

A blurry photograph of a Toshiba laptop. The laptop is the central focus, with a bright light reflecting off the keyboard area. The background is dark and out of focus, showing some cables and a desk surface. The text is overlaid in a bright green, bold, sans-serif font.

Dumping and Copying Toshiba T3200SX BIOS

Preface

These instructions assume the use of a T3200SX portable computer and a TL866 Programmer. They also assume that the reader has a reasonable technical knowledge and is comfortable working with computers, both hardware and software, as well as Microsoft Windows.

If you are only dumping the BIOS, only writing a new one or something else the instructions can probably be used in this manner by skipping or re-arranging certain steps.

I will not be held responsible for any damage, loss of data or otherwise that may occur from following these instructions...

1: Open the case

Ensure that the power is disconnected before opening the computer. Place the computer on a good surface and turn it upside down carefully. Locate the four screws near the front of the casing – two of them are by the carry handle – note Fig. 1.

Once these screws are removed, place them somewhere safe and turn over the computer so it is the correct way up. Lift up the screen and ensure that it is not likely to fall closed whilst you are working.

Carefully lift the keyboard up at the front, see Fig. 2, but be weary of the ribbon cable. These can be brittle and are liable to snap inside if abused. Try to keep the ribbon relatively straight.



Place the keyboard carefully near the front of the machine, not so close that it kinks the ribbon but not so far that it stretches it.

Now remove the two screws holding the metal shield in place – See Fig. 3 - Be careful not to lose them in the machine as the previous owner had done with mine. This shield is lifted upward and forward gently, it should easily move away. See Fig. 4.



2: Remove the Chip

The BIOS EPROM is located near the FPU socket – Fig. 5 – it should be labelled **XX27C1024-NN** where XX is a manufacturer code and NN is the latency. Mine is a HN27C1024-85 which implies that it was made by Hitachi and has a latency of 85ms, chips with values of -10 or -12 would have latencies of 100ms and 120ms respectively.

In an ideal world you would now use a chip puller to extract the chip as in Fig. 6, however, most are too short or have prongs that are not pronounced enough to grab hold of the chip properly. If you are using a chip puller, grip it evenly and pull lightly and evenly on the chip, rock it side to side gently if it remains stuck – do not yank the chip puller as this may stress the legs excessively and snap them off which is *not* good news.



Fig. 5

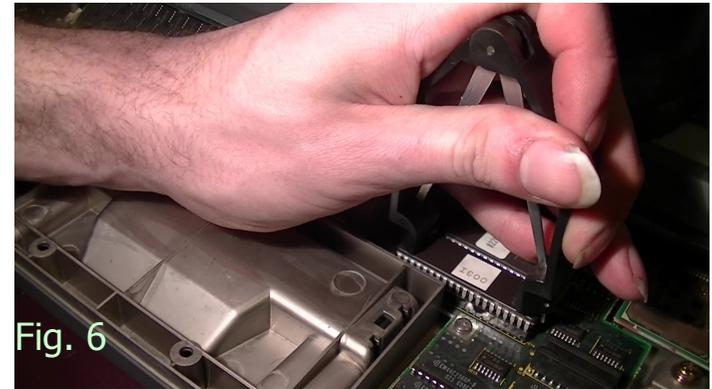
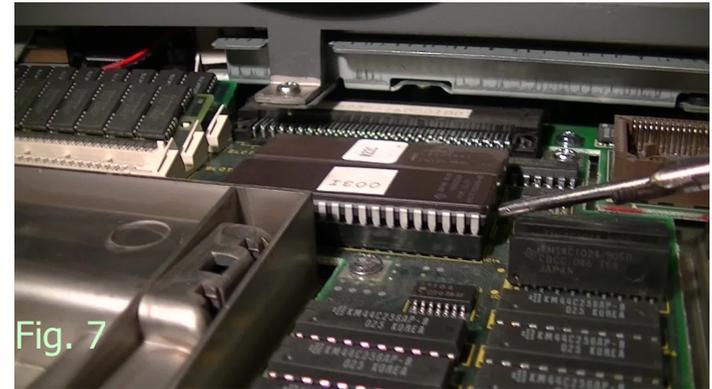


