REAL WORLD INTERFACES

Hardware and Software — Design and Consulting

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Installation instructions for the M32S3 32 Megabyte memory board in the Akai S3000 or S3200

Please call me if you have any doubts about how to proceed.
See separate, more complex, instructions for the S2800, and CD3000.

Robin Whittle

Specifications

This memory board replaces all existing memory boards and behaves *exactly* like four Akai 8 Megabyte memory boards. The existing board or boards in the sampler are not needed and cannot be used with the new board – so you can use them in another sampler or sell them. This includes any ROM boards, for instance those containing fixed piano samples.

32 Megabytes provides around **three minutes and 8 seconds of stereo sampling at 44.1 kHz** or **six minutes and 16 seconds of mono**. The exact time depends on the relatively small amount of memory which may be taken by the sampler's operating system software for its own operations. 32 Megabytes is 16 megawords. This is exactly 16,777,216 words. At 44,100 samples per second, this is 380.436 seconds, or three minutes and ten seconds of stereo.

Warranty

The warranty is 1 year, or 5 years if the board is operated at temperatures no higher than 70°C (158 Fahrenheit).

I am concerned that some samplers are installed in crowded racks with little or no ventilation – causing extremely high temperatures to develop inside the equipment. This greatly accelerates electrical and chemical processes which cause the breakdown of semiconductors and other components.

There's nothing particularly temperature-sensitive about these boards, but commercial electronic devices are specified to operate between 0 and 70°C. Temperatures over 70°C are excessive, unnecessary and will significantly diminish the lifetime of all electronic components. Whether or not you use these memory boards, please ensure adequate ventilation for all your equipment in crowded racks!

Real World Interfaces will repair or replace the faulty board. The customer will be generally be responsible for transport costs regarding warranty repairs. Replacement or repair will only be contemplated after the customer makes a full fault report and works with *Real World Interfaces* to resolve all other possible sources of trouble. The customer is responsible for the installation being carried out by a suitably qualified electronic technician – someone who takes responsibility for their work.

If you have any problems, please contact *Real World Interfaces* via email at rw@firstpr.com.au. This is a permanent email address, and the permanent World Wide Web address is http://www.firstpr.com.au/rwi/ Phone or mail contact details are at the top of this page – but they are not as permanent as the email and web addresses. Please remember that Melbourne time is 10 hours before UK time and 15 to 18 hours before North American time.

Akai information on the Net

For the latest information, including details of Akai sampler mailing lists, FAQs etc. please see: http://www.firstpr.com.au/rwi/smem/ .

0 – Who should install the board?

The procedure for installing the M32S3 board in an S3000 or S3200 is straightforward. If it wasn't for static electricity and other possibilities for damaging the memory board and/or the Akai sampler, then almost anyone could do it.

Since static electricity is such a problem, you really should get a competent electronic technician to install the board. If the technician is not familiar with this particular kind of Akai sampler, then the owner should be present to assist in the final testing of the machine.

Although you only need a screwdriver and a shifting spanner to do this installation – you are working on some delicate and expensive machinery. You must be prepared to take responsibility for whatever havoc you may accidentally wreak.

This board should be installed by an electronic technician who is competent and experienced with computer and/or MIDI electronic musical equipment. If the technician is not familiar with this particular kind of Akai sampler, then the owner should be present to assist in the final testing of the machine.

If you are not an electronic technician, and are considering doing the job yourself, consider the following questions:

1 - Do you already own a soldering iron, multimeter and relevant hand-tools?

2 - Do you have, or have access to, a 50 MHz oscilloscope and know how to use it?

3 - Do you understand the internal operation of MIDI and microcomputer equipment?

4 - Are you prepared to take responsibility for everything that happens to the memory board and the Akai sampler, and for your own safety and that of others?

5 - Did you *already* know that it is very easy to develop a static charge of thousands or tens of thousands of volts, and without realising it, cause this charge to connect with one or more circuit tracks in a piece of equipment, leaving permanent and intermittent damage to one or many integrated circuits, and that such damage is likely to cost up to a thousand dollars to fix in a machine (such as the Akai S3000/S3200) with surface-mount custom LSIs?

If you cannot truthfully answer "yes" to all these questions – then get an electronic technician who can answer "yes" to all these questions to do the installation.

1 – Dismantling

Unplug the power lead from the back panel. Don't connect a power cord to the machine when its cover is open – since there are exposed 240 / 110 volt connections in the power supply which could cause injury or death if you touched them when power was applied. *Never rely on simply turning off the power on the front-panel, or at the power outlet – you may not be turning off the active line. Be sure to unplug the power cord from the rear panel of the machine*

Remove the top cover of the S3000/S3200 so you can see inside the machine. You will have one, two, three or four memory boards – small boards with four "ZIP" vertically mounted chips and one 20 pin chip. These boards will be plugged into connectors called J105, J104, J103 and J102.

