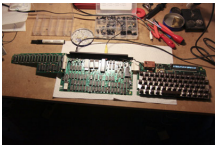
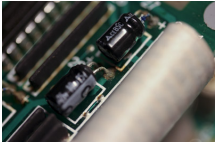
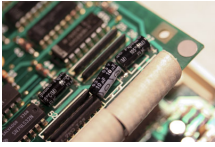
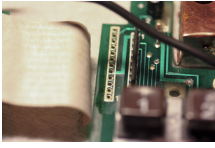
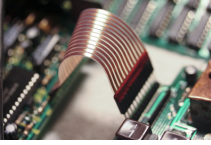
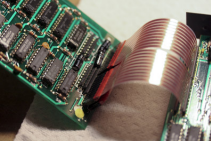
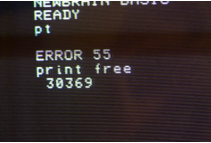
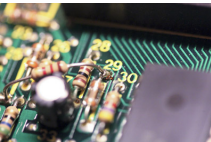
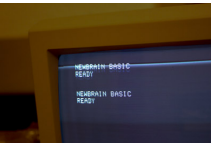
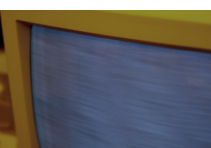
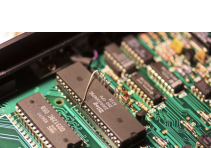


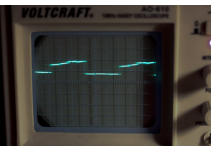
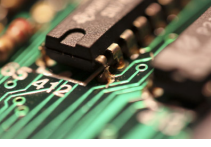
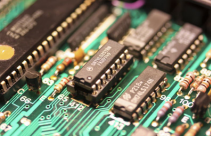
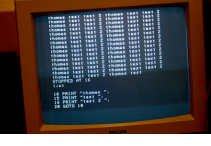
Grundy NewBrain AD Reparatur / Repair (Tradecom)

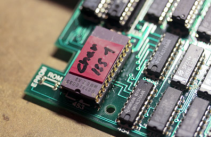
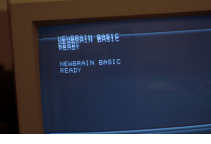
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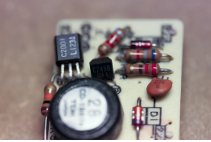
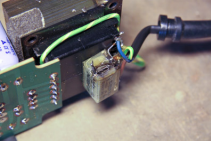
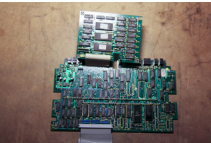
	I got this huge lot of non working Grundy Newbrain AD computers, PSUs, Expansion Interface and a few cables to repair. (Many thanks to Marteen and Albert!) The first basic check showed: • 1 dead NewBrain AD (no Display at all) • 2 NewBrain AD with no Video Display and blinking VFD Display (not booting) • 3 working powersupplies (one went "Puff" later on) • 1 Expansion Interface in unknown state
	On two NewBrain ADs i got only blinking weird characters on the Vacuum Fluorescent Display (short VFD). These two also did not boot or display a monitor image.
	So i opened the first one and spread it out on my workbench. Ramboard - Motherboard - Keyboard with VFD
	The first thing to check on vintage computers are the electrolytic capacitors! They tend to leak and corrode the boards, they also over time loose their function gradually. Here is a closeup of the 3 capacitors on the ramboard.
	I replaced the capacitors with new ones, these are a bit bigger in pysical dimension but do fit nicely.
	In order to isolate the fault, i disconnected the motherboard from the keyboard and from the ramboard.

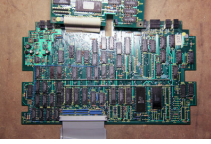
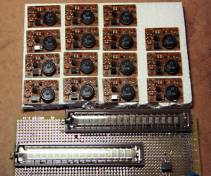
	Instead of the paper-flatwires i inserted headers to the ramboard and to the keyboard. And plastik flatcables to the motherboard.
	I connected the Keyboard to a known working Newbrain motherboard and a working ramboard. Thanks to Michael for lending me his working NewBrain AD boards and the flatcables. And HALLO! the Keyboard including the VFD is working! That means: first working Keyboard
	Then i connected the ramboard instead of the known working one and it's also working! (booting)
	To check if the whole 32k are present i simply use "print free" So: first working ramboard For the moment i left the first motherboard for later, as i wanted to check the other components i got.
	On the second motherboard, the one which was completely dead, the first inspection showed a broken solderjoint connecting the resistor to diode 29.
	After resoldering, i got a display on the monitor, but with heavy sync-problems (four times the boot prompt on 1 screen)
	But i got a perfect Display on my working VFD and full 32k of memory. So: second ramboard working!