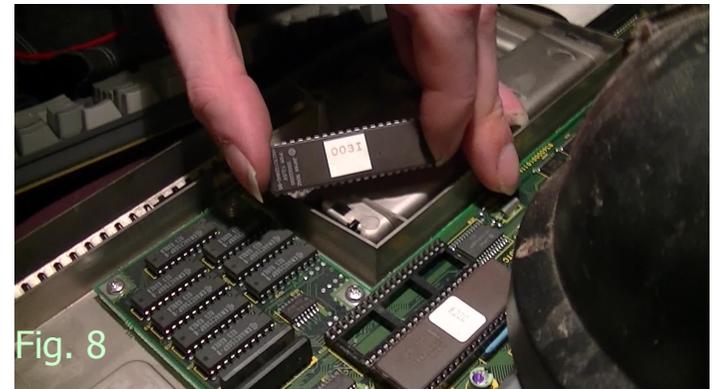
Fig. 6

If a chip puller is not appropriate you can always wedge the chip out carefully. To do this you need a flat object, in Fig. 7 I am using a flat screwdriver. Place this so the tip is between the chip and its socket – be careful. Gently lift this side of the chip a little by levering the flat object against the socket and repeat this process on the other side. Repeat as necessary until the chip is loose enough to remove by hand. Be careful not to touch the legs any more than necessary.

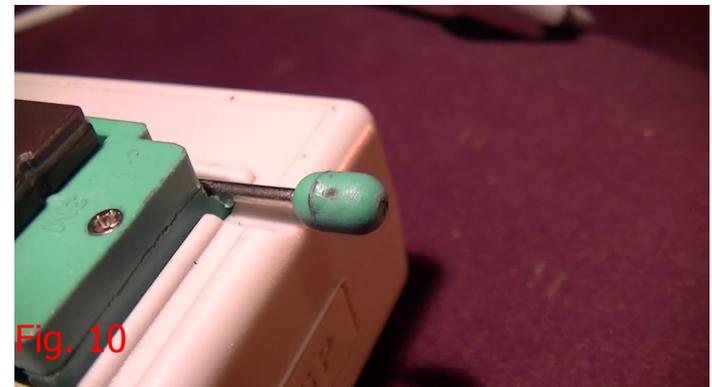


In Fig. 8 you can see that the chip was successfully removed. Note how the label covering the quartz window has the revision of the BIOS written on it. The picture shows 003I here.

Do not remove this label.



Hook the Programmer up to your [modern] computer and load the software for it. You can insert the chip now if you want to, make sure the lever is in the up position and that you abide by the **notch** in the chip which designates **Pin 1**, my programmer shows that this notch should be at the end where the lever is and the chip should always be closest to this end – though being a 40-Pin programmer this 40-Pin chip doesn't leave any choice there – once the chip is inserted into the programmer, **push the lever down** as in Fig 10.



3: Dump the ROM

Sometimes the TL866 software will ask you to re-flash the firmware before use. This is trivial and can be found in the **Tools** menu.

If this should happen you should **remove the chip** (if it is already in the programmer) and select this option. The programmer firmware will update and when it is done you can re-insert the chip as described previously.