Take precautions to avoid static electricity – which may seriously damage the electronics of your sampler or memory board. Always touch the metal chassis of the machine before touching any electronics.

Remove the existing memory boards. These boards cannot be used when the *Real World Interfaces* 32 Megabyte board is installed. The S2800/CD3000/S3000/S32000 cannot access more than 32 Megabytes. This means you can use the old boards in another machine, or sell them.

There are two screws holding the main printed circuit board of the S3000 and the S3200 to the chassis – located in front of and behind J104. Use a Philips head screwdriver to remove these. These screws are not needed any more.

2 – Installation

The 32 Megabyte memory board plugs into J105 and J103 with full 68 pin connectors. This gives access to almost all the control, address and data signals needed by memory boards. It also gives access to the individual board-select signal on pin 1 of J105 and J103. Smaller, six-pin, connectors are used for J104 and J102. Only one pin is active – pin 1 – which provides the board select signal for the memory boards which would normally be plugged into these connectors.

These six-pin connectors are relatively fragile. Take the memory board out of its static-protective bag and remove the packaging which protects the six-pin connectors. Carefully inspect these connectors and the pins in the 68 pin connectors to make sure they are straight.

The new memory board mounts horizontally – differently from the vertical mounting of the original memory boards. To hold the board in place, two spacers are screwed into the holes on either end of J104. Then the board is installed and two screws hold the board to the spacers.

The memory board is supplied with two spacers, two screws and four fibre washers. In addition some wires are also supplied which are not needed for the S3000 or S3200 installation: Yellow and Blue wires, and short bare wire. These are supplied for installation in the S2800 and CD3000.

Install the two spacers, in the two holes at either end of J104 – using a fibre washer between the spacer and the printed circuit board. Use a shifting spanner to tighten the spacers reasonably firmly. Take special care that whatever tool you use does not scratch any little pieces of metal from the spacers. The Akai board has many finely spaced pins on many of its integrated circuits – and a tiny scrap of metal could cause havoc with them.

Now it is time to insert the memory board in the J105, J104, J103 and J102 sockets. This is pretty straightforward, but please do it gently. These connectors have very fine pins, and rough installation could damage them permanently. Place the board gently on the connectors. You should be able to feel by wiggling it that the connectors have started to mate.

You should also be able to see that the board is correctly located by the two mounting holes in the memory board lining up almost exactly with the spacers you have just installed.

Now, with both hands, smoothly press the board into place. This may take some pressure – there are two 68 pin connectors being fitted together. Try to make the board go down evenly, rather than one side or one end at a time.

When board is in position, use the two screws and two fibre washers provided to hold it in place properly. Tighten the screws moderately – not too firmly.

Now turn the machine upside down and shake out any debris from the preceding operations. There shouldn't be, but it is best to guard against lost screws or other things.

Replace the top cover of the machine and reconnect the power cord.

4 – Testing the new memory system

Power the machine up. It should report that there are 16 Megawords of memory. A word is a 16 bit sample – and 16 bits is 2 bytes. So 32 Megabytes is 16 Megawords.

If the display does not report 16 Megawords with the new memory board, or if the memory test below fails, then contact Real World Interfaces to report the problem. Before doing so, re-install your original memory boards and perform the memory test on them.

Ten seconds after the power is turned on, the machine should be ready to operate normally. Its time to test the memory:

Perform the following front panel operation to start the memory test:

Press and hold the "MARK" button.
While holding it, press the "NAME" button too.
Release both these buttons.
Press the "+" button and then release it.

This will start the memory test operation – which takes just over five minutes to completely test the memory. The software will report its progress as it tests each of the four boards which it thinks are there. (The 32 Megabyte board behaves *exactly* the same as four 8 Megabyte boards.)

The memory test operation takes about four and a half minutes to test the four boards and another minute before it writes the final "Press F8 to continue" line. When the test is successfully completed, your screen should show:

```
Testing Memory
slot1..testing 4M DRAM...okay
slot2..testing 4M DRAM...okay
slot3..testing 4M DRAM...okay
slot4..testing 4M DRAM...okay
     Press F8 to continue
```

(Early versions of the Akai software display a changing number during testing, and this number remains on the screen just before the "okay" message.)

If the four "boards" test out OK then all is well. Contact Real World Interfaces if there is any difficulty.

When the test is finished, turn the power off, and on again.

Now you should be able to load and play long samples from hard-disk – or record from an external audio source.

Potential problem with loading whilst playing

On the CD3000 with V2.0 software, and possibly on the S2800, S3000 and S3200, loading samples whilst playing the machine from MIDI can lead to erratic operation and may cause the operating system to crash. This may only occur when most of the memory is in use – so yo may not have experienced this when your sampler had less than 32 Megabytes of memory. This is a problem with the operating system, not with the Real World Interfaces memory card.