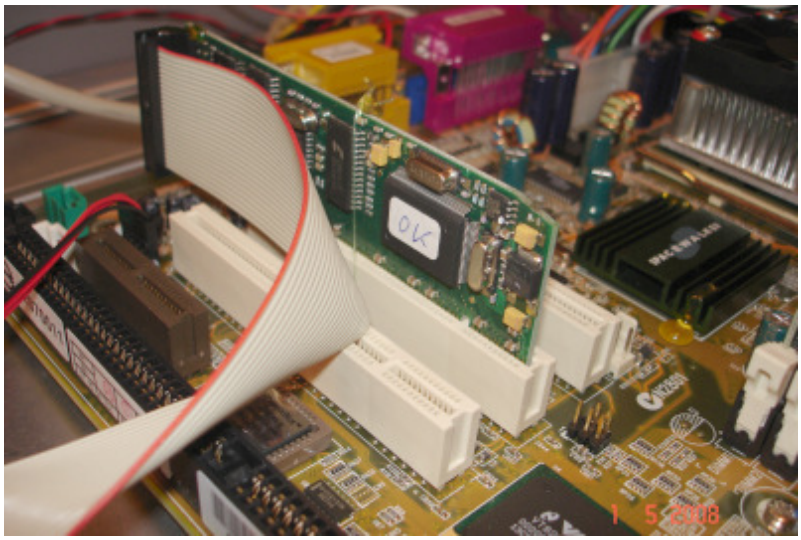
PC Board Connections (3 of 6) – Extended USB Connector 3 connected with I/O Board



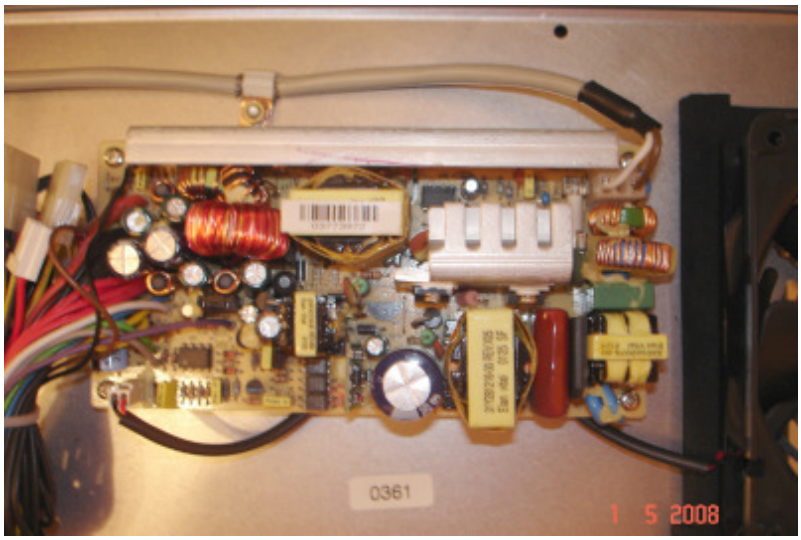
PC Board Connections (4 of 6) - Hard Drive Data cable



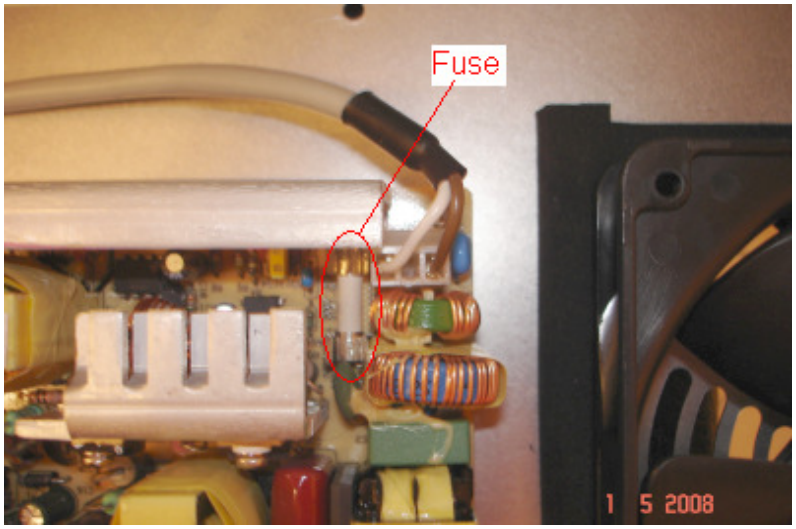
PC Board Connections (5 of 6) – CPU Fan Connector