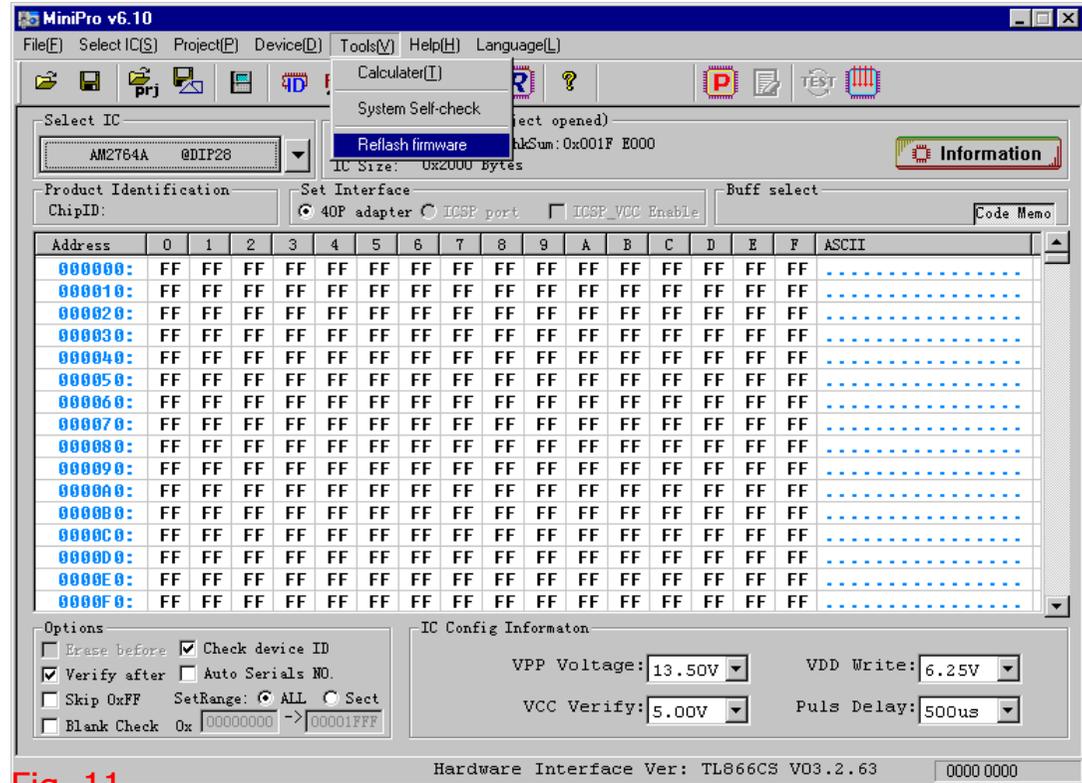
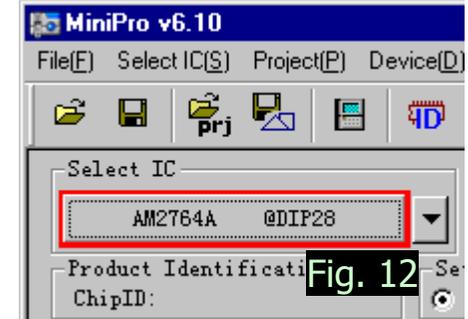
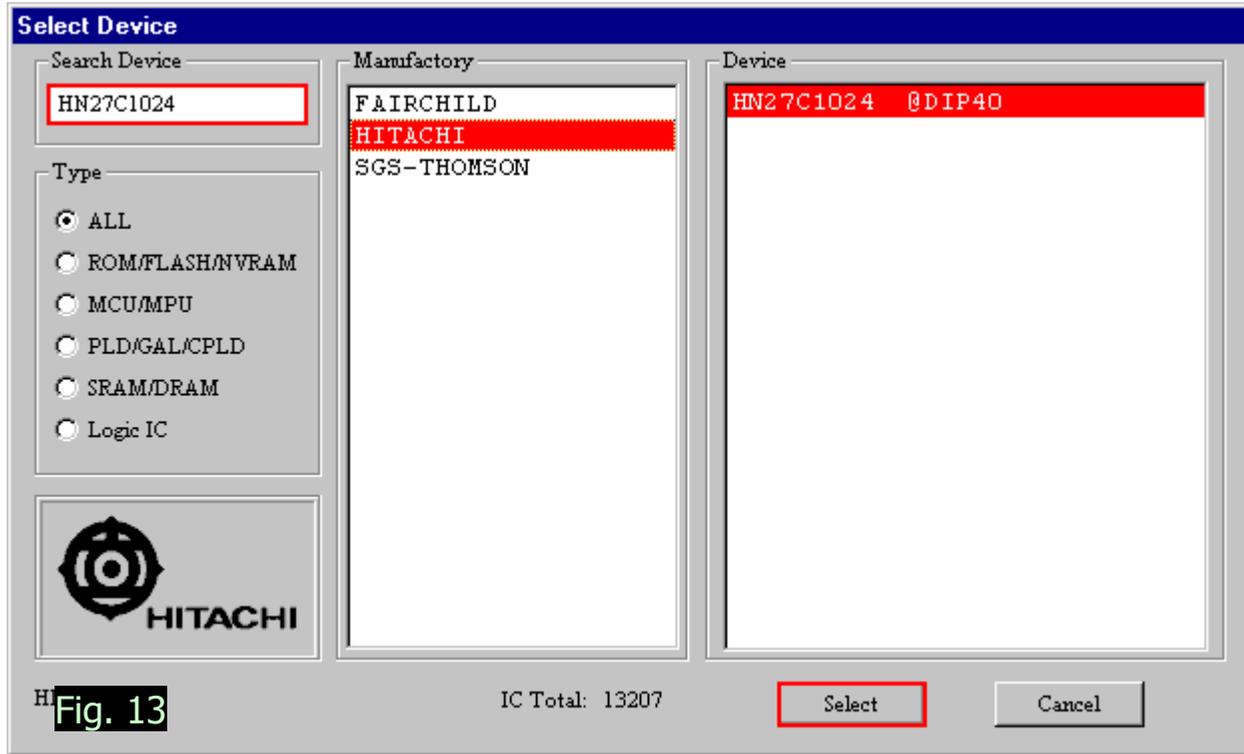