	The second motherboard with sync problem left for later... the second keyboard showed no display on VFD left for later ...
	Third NewBrain: Again blinking characters at startup...
	and only noise on the screen...
	I connected the third keyboard to the working Newbrain and i got a display... But with a lot of missing segments!!!!
	I started checking - and behold! when i touched Pin 10 of IC 402 with the probe - all the missing segments lighted up!!!
	So i replaced the 4015 Chip - and ...
	... Third keyboard working! ... Third ramboard working!
	Next i replaced the CPU with a NOP generator to check the Addresslines. A NOP generator is simply a Z80 with all 8 Datalines connected to Ground - that causes the Z80 to process only "NOP" instructions, which means he is counting thru his addresslines. That way you get perfect square waves on all addresslines.

	That's how one of the addresslines normaly looks.
	and that's how A1 was looking!
	I followed A1 on the shematic and i found it goes from the CPU to a lot of places ... After i cut the "A1" Pin on IC 412 the Signal jumped to its normal form!
	So i replaced IC 412 (74LS257) and ...
	Third Mainboard working!
	Now i got back to the second motherboard (the one with the sync problem ...) i traced the syncsignal backwards and found a faulty 74LS393 at position 447. After replacing it (with one from the last remaining not working motherboard)...
	I got a stable picture! So: Second mainboard working!

	That left only the first motherboard and the second keyboard non working... On the motherboard i found 2 weird datalines there's only a few chips, where both datalines are connected. So i started to change chips... With the 3. Chip i got lucky! It was again IC 412 that was faulty! Now i got perfect display on the (working) keyboard, but...
	The Video display had only wrong characters! Please mark in this picture the NewBrain is using the faulty LS393 Chip hence the bad sync ... But it was Sunday and no chance to buy a new one...
	The character rom (IC 453) was getting rather warm, so i burned a new 2732 eprom with the content of a known working one...
	Here is my character rom...
	Finally the last motherboard works! After changing the LS393 (on monday) also with perfect sync.
	Now for the last keyboard (no VFD Display). I measured around the little converterboard, and found input-voltage but no output-voltage...
	Backside of the converterboard.

	Then i went on a search thru the internet and found something very curios! The TDK CD-1867N is not the converter you should use for the VFD used in the NewBrain!!!! That´s why the servicemanual asks you to do the patch with the zenerdiode and the resistor as the CD-1867N has too high outputvoltage! They used the wrong part! The right part for the NewBrain VFD (NEC FIP16A5R) is a TDK CD-1683N!!!!!! I managed to find a nice guy who sold me 10 converters and two VFDs. Now i am waiting for them to arrive.
	While i am waiting, i cleaned the cases. Here are the three cases after carefull cleaning in my bathtub.
	First working Grundy NewBrain AD. :-)
	Second working Grundy NewBrain AD. :-) :-)
	One of the PSUs made a loud noise and produced smoke and an awfull smell. The mains-filter-capacitor had exploded! I replaced it and now all three PSUs are working
	When i connect the expansion interface, the NewBrain is not booting ... Will work on it later ...

	64kb ram and roms.
	A lot of logic-chips and many small blue patchwires...
	Expansion Interface Label
	Examining the Expansion Interface, i found the flatribbon cable broken! (near the red line). After replacing it with an old SCSI cable...
	The NewBrain was booting!!!! PRINT FREE showed 40881 bytes free, so i think it is working!
	Today the replacement converters arrived! Many thanks to Steffen! Now i have plenty of replacement parts! If you are in need of such a converter => just send me an e-mail! i will send you one for little more than postage costs ... PS: These are the matching converters for the NEC FIP! I also received 2 replacement FIPs...



Replacement converter soldered in.
(HALLO WORLD Program is running!)



Here is a closeup of the converter.



So: Third and final NewBrain AD as good as new!
Work completed.