PC Board Connections (6 of 6) – Interface card with flat cable connected to I/O Board



Power Supply – Overview



Power Supply Connections (1 of 2) – Main Power connector



Power Supply Connections (2 of 2) – Main fan connector

25 Schlafhorst Article Numbers (but no longer selling parts)

Art. Number	Description
661155028	MB-Spacewalker MV25N PLE13T µATX - Mainboard
661155062	Hard Disc 3,5" e.g. 80GB Samsung SP0842N
03811995 ?	I/O Board
03757579 ?	Left Data Entry / Display Board
03846433 ?	Right Data Entry / Display Board
03756219 ?	Controller Data Entry Board
03773972 ?	Power Supply
?	PCI Soundcard

January 2009

Schlafhorst is no longer selling parts or give support for the Neuron! While the warranty period for all shipped units is over, they are no longer required to provide support by law.

26 Some Electronic Circuits and parts

… that might fit as a replacement type

I'm not responsible for any harm, fatal injuries through electrical shock or to the destruction of your device!

If you are unfamiliar in technical aspects, please ask an authorized service (repair) centre to do the necessary tasks. This instruction is only for those who are familiar with electrical devices and appropriated repair processes.

You are warned... everything you do you do it at your own risk!!!

- **Power Supply (PSU) Fuses in case of they are blown:**
  (Based on the original thread from Neotrope; 30.05.2011 „Fuse Info for Neuron KB Power Supply PSU")

  Arcane data on the PSU circuit board reads like this for the fuse:
  EUN 1216
  EVP 2006
  T2,5AH 250V
  T4AH/250V

  These are the specification for a Ceramic tube G fuse 5 x 20 mm to IEC 60127-2 part 5, type Littelfuse 215 (G160.810)

  Spec-Sheets:
  T2,5AH/250 -> http://www.littelfuse.com/products/Fuses/5x20mm/215/021502.5.html
  T4AH/250 -> http://www.littelfuse.com/products/Fuses/5x20mm/215/0215004..html

  Sources which might be useful:

  US distributors - according Neotrope (Christopher S.)
  In the US, it looks like http://www.Newark.com stocks these.

  Better source might be (slightly higher price, but better known dealer perhaps):
  http://parts.digikey.com/1/parts/702152 ... 4-hxp.html

  German Distributor Bürklin (or similar Distributors):
  T2,5AH / 250V -> Part Nbr. 42 G 1782
  T4,0AH / 250V -> Part Nbr. 42 G 1786

  At the ends of the ceramic cylinder there are metal caps. One of the caps should show one of the above readings. So you need to replace the fuse with the same spec as previously installed at your Neuron.

- **Rotary encoders** (without push button) are available from http://www.mouser.com
  PartNumber # **EC12E24204A9**
  ALPS EC12E SERIES: 12MM INSULATED SHAFT ENCODERS
  • Rating: 0.1A @ 12VDC • Operating Life: 30,000 cycles • Incremental type

- **ALPS Multi Control Stick Controller** RKJXK Series from http://www.mouser.com
  PartNumber # **688-RKJXK122000D**
  ALPS Multi Control Stick Controller RKJXK122000D

Controller type	: Stick Controller
Resolution	: Contiguous
Rating	: 50 mA at 12 VDC
Center-Push	: No
Mounting	: PCB
Operating angle	: 60 deg
Operating Power rating	: 0.0125 W
Dimensions	: 16 mm L x 16 mm W x 12.9 mm H
High	: 12.9 mm

27 Other Information Resources

Tech Tip from adiblasi : Repaired Hartmann Neuron Synthesizer (new PSU)
YouTube: http://www.youtube.com/watch?v=WyaEii4LtyQ

Tech Tip from adiblasi : Holiday Hardware Hacking III (Hartmann Neuron)
YouTube: http://www.youtube.com/watch?v=adUFsrTpPkk

Looking for a Synthrepair Centre

Beside some links and I'm not sure if they are able to help, but it might be worth to give them a call.
- **UK** http://www.synthrepairservices.com/
- **Netherlands** http://www.synthrepair.nl/
- **Germany** http://www.synthesizerservice.de/
- **US** http://www.kurtsamps.com/

more can be found using Google entering "Synthesizer Repair" and your Country name.

In addition I found a distributor in the Netherlands selling electronic circuits and parts for a whole bunch of Vintage Synthesizer and maybe you are able to get some electronic circuits from them in case of any electronic damage:

http://www.vintageplanet.nl/semiconductors.html