Fig. 11

Next you must select the chip type that you are using. Do that by clicking below "**Select IC**" – see Fig. 12 - this will open up a new window as in Fig. 13, you needn't go through the list, simply type **27C1024** into the search box and it should find several. You need to select the correct manufacturer for your chip but if it is not available in the list, select one of the others as it should be a compatible chip provided the numbers are the same.



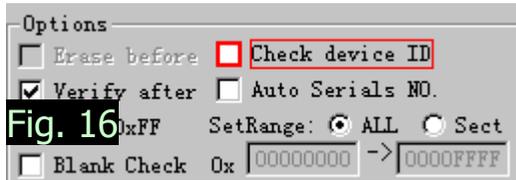
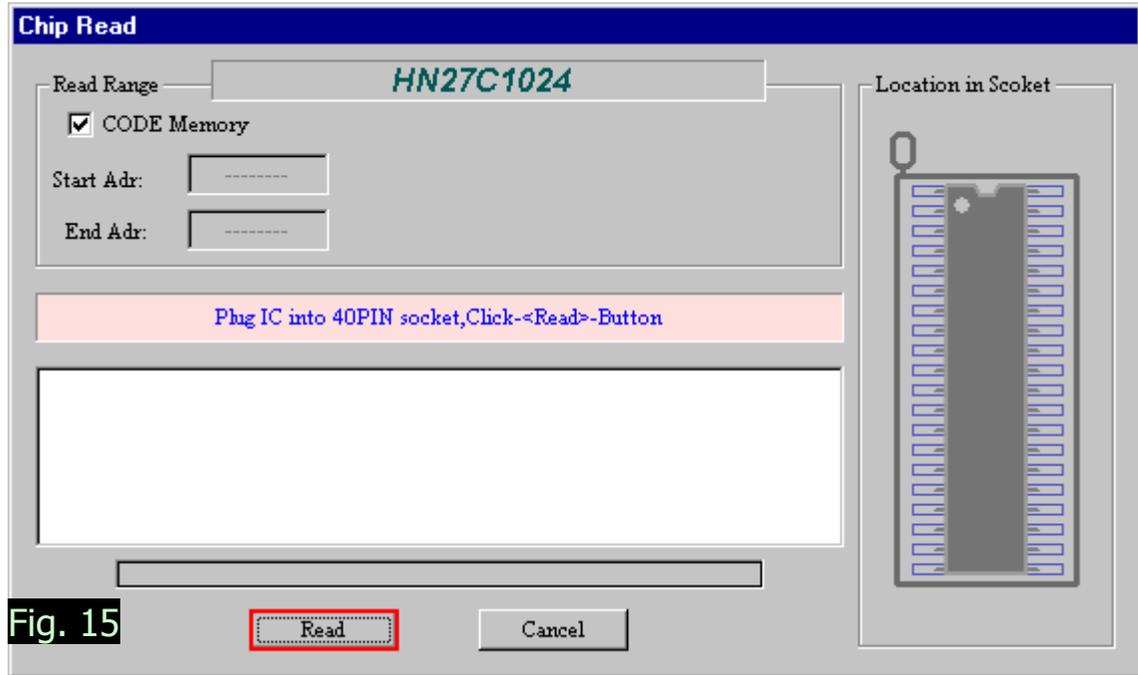


Hi **Fig. 13**

Once the chip type is selected you may proceed to Read the data from the chip by pressing the **“Read”** button on the toolbar, see Fig. 14.



This will bring up the dialog displayed in Fig. 15, press **Read** and the chip should be read into the machine. If this process fails check it is seated correctly, make sure you have the correct type selected and make corrections if necessary. If you had to select a different manufacturer then you will need to untick the **“Check device ID”** checkbox at the lower left before opening this dialog.



If that does not work, I am beyond any real ability to help in these instructions. However, the read should go ahead and you should end up with a success message at which point you can close the dialog box. You should have something that looks like Fig. 17. Interestingly it appears that the video BIOS is also contained in this chip and is the first thing in the ROM; BIMBCP... etc... is *IBM COMPATIBLE Phoenix Advanced Video BIOS Version Copyright (C) 1984-1989 Phoenix Technologies Ltd.* With Endian reversed.

I recommend doing a **Verify** next to make sure the chip was dumped correctly: Fig. 18.



Fig. 17

MiniPro v6.10
 File(F) Select IC(S) Project(P) Device(D) Tools(V) Help(H) Language(L)

Select IC: MN27C1024 @DIP40
 IC Information (No Project opened)
 ChipType: EEPROM ChkSum: 0x00E0 4800
 IC Size: 0x10000 Words

Product Identification
 ChipID: []
 Set Interface: 40P adapter ICSP port ICSP_VCC Enable
 Buff select: [] Code Memo: []

Address	0/8	1/9	2/A	3/B	4/C	5/D	6/E	7/F	ASCII
000000:	AA55	E940	00CE	5248	5347	0000	0000	0000	.U.@..RHSG.....
000008:	0000	0000	0000	0000	0000	0000	0000	4249BI
000010:	2040	4F43	5040	5441	4249	454C	500A	6F68	MOCPTABIELP.oh
000018:	6E65	7869	4120	7664	6E61	6563	2064	6956	nexia vdnaec diU
000020:	6564	206F	4942	534F	5620	7265	6973	6E6F	ed oIBSOV reiso
000028:	0020	0A0D	6F43	7970	6972	6867	2074	4328	...oCypirhg tC(
000030:	2029	3931	3438	312D	3839	2039	6850	656F)91481-89 9hPeo
000038:	696E	2078	6554	6863	6F6E	6F6C	6967	7365	in xelthconoligse
000040:	4C20	6474	0D2E	410A	6C6C	5220	6769	7468	L dt..A.l1R gith
000048:	2073	6552	6573	7672	6465	0A0D	000A	0677	seResurde.....w
000050:	C000	0000	0000	0000	0000	0000	0000	000A
000058:	C000	0000	0000	0000	0000	001A	056A	C000j..
000060:	0000	0000	0000	0000	0000	0000	0000	0000
000068:	0000	0000	FA9C	ED33	C033	D88E	06C7	00403.3.....@
000070:	058E	0E8C	0042	06C7	01B4	0591	0E8C	01B6B.....
000078:	06C7	0108	F065	06C7	010A	F000	06C7	010Ce.....

Options:
 Erase before Check device ID
 Verify after Auto Serials NO.
 Skip OxFF SetRange: ALL Sect

IC Config Informaton
 VPP Voltage: 13.50V VDD Write: 5.50V
 VCC Verify: 5.00V Puls Delay: 100us

check Ox: 00000000 -> 0000FFFF

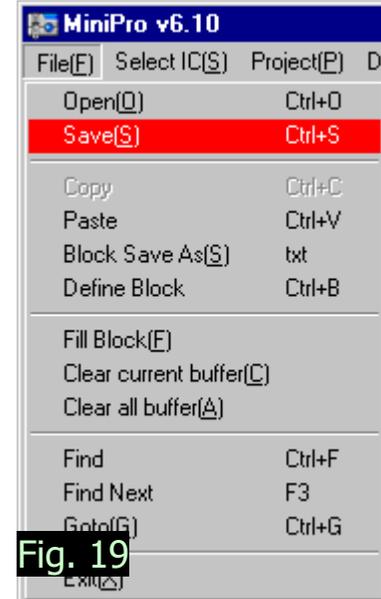
Ready Hardware Interface Ver: TL866CS V03.2.63 0000 0000

Now **Save** the ROM to a file on your hard drive in case you need it later. If you are making a copy you will want it later to do that. Congratulations, the ROM is now dumped and can be copied to whatever you want to copy it to... Presumably the same type of chip for another T3200SX as I suspect it's uses may be limited outside of that.

Chances are you can remove the chip by now. However, note that whenever the chip is in use, the **RUN LED** will illuminate on the Programmer as it is in Fig. 20. **NEVER** remove the chip or disconnect the Programmer when this LED is lit if you can help it as it is liable to break something.



Fig. 20



4: Copy the ROM

This process is not vastly dissimilar to the process of dumping the chip. Firstly you need to take a new chip of the same type, if it's a different manufacturer remember to correct this in the "**Select IC**" dialog or uncheck the "**Check device ID**" checkbox. Note how the chips have their quartz windows exposed. This will be explained later.



All you have to do is select the IC, load the ROM you dumped and press the "**Program**" button, which appears as  on the toolbar. This dialog behaves much the same as the "**Read**" dialog does.

You can also use the **Verify** button again to check the chip. Please note that you had better be sure you want to write to the EPROM before you do so, the chip is not electronically erasable.

5: Re-install chip

Whether you are using the original chip or installing a new one, you must now return to the T3200SX.

If you have written a new chip you may first want to tape over the quartz window to prevent accidental erasure of the EPROM, whilst indoor lighting generally doesn't output much if any UVC and will not erase the chip, sunlight or other sources can have an effect. Foil tape is best but any will do.

Make a note of where the notch should be, in my system it faces towards the SIMM slots. Press **evenly** and **gently** to guide the chip into the socket. You may have to push the edges of the chip against the top of your desk to bend the pins inwards a little so they fit in the socket properly. Be sure that no pins are bending or escaping over the edges.

The chip should insert relatively easily.



6: Other information?

Reading the chip is pretty safe, especially given that it cannot be electronically erased and the laptop already does this every time you power it up.

If you write a chip incorrectly or have to erase one you bought you will need a UVC lamp, you can also buy a specific EPROM eraser which usually just has a drawer with a germicidal lamp attached to a timer... Never look at the light from a UVC bulb as it can cause damage to your eyes, even blindness. Most EPROMS take 5-10 minutes to erase, if they don't, you can put them back in. The TL866 software has a "Blank Check" feature which will check that the chip is blank. Make sure the window is very clean before trying to erase a chip. You might have to re-orient the chip under the UVC light source to let it erase properly if there is dirt or a defect in the window that prevents the light from erasing certain Bits.

You can buy OTP versions of the 27C1024 which do not have the quartz window. These chips can not be erased, hence OTP which means "One-Time-Programmable", if you make a mistake with these you will have to buy a new one. I recommend using erasable versions until you know your copy of the ROM is good.

Observe the latency; try to get chips of the same or better than yours. Less latency is better. 85ms is what Toshiba went with.

These instructions are only a general guide and they expect a reasonable technical knowledge is possessed by the person trying to carry them out. They are probably shoddily written as I tried to kill two birds with one stone.

These instructions were written in Office 97 using a Toshiba Satellite Pro 410CDT with a Pentium 90MHz, 40MB of RAM and a 1.6GB hard drive running Windows 95. The conversion to PDF was done using a Dell XPS that was recalled for setting fire which I don't like so much...

